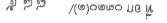


លើកកម្ពស់ស្ថានភាពជីវភាពរស់នៅរបស់ប្រជាជនក្នុងតំបន់កំពង់ចាម ក្នុងរយៈពេល ៥ ឆ្នាំ ឆ្លងកាត់ ឆ្នាំ ២០២០ ដោយស្របតាមផែនការយុទ្ធសាស្ត្រកម្ពុជា ២០៣០ ។



ՀԱՅԱՍՏԱՆԻ ԴԵՄՈՔՐԱՏԻԿԱՆ ՀԱՅՏԱՆԻԿԱԿԱՆ ԴՐՈՒՄՆԵՐԻ ՄԱՍԻՆ



...စွဲလေ့ရှိသည်။

សេចក្តី ៖ ក្រសួង ស្ថាប័ន ពាក់ព័ន្ធនានា ត្រូវ អនុវត្ត តាម កិច្ចសន្យា

ELUATE 1. REPLENISH

คณะผู้บริหารและบุคลากรที่เกี่ยวข้องกับการดำเนินงานของศูนย์ฯ ได้มีการประชุม

[illegible]

ଉତ୍କଳପ୍ରଦେଶ

คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงสมุดผลการ และชนิดสารเคมีของห้องปฏิบัติการวิเคราะห์เอกชน

วันที่ 27 เดือน ตุลาคม พ.ศ. 2566

ข้าพเจ้า () ผู้รับใบอนุญาต
(✓) บริษัท/ห้าง
ตั้งอยู่ที่เลขที่..... 14/5358หมู่ที่.....
ถนน..... บางบัวทอง.....
อำเภอ/เขต..... 02-045-2446-7
โทรศัพท์
ได้รับทราบระเบียบกรมโรงงานอุตสาหกรรมว่า
ตามระเบียบจากประการ และได้แนบบเอกสาร

รายการขอดำเนินการ

| รายละเอียด(รายการ) | | | | |
|--|--|-----------|---|----------------------------------|
| การดำเนินการ | น้ำเสีย/น้ำทิ้ง | น้ำใต้ดิน | อากาศเสีย | สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว |
| [] ขอขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน | | | | |
| [✓] ต่ออายุห้องปฏิบัติการวิเคราะห์เอกชน | 1. Biochemical Oxygen Demand 2. Chemical Oxygen Demand 3. Free Chlorine 4. Hexavalent Chromium 5. Oil & Grease 6. pH 7. Sulfide 8. Suspended Solids 9. Temperature 10. Total Dissolved Solids | pH | 1. Hydrogen Sulfide 2. Oxides of Nitrogen 3. Sulfur Dioxide 4. Sulfuric Acid 5. Total Suspended Particulate 6. Opacity 7. Xylene 8. Cresol 9. Carbon Monoxide | pH |
| [✓] เปลี่ยนแปลงสารเคมีที่ใช้วิเคราะห์ (✓) เพิ่มสารเคมี () ยกเลิกสารเคมี | 1. Color(ADMI) | | | |
| [✓] เปลี่ยนแปลงบุคลากร (✓) เพิ่มบุคลากร (✓) ยกเลิกบุคลากร | จำนวน 11 ราย (รายละเอียดตาม แบบ ปว.1) จำนวน 6 ราย (รายละเอียดตาม แบบ ปว.1-1) | | | |
| [] ยกเลิกห้องปฏิบัติการวิเคราะห์เอกชน | | | | |

[] ว่าง / ไม่ทราบ.....

วันที่.....

เพื่อ

วิภา

ผู้ว่า

F

ขอสงวนสิทธิ์ในข้อมูลนี้



กรมส่งเสริมการค้าระหว่างประเทศ
กระทรวงพาณิชย์
เลขที่.....
ถนน.....
กรุงเทพฯ 10110

นางสาว.....
ตำแหน่ง.....
โทรศัพท์.....
โทรสาร.....
แฟกซ์.....
อีเมล.....

นางสาว.....
ตำแหน่ง.....
โทรศัพท์.....
โทรสาร.....
แฟกซ์.....
อีเมล.....

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อีเมล.....

นางสาว.....
ตำแหน่ง.....
โทรศัพท์.....
โทรสาร.....
แฟกซ์.....
อีเมล.....



ស្ថាប័នទាំងនេះ
កំពុងរកស្វែង
មេបង្កើនស្តុក

—LUMINUM (O)

[illegible]

០០២០២ ឈរនៅលើ ឧបករណ៍
ស្របច្បាប់ ១ អត្ថបទសរសេរ
រួចបញ្ជូនទៅក្រុមប្រឹក្សា



ಶ್ರೀ ೧೦೦೦ (೧೦)೦೦೦೦ ೫೫ ೫

www.ijm.eg

การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๑. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๒. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๓. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๔. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๕. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๖. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๗. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๘. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๙. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒
 ๑๐. การดำเนินงานตามแผนปฏิบัติการประจำปี ๒๕๖๒

[illegible]

กรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์
กรมส่งเสริมการค้าระหว่างประเทศ
117, 118 ถนนวิภาวดีรังสิต แขวงจตุจักร เขตจตุจักร กรุงเทพมหานคร 10900
โทรศัพท์ 0-2606-1000 โทรสาร 0-2606-1001
E-mail: info@tradepromote.go.th, trade@tradepromote.go.th

| ลำดับ | ชื่อสาร | วิธีการวิเคราะห์ |
|-------|---------------------------|--|
| 1 | Arsenic | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ²¹ |
| 2 | Barium | Digestion, Direct Nitrous Oxide-Acetylene Flame Method ²² |
| 3 | Biochemical Oxygen Demand | 1) 5-Day BOD Test, Azide Modification Method ²³ 2) 5-Day BOD Test, Membrane Electrode Method ²⁴ |
| 4 | Cadmium | Digestion, Direct Air-Acetylene Flame Method ²⁵ Closed Reflux, Colorimetric Method ²⁶ |
| 5 | Chemical Oxygen Demand | ADMI Weighted-Ordinate Spectrophotometric Method ²⁷ |
| 6 | Color | ADMI Weighted-Ordinate Spectrophotometric Method ²⁸ |
| 7 | Copper | Digestion, Direct Air-Acetylene Flame Method ²⁹ |
| 8 | Cyanide | Distillation, Colorimetric Method ³⁰ |
| 9 | Formaldehyde | Distillation, Colorimetric Method ³¹ |
| 10 | Free Chlorine | DPD Colorimetric Method ³² |
| 11 | Hexavalent Chromium | Colorimetric Method ³³ |
| 12 | Lead | Digestion, Direct Air-Acetylene Flame Method ³⁴ |
| 13 | Manganese | Digestion, Direct Air-Acetylene Flame Method ³⁵ |
| 14 | Mercury | Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ³⁶ |
| 15 | Nickel | Digestion, Direct Air-Acetylene Flame Method ³⁷ |
| 16 | Oil & Grease | Liquid-Liquid, Partition-Gravimetric Method ³⁸ |
| 17 | pH | Electrometric Method ³⁹ |
| 18 | Phenols | 1) Distillation, Chloroform Extraction Method ⁴⁰ 2) Distillation, Direct Photometric Method ⁴¹ |
| 19 | Selenium | Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁴² |
| 20 | Sulfide | Iodometric Method ⁴³ |
| 21 | Temperature | Laboratory and Field Methods ⁴⁴ |
| 22 | Total Dissolved Solids | Dried at 180 °C ⁴⁵ |

กรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์
กรมส่งเสริมการค้าระหว่างประเทศ
117, 118 ถนนวิภาวดีรังสิต แขวงจตุจักร เขตจตุจักร กรุงเทพมหานคร 10900
โทรศัพท์ 0-2606-1000 โทรสาร 0-2606-1001
E-mail: info@tradepromote.go.th, trade@tradepromote.go.th

| ลำดับ | ชื่อสาร | วิธีการวิเคราะห์ |
|-------|-------------------------|--|
| 23 | Total Kjeldahl Nitrogen | Dried from 103-105 °C ⁴⁶ |
| 24 | Total Suspended Solids | Digestion, Direct Air-Acetylene Flame Method ⁴⁷ |
| 25 | Trivalent Chromium | Colorimetric Method, Calculation ⁴⁸ |
| 26 | Zinc | Digestion, Direct Air-Acetylene Flame Method ⁴⁹ |

1. กรมส่งเสริมการค้าระหว่างประเทศ กระทรวงพาณิชย์
2. APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater, 24th ed Washington, DC: APHA, 2023.

CERTIFICATE OF CALIBRATION

Certificate No. : CO-006-66

Page 1 of 2 Pages

MEASUREMENT ITEM
MANUFACTURER
MODEL/TYPE
SERIAL NUMBER
ID NUMBER
CONDITION AS-RECEIVED
CUSTOMER

: Top Load Orifice
: TISCH
: TE-5025A
: 710725
: -
: Used Item
: Pacific Laboratory Co., Ltd.
14/5358 Moo14, T. Bang Bua Thong, A. Bang Bua Thong,
Nonthaburi 11110, Thailand.

RECEIVED DATE
MEASUREMENT DATE
ISSUE DATE

: 08 Jun 2023
: 13 Jun 2023
: 13 Jun 2023

ENVIRONMENTAL CONDITIONS:

Ambient condition in the laboratory are as follow:

Temperature : 23.0 ± 3.0 °C
Relative Humidity : 55.0 ± 15.0 %RH
Atmospheric Pressure : 1010 ± 10 hPa

CALIBRATION CONDITION:

Preconditioning : 24 hours at ambient conditions.
Measurement Condition : The average values during measurement are 24.3 °C and 57.1%RH.

NOTED: The certificate is valid only to the item calibrated on date and place of calibration.

TABULATION OF RESULTS:

The table on next page give the measured values.

Calibration procedure:
The Orifice gas flow device was calibrated against
Standard Rotary Displacement Meter (Roats
Meter) Model G55/INAC/M2-dp, The W-CL-004
was used as a calibration guideline.

Traceability:
This certificate provides a traceability of the
measurement to recognized the national
standards, and to realization of the international
system of units (SI) through the VSL (National
Metrology Institute of Netherlands) via Certificate
number: G2211901

Uncertainty of Measurement:
The reported uncertainty of measurement is based
on the standard uncertainty multiplied by a
coverage factor $k=2$, Which for a normal
distribution corresponds to a coverage probability
of approximately 95%. The standard uncertainty
has been determined in accordance with the GUM
"Evaluation of measurement
data - Guide to the expression of uncertainty in
measurement"

Calibrated by:

☐ Mr. Sorawit Thachalad
☒ Miss Jitraporn Lertsomphol

Approved signatory:



Calibration Department Manager

เอกสารสอบเทียบเครื่องมือตรวจวัดคุณภาพอากาศ
ภาคผนวกที่ 5-1

MEASUREMENT RESULTS:

The Orifice gas flow device was calibrated by direct comparison method with the Standard Rotary Displacement Meter (Roots Meter). The humid air was used as a medium in the system. The standard conditions are 25 °C (298.15 K) and 760 mmHg for standard temperature and standard pressure respectively.

Table 1: The results of Q Standard calibration data

| Plate | Flow rate m ³ /min | Pressure [Pa] mmHg | Temperature [T ₀] °C | Temperature [T _{in}] °C | Δp_meter mmHg | Δp_orifice inH ₂ O | Y | Standard Flow (Q _s) m ³ /min |
|-------|----------------------------------|--------------------------|--|---|------------------|----------------------------------|-------|--|
| 1 | 0.706 | 755.735 | 24.45 | 23.61 | 50.097 | 1.703 | 1.302 | 0.659 |
| 2 | 0.998 | 755.793 | 24.22 | 23.66 | 63.145 | 3.306 | 1.816 | 0.914 |
| 3 | 1.119 | 755.870 | 24.25 | 23.69 | 43.259 | 4.386 | 2.091 | 1.054 |
| 4 | 1.167 | 755.926 | 24.11 | 23.44 | 32.309 | 4.937 | 2.219 | 1.117 |
| 5 | 1.409 | 755.921 | 24.03 | 23.51 | 29.079 | 7.321 | 2.703 | 1.354 |

Slope (m): 2.01034

Intercept (b): -0.02337

Correlation coefficient (r): 0.99984

Uncertainty (k=2): 0.015 m³/min

Table 2: The results of Q actual calibration data

| Plate | Flow rate m ³ /min | Pressure [Pa] mmHg | Temperature [T ₀] °C | Temperature [T _{in}] °C | Δp_meter mmHg | Δp_orifice inH ₂ O | Y | Standard Flow (Q _s) m ³ /min |
|-------|----------------------------------|--------------------------|--|---|------------------|----------------------------------|-------|--|
| 1 | 0.706 | 755.735 | 24.45 | 23.61 | 50.097 | 1.703 | 0.819 | 0.661 |
| 2 | 0.998 | 755.793 | 24.22 | 23.66 | 63.145 | 3.306 | 1.141 | 0.916 |
| 3 | 1.119 | 755.870 | 24.25 | 23.69 | 43.259 | 4.386 | 1.314 | 1.057 |
| 4 | 1.167 | 755.926 | 24.11 | 23.44 | 32.309 | 4.937 | 1.393 | 1.120 |
| 5 | 1.409 | 755.921 | 24.03 | 23.51 | 29.079 | 7.321 | 1.697 | 1.357 |

Slope (m): 1.25919

Intercept (b): -0.01471

Correlation coefficient (r): 0.99983

Uncertainty (k=2): 0.015 m³/min

End of Certificate of Calibration



Certificate of Calibration

Certificate No. : 66-200247-2 Page : 1 of 2

Submitted by :

Pacific Laboratory Co., Ltd.

14/5358 Moo 14, 1.Bang Bua Thong, A.Bang Bua Thong, Nonthaburi 11110 Thailand

Equipment :

Electronic Balance

Manufacturer : SHIMADZU

Model : AP225WD

Serial No. : D316301828

ID No. : LAB-BL-003

Capacity : 220 g

Resolution : 0.00001g/102g, 0.0001g/220g

Environment :

On site calibration was carried out at the Laboratory, Pacific Laboratory Co., Ltd.

Ambient Temperature : (25.1 to 25.4) °C

Relative Humidity : (62.3 to 64.8) %

Air Pressure : 1007.0 mbar

Date of Received : 31 July 2023

Date of Calibration : 31 July 2023

Date of Issue : 02 August 2023

Calibrated by : Akaradeth Thippichai

Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref : LAB 14

Edition 5, July 2015

Reference Standard Instruments : This certification is traceable to the International System of Units

Standard Weights

ID No, Cert.No, Due Date, Traceability

E261-42624

C02222345

10 Nov 2023

National Institute of Metrology (Thailand), (NIMT)

Laboratory Manager

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.



CAL-P0031-03

Certificate of Calibration

Certificate No. : 66-200247-2

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Departure of indication from nominal value

| Nominal Value (g) | Correction (g) | Uncertainty \pm (g) |
|----------------------|-------------------|--------------------------|
| 0.001 | 0.00001 | 0.000020 |
| 0.01 | 0.00001 | 0.000021 |
| 0.05 | 0.00001 | 0.000019 |
| 0.1 | 0.00001 | 0.000024 |
| 1 | -0.00001 | 0.000030 |
| 2 | 0.00000 | 0.000036 |
| 5 | -0.00001 | 0.000046 |
| 20 | -0.00002 | 0.000073 |
| 50 | -0.00004 | 0.00011 |
| 100 | -0.00005 | 0.00020 |
| 150 | -0.0001 | 0.00038 |
| 200 | -0.0001 | 0.00040 |

This result of calibration was found accurate as shown on date and place of calibration only.

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.57$, providing a level of confidence of approximately 95%

| | |
|-----------------|------------------|
| Eccentric error | Load test : 50 g |
| A | 0.00002 |
| B | 0.00003 |
| C | 0.00001 |
| D | 0.00004 |
| E | 0.00000 |

| | |
|---------------|-------------------|
| Repeatability | Load test : 200 g |
| Sidev. | 0.000048 g |

-o0o-





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



บริษัท เอ็นวิร์ เซอร์วิส จำกัด
42 รามินทรา 14 Yeak 9, Tha Raeng, Bang Khen, Bangkok 10230 โทรศัพท์: 02-9435814-5 โทรสาร: 02-9438201
www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 21 March 2023

Instruments Information

Analyzer Type : SO2 Analyzer
Model : 43C
Manufacturer : Thermo Environmental
Serial Number : 43C-58286-317

Calibrator Unit

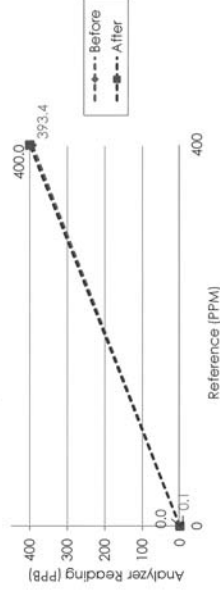
Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924
Standard Gas Concentration
Nitric Oxide (NO) : 55.47 PPM
Sulphur Dioxide (SO2) : 55.11 PPM
Carbon Monoxide (CO) : 4.535 PPM
Cylinder number : EB0129027
Expire Date: 29 Oct. 2027

Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

| Status | Zero | | | Span | | |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| | Reference (PPB) | Reading (PPB) | Drift (PPB) | Reference (PPB) | Reading (PPB) | Drift% |
| Before | 0.0 | 0.1 | 0.1 | 400.0 | 393.4 | -1.7 |
| After | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |

Single Point Calibration Chart



Calibrate

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

Analyzer Type: SO2 Analyzer
Model: 43C
Manufacturer: Thermo Environmental
SIN: 6057415770

Calibration System

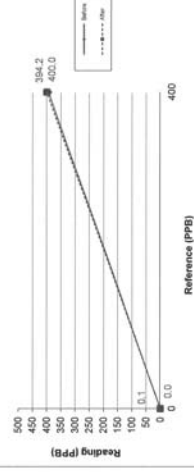
| Calibrator Unit | | Standard Gas | |
|--------------------|-------------------|--------------|--------------|
| Dilutor Model | Dasibi Model 5008 | NO Conc | 45.05 PPM |
| SIN: | 705 | SO2 Conc | 45.01 PPM |
| ZERO AIR Generator | API MODEL 701 | CO Conc | 4.487 PPM |
| SIN: | 1924 | Expire Date: | 19 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

| Status | Zero | | | Span | | |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| | Reference (PPB) | Reading (PPB) | Drift (PPB) | Reference (PPB) | Reading (PPB) | Drift% |
| Before | 0.0 | 0.1 | 0.1 | 400.0 | 394.2 | -1.5 |
| After | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |

Single Point Calibration Chart





บริษัท เอ็นวีอาร์ เซอร์วิส จำกัด

42/3 ถนนพหลโยธิน 14 ถนน 9 แขวงจันทน์บุรี เขตจันทน์ กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9435201
บริษัท เอ็นวีอาร์ เซอร์วิส จำกัด 42 Ramindra 14 yolk 9, Tha Rang, Bangkok, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9435201
ENVIRO SERVICE CO., LTD.

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|---|---|
| Analyzer Type: SO2 Analyzer Model: 43C | Manufacturer: Thermo Environmental S/N: 0807415772 |
|---|---|

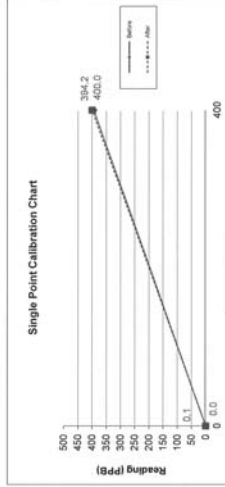
Calibration System

| | |
|---|---|
| Calibrator Unit Dilutor Model Dastbi Model 5008 S/N: 705 ZERO AIR Generator API MODEL 701 S/N: 1924 | Standard Gas NO Conc 48.05 PPM SO2 Conc 46.01 PPM CO Conc 4.487 PPM Expire Date: 19 Sep. 2020 |
|---|---|

Environment: Temperature_25.5_ °C Humidity_51_ %RH

Calibration Report

| Status | Reference (ppb) | Reading (ppb) | Drift (ppb) | Reference (ppb) | Reading (ppb) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 400.0 | 394.2 | -1.5 |
| After | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |



บริษัท เอ็นวีอาร์ เซอร์วิส จำกัด

42/3 ถนนพหลโยธิน 14 ถนน 9 แขวงจันทน์บุรี เขตจันทน์ กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9435201
บริษัท เอ็นวีอาร์ เซอร์วิส จำกัด 42 Ramindra 14 yolk 9, Tha Rang, Bangkok, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9435201
ENVIRO SERVICE CO., LTD.

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|---|--|
| Analyzer Type: SO2 Analyzer Model: 43C | Manufacturer: Thermo Environmental S/N: 43C-65967-350 |
|---|--|

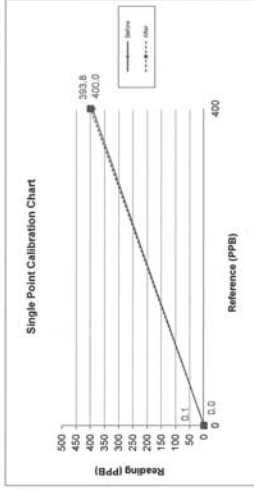
Calibration System

| | |
|---|---|
| Calibrator Unit Dilutor Model Dastbi Model 5008 S/N: 705 ZERO AIR Generator API MODEL 701 S/N: 1924 | Standard Gas NO Conc 48.05 PPM SO2 Conc 46.01 PPM CO Conc 4.487 PPM Expire Date: 19 Sep. 2020 |
|---|---|

Environment: Temperature_25.5_ °C Humidity_51_ %RH

Calibration Report

| Status | Reference (ppb) | Reading (ppb) | Drift (ppb) | Reference (ppb) | Reading (ppb) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 400.0 | 393.8 | -1.6 |
| After | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |





บริษัท เอ็นวีร์ เซอร์วิส จำกัด

42 รามอินทรา 14 ยาก 9, The Rang, Banghuen, Bangkok 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
E-MAIL: envir@envir.co.th
ENVIR SERVICE CO.,LTD. 42 Raminthra 14 yak 9, Tha Rang, Banghuen, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|---|---|
| Analyzer Type: SO2 Analyzer Model: 43C | Manufacturer Thermo Environmental SIN: 0601114-787 |
|---|---|

Calibration System

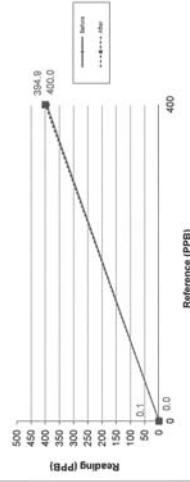
| Calibrator Unit | Standard Gas |
|--|---|
| Dilutor Model Dasabi Model 5008 SIN: 705 ZERO AIR Generator API MODEL 701 SIN: 1924 | NO Conc 46.05 PPM SO2 Conc 46.01 PPM CO Conc 4.487 PPM Expire Date: 19 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

| Status | Reference (ppb) | Reading (ppb) | Drift (ppb) | Span | Reading (ppb) | Drift% |
|--------|-----------------|---------------|-------------|------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | | 394.9 | -1.3 |
| After | 0.0 | 0.0 | 0.0 | | 400.0 | 0.0 |

Single Point Calibration Chart



Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|--|---|
| Analyzer Type: NO/NO2/NOx Analyzer Model: 42C | Manufacturer Thermo Environmental SIN: 42C-69273-392 |
|--|---|

Calibration System

| Calibrator Unit | Standard Gas |
|--|---|
| Dilutor Model Dasabi Model 5008 SIN: 705 ZERO AIR Generator API Model 701 SIN: 1924 | NO Conc 46.05 PPM SO2 Conc 46.01 PPM CO Conc 4.487 PPM Expire Date: 19 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity: 51 %RH

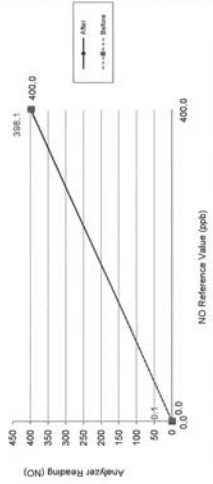
Calibration Check (Before adjust)

| GAS | Zero | | | Span | | |
|-----|---------------------|----------------------|-------------|---------------------|----------------------|--------|
| | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% |
| NO | 0.1 | 0.0 | 0.1 | 398.1 | 400.0 | -0.5 |
| NOx | 0.1 | 0.0 | 0.1 | 400.0 | 400.0 | 0.0 |

Calibration Check (After adjust)

| GAS | Zero | | | Span | | |
|-----|---------------------|----------------------|-------------|---------------------|----------------------|--------|
| | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% |
| NO | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |
| NOx | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |

Single Point Calibration Chart



Calibrate



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www.envirservice.co.th

Analyzer Performance Test

Calibrated Date: 21 March 2023

Instruments Information

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

Manufacturer : Thermo Environmental
Serial Number : 42C-70412-365

Calibrator Unit

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

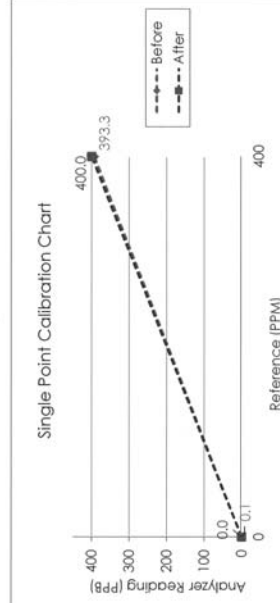
Standard Gas Concentration

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

Environment : Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

| Status | Zero | | | Span | | |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| | Reference (PPB) | Reading (PPB) | Drift (PPB) | Reference (PPB) | Reading (PPB) | Drift% |
| Before | 0.0 | 0.1 | 0.1 | 400.0 | 393.3 | -1.7 |
| After | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |



Analyzer Performance Test

Calibrated Date: 26 January 2023

Instruments Information

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

Manufacturer Thermo Environmental
SIN: 032830000000891

Calibration System

| Calibrator Unit | | Standard Gas |
|--------------------|--------------------|---------------------------|
| Dilutor Model | Dasilbi Model 5008 | |
| | SIN: 705 | NO Conc 55.47 PPM |
| | | SO2 Conc 55.11 PPM |
| | | CO Conc 4.535 PPM |
| ZERO AIR Generator | API Model 701 | |
| | SIN: 1924 | Cylinder number EB0129027 |
| | | Expire Date: 29 Oct. 2027 |

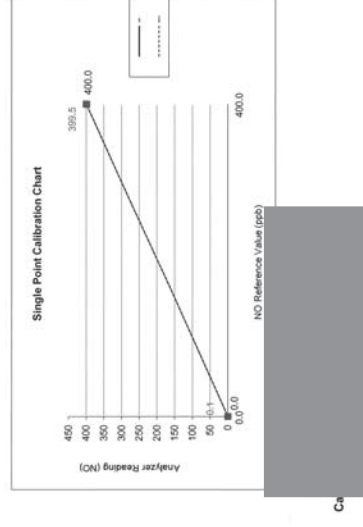
Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Check (Before adjust)

| GAS | Zero | | | Span | | |
|-----------------|---------------------|----------------------|-------------|---------------------|----------------------|--------|
| | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% |
| NO | 0.1 | 0.0 | 0.1 | 399.5 | 400.0 | -0.1 |
| NO _x | 0.1 | 0.0 | 0.1 | 399.2 | 400.0 | -0.2 |

Calibration Check (After adjust)

| GAS | Zero | | | Span | | |
|-----------------|---------------------|----------------------|-------------|---------------------|----------------------|--------|
| | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% |
| NO | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |
| NO _x | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |



Analyzer Performance Test

Calibrated Date: 21 March 2023

Instruments Information

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

Manufacturer : Thermo Environmental
Serial Number : 42C-70626-366

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705

Standard Gas Concentration

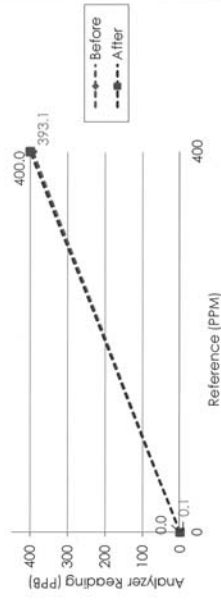
| | | |
|------------------------------------|--------------|-----|
| Nitric Oxide (NO) | 55.47 | PPM |
| Sulphur Dioxide (SO ₂) | 55.11 | PPM |
| Carbon Monoxide (CO) | 4,535 | PPM |
| Cylinder number | EB0129027 | |
| Expire Date: | 29 Oct, 2027 | |

Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

| Status | Zero | | | Span | | |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| | Reference (PPB) | Reading (PPB) | Drift (PPB) | Reference (PPB) | Reading (PPB) | Drift% |
| Before | 0.0 | 0.1 | 0.1 | 400.0 | 393.1 | -1.7 |
| After | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |

Single Point Calibration Chart



Calibrate By :

Analyzer Performance Test

Calibrated Date: 26 January 2023

Instruments Information

| | |
|--|---|
| Analyzer Type: NO/NO2/NOx Analyzer Model: 42C | Manufacturer: Thermo Environmental S/N: 0514811452 |
|--|---|

Calibration System

| Calibrator Unit | Standard Gas |
|----------------------------------|---------------------------|
| Dilutor Model Dasibi Model 5908 | NO Conc 55.47 PPM |
| SIN: 705 | SO2 Conc 55.11 PPM |
| ZERO AIR Generator API Model 701 | CO Conc 4.535 PPM |
| SIN: 1924 | Cylinder number EB0129027 |
| | Expire Date: 28 Oct. 2027 |

Environment: Temperature 25.5 °C Humidity: 51 %RH

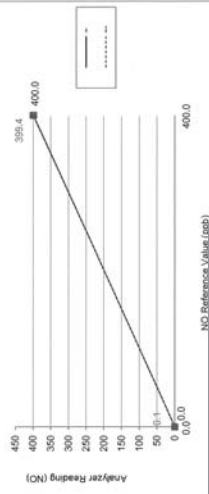
Calibration Check (Before adjust)

| GAS | Zero | | | Span | | |
|-----|---------------------|----------------------|-------------|---------------------|----------------------|-----------|
| | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift (%) |
| NO | 0.1 | 0.0 | 0.1 | 399.4 | 400.0 | -0.2 |
| NOx | 0.1 | 0.0 | 0.1 | 399.3 | 400.0 | -0.2 |

Calibration Check (After adjust)

| | Zero | | | Span | | |
|-----|---------------------|----------------------|-------------|---------------------|----------------------|--------|
| | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% |
| GAS | | | | | | |
| NO | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |
| NOx | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 |

Single Point Calibration Chart





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42 รามอินทรา 14 ซอย 9 แขวงรามอินทรา 10250 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
บริษัท เอ็นวีเอส เซอร์วิส จำกัด 42 Ramintra 14, ysoak 9, Tha Rang, Bangkok, Bangkok 10230 Tel: 02-9435814-5 Fax: 02-9438201
ENVIA SERVICE CO., LTD.

Analyzer Performance Test

Calibrated Date: 11 Aug 2023

Instruments Information

| | |
|------------------------------------|------------------------------------|
| Analyzer Type: NO/NO2/NOx Analyzer | Manufacturer: Thermo Environmental |
| Model: 42C | S/N: 42C-63476-339 |

Calibration System

| Calibrator Unit | Standard Gas |
|----------------------------------|---------------------------|
| Dilutor Model: Thermo Model 5008 | NO Conc 46.05 PPM |
| S/N: 705 | SO2 Conc 46.01 PPM |
| ZERO AIR Generator API Model 701 | CO Conc 4.487 PPM |
| S/N: 1924 | Expire Date: 19 Sep. 2020 |

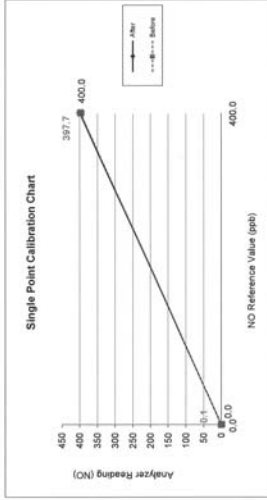
Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Check (Before adjust)

| Zero | | Span | |
|---------------------|----------------------|-------------|--------|
| Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Drift% |
| GAS | | | |
| NO | 0.1 | 0.1 | -0.6 |
| NOx | 0.1 | 0.1 | 0.0 |

Calibration Check (After adjust)

| Zero | | Span | |
|---------------------|----------------------|-------------|--------|
| Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Drift% |
| GAS | | | |
| NO | 0.0 | 0.0 | 0.0 |
| NOx | 0.0 | 0.0 | 0.0 |



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บริษัท เอ็นวีเอส เซอร์วิส จำกัด

42 รามอินทรา 14 ซอย 9 แขวงรามอินทรา 10250 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
บริษัท เอ็นวีเอส เซอร์วิส จำกัด 42 Ramintra 14, ysoak 9, Tha Rang, Bangkok, Bangkok 10230 Tel: 02-9435814-5 Fax: 02-9438201
ENVIA SERVICE CO., LTD.

Analyzer Performance Test

Calibrated Date: 11 Aug 2023

Instruments Information

| | |
|------------------------------------|------------------------------------|
| Analyzer Type: NO/NO2/NOx Analyzer | Manufacturer: Thermo Environmental |
| Model: 42C | S/N: 65850-350 |

Calibration System

| Calibrator Unit | Standard Gas |
|----------------------------------|---------------------------|
| Dilutor Model: Thermo Model 5008 | NO Conc 46.05 PPM |
| S/N: 705 | SO2 Conc 46.01 PPM |
| ZERO AIR Generator API Model 701 | CO Conc 4.487 PPM |
| S/N: 1924 | Expire Date: 19 Sep. 2020 |

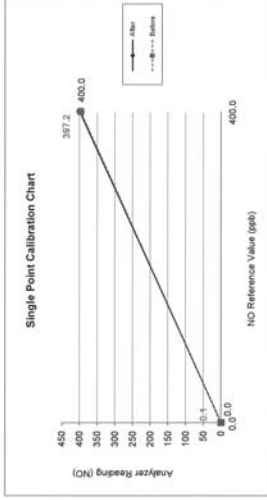
Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Check (Before adjust)

| Zero | | Span | |
|---------------------|----------------------|-------------|--------|
| Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Drift% |
| GAS | | | |
| NO | 0.1 | 0.1 | -0.7 |
| NOx | 0.1 | 0.1 | 0.0 |

Calibration Check (After adjust)

| Zero | | Span | |
|---------------------|----------------------|-------------|--------|
| Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Drift% |
| GAS | | | |
| NO | 0.0 | 0.0 | 0.0 |
| NOx | 0.0 | 0.0 | 0.0 |





บริษัท เอ็นวีแอร์ เซอร์วิส จำกัด

42 รามอินทรา 14 ถนน 9 แขวงจันทบุรี เขตจันทบุรี กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
เจ้าหน้าที่บริการลูกค้า
ENVIA SERVICE CO.,LTD. 42 Ramindra 14 yeak 9, Tha Rang, Bangchen, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|-----------------------------------|-----------------------------------|
| Analyzer Type: NONOX/NOx Analyzer | Manufacturer Thermo Environmental |
| Model: 42C | SIN: 42C-69273-362 |

Calibration System

| Calibrator Unit | Standard Gas |
|----------------------------------|---------------------------|
| Dilutor Model Daabi Model 5008 | NO Conc 46.05 PPM |
| SIN: 705 | SO2 Conc 46.01 PPM |
| ZERO AIR Generator API Model 701 | CO Conc 4.487 PPM |
| SIN: 1924 | Expire Date: 19 Sep. 2020 |

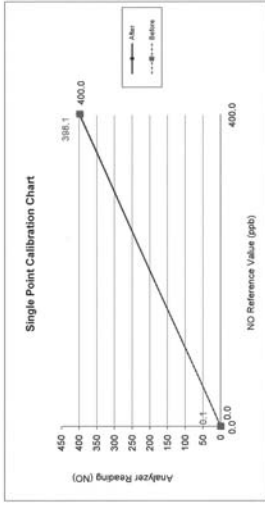
Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Check (Before adjust)

| Zero | | | | Span | | | |
|------|---------------------|----------------------|-------------|---------------------|----------------------|--------|--|
| GAS | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% | |
| NO | 0.1 | 0.0 | 0.1 | 388.1 | 400.0 | -0.5 | |
| NOx | 0.1 | 0.0 | 0.1 | 400.0 | 400.0 | 0.0 | |

Calibration Check (After adjust)

| Zero | | | | Span | | | |
|------|---------------------|----------------------|-------------|---------------------|----------------------|--------|--|
| GAS | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% | |
| NO | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 | |
| NOx | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 | |



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42 รามอินทรา 14 ถนน 9 แขวงจันทบุรี เขตจันทบุรี กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
เจ้าหน้าที่บริการลูกค้า
ENVIA SERVICE CO.,LTD. 42 Ramindra 14 yeak 9, Tha Rang, Bangchen, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|-----------------------------------|-----------------------------------|
| Analyzer Type: NONOX/NOx Analyzer | Manufacturer Thermo Environmental |
| Model: 42C | SIN: 42C-63476-338 |

Calibration System

| Calibrator Unit | Standard Gas |
|----------------------------------|---------------------------|
| Dilutor Model Daabi Model 5008 | NO Conc 46.05 PPM |
| SIN: 705 | SO2 Conc 46.01 PPM |
| ZERO AIR Generator API Model 701 | CO Conc 4.487 PPM |
| SIN: 1924 | Expire Date: 19 Sep. 2020 |

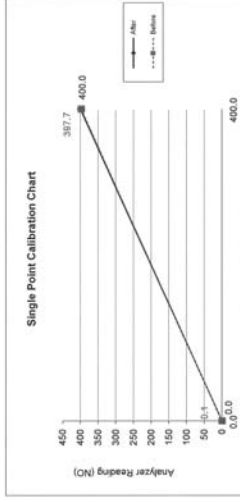
Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Check (Before adjust)

| Zero | | | | Span | | | |
|------|---------------------|----------------------|-------------|---------------------|----------------------|--------|--|
| GAS | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% | |
| NO | 0.1 | 0.0 | 0.1 | 397.7 | 400.0 | -0.6 | |
| NOx | 0.1 | 0.0 | 0.1 | 400.0 | 400.0 | 0.0 | |

Calibration Check (After adjust)

| Zero | | | | Span | | | |
|------|---------------------|----------------------|-------------|---------------------|----------------------|--------|--|
| GAS | Reading Value (ppb) | Expected Value (ppb) | Drift (ppb) | Reading Value (ppb) | Expected Value (ppb) | Drift% | |
| NO | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 | |
| NOx | 0.0 | 0.0 | 0.0 | 400.0 | 400.0 | 0.0 | |





บริษัท เอ็นวีเอส เซอร์วิส จำกัด

42 รามอินทรา 14 แยก 9 แขวงท่าแร้ง เขตบางเขน กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
บริษัท เอ็นวีเอส เซอร์วิส จำกัด
ENVIA SERVICE CO., LTD. 42 Ramintra 14 yak 9, Tha Rang, Bangkok, Bankok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 10 February 2023

Instruments Information

| Analyzer Type: CO Analyzer | Manufacturer API |
|----------------------------|------------------|
| Model: 300 | SIN: 411 |

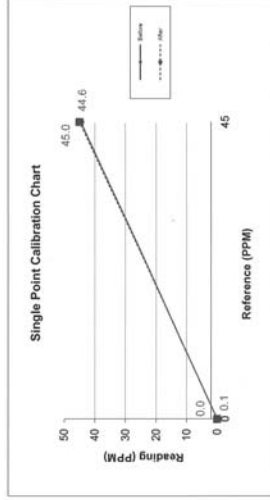
Calibration System

| Calibrator Unit | Standard Gas |
|---|--|
| Dilutor Model Dasibi Model 5008 SIN: 705 | NO Conc 55.47 PPM SO2 Conc 55.11 PPM CO Conc 4.535 PPM |
| ZERO AIR Generator API MODEL 701 SIN: 1924 | Cylinder number EB0129027 Expire Date: 29 Oct. 2027 |

Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

| Status | Reference (PPM) | Zero | Reading (PPM) | Drift (PPM) | Reference (PPM) | Span | Reading (PPM) | Drift% |
|--------|-----------------|------|---------------|-------------|-----------------|------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 0.1 | 45.0 | 44.6 | 44.6 | -0.9 |
| After | 0.0 | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 45.0 | 0.0 |



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42 รามอินทรา 14 แยก 9 แขวงท่าแร้ง เขตบางเขน กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
บริษัท เอ็นวีเอส เซอร์วิส จำกัด
ENVIA SERVICE CO., LTD. 42 Ramintra 14 yak 9, Tha Rang, Bangkok, Bankok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 10 February 2023

Instruments Information

| Analyzer Type: CO Analyzer | Manufacturer API |
|----------------------------|------------------|
| Model: 300 | SIN: 424 |

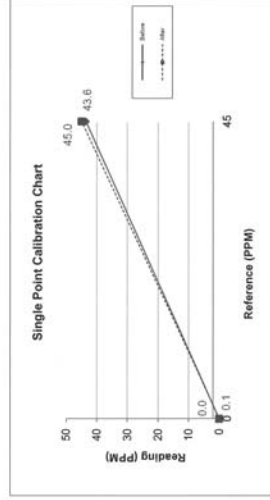
Calibration System

| Calibrator Unit | Standard Gas |
|---|--|
| Dilutor Model Dasibi Model 5008 SIN: 705 | NO Conc 55.47 PPM SO2 Conc 55.11 PPM CO Conc 4.535 PPM |
| ZERO AIR Generator API MODEL 701 SIN: 1924 | Cylinder number EB0129027 Expire Date: 29 Oct. 2027 |

Environment: Temperature 25.5 °C Humidity: 51 %RH

Calibration Report

| Status | Reference (PPM) | Zero | Reading (PPM) | Drift (PPM) | Reference (PPM) | Span | Reading (PPM) | Drift% |
|--------|-----------------|------|---------------|-------------|-----------------|------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 0.1 | 45.0 | 43.6 | 43.6 | -3.1 |
| After | 0.0 | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 45.0 | 0.0 |





บริษัท เอ็นวีร์ เซอร์วิส จำกัด

42 รามอินทรา 14 เขต 9 แขวงจตุจักร เขตปทุมวัน กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
บริษัท เอ็นวีร์ เซอร์วิส จำกัด 42 รามอินทรา 14 เขต 9, The Rang, Bangkok, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9438201
ENVIA SERVICE CO.,LTD.

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|----------------------------|-----------------------------------|
| Analyzer Type: CO Analyzer | Manufacturer Thermo Environmental |
| Model: 46C | S/N: 0604015184 |

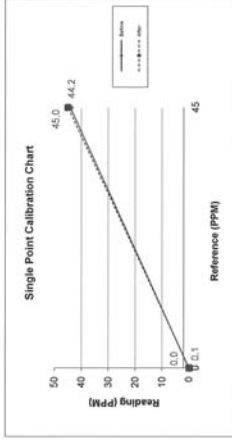
Calibration System

| | |
|----------------------------------|--------------------------------|
| Calibrator Unit | Standard Gas |
| Dilutor Model Dynal Model 5008 | NO Conc 48.05 PPM |
| S/N: 705 | SO ₂ Conc 48.01 PPM |
| ZERO AIR Generator API MODEL 701 | CO Conc 4.487 PPM |
| S/N: 1924 | Cylinder number CC507080 |
| | Expire Date: 18 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Report

| Status | Reference (PPM) | Reading (PPM) | Drift (PPM) | Reference (PPM) | Reading (PPM) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 45.0 | 44.2 | -1.8 |
| After | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 0.0 |



บริษัท เอ็นวีร์ เซอร์วิส จำกัด

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ENVIA SERVICE CO.,LTD.

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|----------------------------|-----------------------------------|
| Analyzer Type: CO Analyzer | Manufacturer Thermo Environmental |
| Model: 46C | S/N: 051461738 |

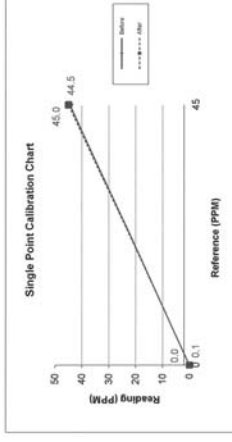
Calibration System

| | |
|----------------------------------|--------------------------------|
| Calibrator Unit | Standard Gas |
| Dilutor Model Dynal Model 5008 | NO Conc 48.05 PPM |
| S/N: 705 | SO ₂ Conc 48.01 PPM |
| ZERO AIR Generator API MODEL 701 | CO Conc 4.487 PPM |
| S/N: 1924 | Expire Date: 18 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Report

| Status | Reference (PPM) | Reading (PPM) | Drift (PPM) | Reference (PPM) | Reading (PPM) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 45.0 | 44.5 | -1.1 |
| After | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 0.0 |





บริษัท เอ็นวีแอร์ เซอร์วิส จำกัด

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ENVIA SERVICE CO.,LTD. 42 Ramindra 14 year 9, The Rang, Bangkhen, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|--|--|
| Analyzer Type: CO Analyzer Model: 48C | Manufacturer Thermo Environmental SIN: 48C-0604815184 |
|--|--|

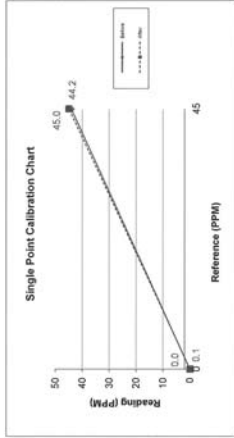
Calibration System

| Calibrator Unit | Standard Gas |
|--|---|
| Dilutor Model Dabo Model 5008 SIN: 700 ZERO AIR Generator APT MODEL 701 SIN: 1924 | NO Conc 46.05 PPM SO2 Conc 46.01 PPM CO Conc 4.487 PPM Cylinder number CG507090 Expire Date: 19 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Report

| Status | Reference (ppm) | Reading (ppm) | Drift (ppm) | Reference (ppm) | Reading (ppm) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 45.0 | 44.2 | -1.8 |
| After | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 0.0 |



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บริษัท เอ็นวีแอร์ เซอร์วิส จำกัด
ENVIA SERVICE CO.,LTD. 42 Ramindra 14 year 9, The Rang, Bangkhen, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|--|--|
| Analyzer Type: CO Analyzer Model: 48C | Manufacturer Thermo Environmental SIN: 48C-0604815184 |
|--|--|

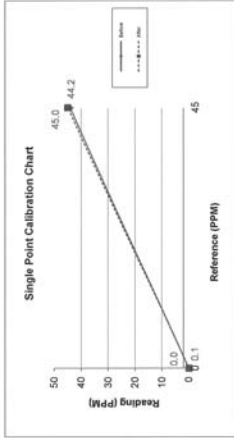
Calibration System

| Calibrator Unit | Standard Gas |
|--|---|
| Dilutor Model Dabo Model 5008 SIN: 700 ZERO AIR Generator MODEL 701 SIN: 1924 | NO Conc 46.05 PPM SO2 Conc 46.01 PPM CO Conc 4.487 PPM Cylinder number CG507090 Expire Date: 19 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Report

| Status | Reference (ppm) | Reading (ppm) | Drift (ppm) | Reference (ppm) | Reading (ppm) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 45.0 | 44.2 | -1.8 |
| After | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 0.0 |





บริษัท เอ็นไทร์ เซอร์วิส จำกัด

42/31 ถนนพหลโยธิน 14 แขวง 9 เขตราชเทวี กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
บริษัท เอ็นไทร์ เซอร์วิส จำกัด
ENVIAIR SERVICE CO., LTD. 42 Ramindra 14 Yeak 9, Tha Rang, Bangkok, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|----------------------------|-----------------------------------|
| Analyzer Type: CO Analyzer | Manufacturer Thermo Environmental |
| Model: 48C | SIN: 0514811738 |

Calibration System

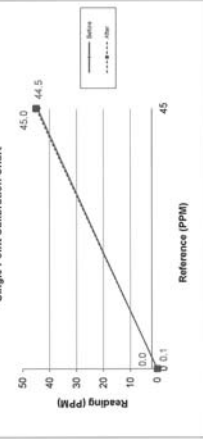
| Calibrator Unit | Standard Gas |
|----------------------------------|--------------------------------|
| Dilutor Model Dashi Model 5008 | NO Conc 46.05 PPM |
| SIN: 705 | SO ₂ Conc 46.01 PPM |
| ZERO AIR Generator API MODEL 701 | CO Conc 4.487 PPM |
| SIN: 1924 | Expire Date: 19 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Report

| Status | Reference (ppm) | Reading (ppm) | Drift (ppm) | Reference (ppm) | Reading (ppm) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 45.0 | 44.5 | -1.1 |
| After | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 0.0 |

Single Point Calibration Chart



บริษัท เอ็นไทร์ เซอร์วิส จำกัด

42/31 ถนนพหลโยธิน 14 แขวง 9 เขตราชเทวี กรุงเทพมหานคร 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
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ENVIAIR SERVICE CO., LTD. 42 Ramindra 14 Yeak 9, Tha Rang, Bangkok, Bangkok 10230 Tel : 02-9435814-5 Fax : 02-9438201

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|----------------------------|-----------------------------------|
| Analyzer Type: CO Analyzer | Manufacturer Thermo Environmental |
| Model: 48C | SIN: 65774-350 |

Calibration System

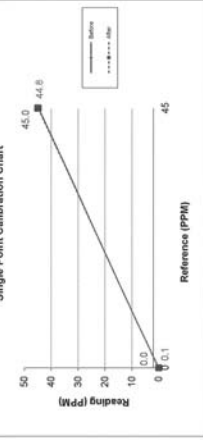
| Calibrator Unit | Standard Gas |
|----------------------------------|--------------------------------|
| Dilutor Model Dashi Model 5008 | NO Conc 46.05 PPM |
| SIN: 705 | SO ₂ Conc 46.01 PPM |
| ZERO AIR Generator API MODEL 701 | CO Conc 4.487 PPM |
| SIN: 1924 | Expire Date: 19 Sep. 2020 |

Environment: Temperature 25.5 °C Humidity 51 %RH

Calibration Report

| Status | Reference (ppm) | Reading (ppm) | Drift (ppm) | Reference (ppm) | Reading (ppm) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 45.0 | 44.8 | -0.4 |
| After | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 0.0 |

Single Point Calibration Chart





บริษัท เอ็นวิร์ เซอร์วิส จำกัด

42/3 หมู่ 9 ถนน 9 มิถุนายน แขวง คลองหลวง เขต คลองหลวง 10230 โทรศัพท์ 02-9435814-5 โทรสาร 02-9438201
42 Ramintra 14 Yeak 9, Tha Raeng, Bangkok, Bangkok 10230 Tel.: 02-9435814-5 Fax.: 02-9438201

Analyzer Performance Test

Calibrated Date: 11 August 2023

Instruments Information

| | |
|----------------------------|------------------------------------|
| Analyzer Type: CO Analyzer | Manufacturer: Thermo Environmental |
| Model: 48C | S/N: 052-8012 |

Calibration System

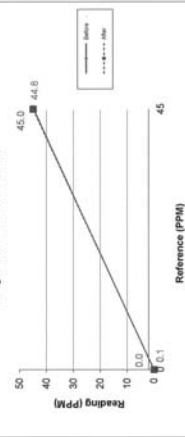
| | |
|--|---|
| Calibrator Unit Dilutor Model Dasibi Model 5008 S/N: 705 ZERO AIR Generator API MODEL 701 S/N: 1924 | Standard Gas NO Conc: 48.05 PPM SO2 Conc: 48.01 PPM CO Conc: 4.487 PPM Expire Date: 19 Sep. 2020 |
|--|---|

Environment: Temperature: 25.5 °C Humidity: 51 %RH

Calibration Report

| Status | Reference (PPM) | Reading (PPM) | Drift (PPM) | Reference (PPM) | Reading (PPM) | Drift% |
|--------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Before | 0.0 | 0.1 | 0.1 | 45.0 | 44.8 | -0.4 |
| After | 0.0 | 0.0 | 0.0 | 45.0 | 45.0 | 0.0 |

Single Point Calibration Chart



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

Analyzer Performance Test

Calibrated Date: 27 April 2023

Instruments Information

| | |
|--------------------------------------|------------------------------------|
| Analyzer Type: Methane-NMHC Analyzer | Manufacturer: Thermo Environmental |
| Model: 55C | Serial Number: 0515611965 |

Calibrator Unit

| | |
|---|---|
| Dilutor Model: Serial Number: 705 | Standard Gas Concentration Methane (CH4) 180 PPM Propane 181 PPM |
| ZERO AIR Generator: Serial Number: 1924 | API MODEL 701 Cylinder number: E80129027 Expire Date: 29 Oct. 2027 |

Environment: Temperature: 25.5 °C Humidity: 51 %RH

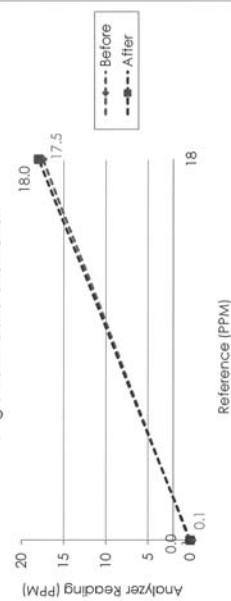
Calibration Report (Before adjust)

| Status | Reference (PPM) | Reading (PPM) | Drift (PPM) | Reference (PPM) | Reading (PPM) | Drift% |
|---------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Methane | 0.0 | 0.1 | 0.1 | 18.0 | 17.5 | -2.8 |
| NMHC | 0.0 | 0.1 | 0.1 | 18.0 | 17.7 | -1.7 |

Calibration Report (After adjust)

| Status | Reference (PPM) | Reading (PPM) | Drift (PPM) | Reference (PPM) | Reading (PPM) | Drift% |
|---------|-----------------|---------------|-------------|-----------------|---------------|--------|
| Methane | 0.0 | 0.0 | 0.0 | 18.0 | 18.0 | 0.0 |
| NMHC | 0.0 | 0.0 | 0.0 | 18.0 | 18.0 | 0.0 |

Single Point Calibration Chart





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

Analyzer Performance Test

Calibrated Date: 24 April 2024

Instruments Information

Analyzer Type : Methane-NMHC Analyzer
Model : 55C
Manufacturer : Thermo Environmental
Serial Number : 55C-0515611965

Calibrator Unit

Dilutor Model : Dasibi Model 5008
Serial Number : 705
ZERO AIR Generator : API MODEL 701
Serial Number : 1924
Standard Gas Concentration
Methane (CH₄) 183.0 PPM
Propane 59.1 PPM
Cylinder number 4860
Expire Date: 6 Dec. 2025

Environment : Temperature 25.5 °C Humidity: 51 %RH

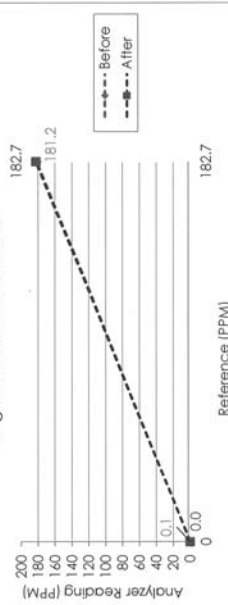
Calibration Report (Before adjust)

| Status | Zero | | | Span | | |
|---------|-----------------|---------------|-------------|-----------------|---------------|--------|
| | Reference (PPM) | Reading (PPM) | Drift (PPM) | Reference (PPM) | Reading (PPM) | Drift% |
| Methane | 0.0 | 0.1 | 0.1 | 183.0 | 181.2 | -1.0 |
| NMHC | 0.0 | 0.1 | 0.1 | 59.1 | 58.3 | -1.4 |

Calibration Report (After adjust)

| Status | Zero | | | Span | | |
|---------|-----------------|---------------|-------------|-----------------|---------------|--------|
| | Reference (PPM) | Reading (PPM) | Drift (PPM) | Reference (PPM) | Reading (PPM) | Drift% |
| Methane | 0.0 | 0.0 | 0.0 | 183.0 | 182.7 | -0.2 |
| NMHC | 0.0 | 0.0 | 0.0 | 59.1 | 59.0 | -0.2 |

Single Point Calibration Chart



Calibrate By :

ภาคผนวกที่ 5-2
เอกสารสอบเทียบเครื่องมือตรวจวัดระดับเสียง



Professional Calibration & Services Co., Ltd.
50/888 Moo 2, Rungtith-Kokornayok Rd., Bungyeetho, Thunayaburi,
Pattumthani 12130 Thailand
Tel : (+66)2150-6641 (Autofone), (+66)2569-5158
Email : info@p-cal.com www.p-cal.com



Certificate of Calibration

Page 1 of 3

Certificate Number : EL39305/23
Control Number : PCAL153035
Customer Control : -
Description : Sound Calibrator
Manufacturer : SOUNDTEK
Model : ST-120
Serial Number : 211203764
Customer : Pacific Laboratory Co., Ltd.

14/5358 Moo 14, Tambol Bang Bua Thong, Amphoe Bang Bua Thong,
Nonthaburi 11110

Date of Receipt : 01-Sep-23
Date of Calibration : 01-Sep-23
Environment : Temperature 23 °C ± 2 °C
: Relative Humidity 50 % ± 20 %
Calibration Method : Calibration Procedure Number CP-EL35
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/IEC17025 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

CALIBRATION REPORT

Professional Calibration & Services Co., Ltd.

Certificate Number : EL39305/23

Page 2 of 3

Equipment Standards Used

| Description | Serial No. | Traceability to | Certificate No. | Cal. Due Date |
|------------------------|------------|------------------------|-----------------|---------------|
| Sound Level Meter | 030606101 | ANAB - AC-2590 | EL09782/23 | 29-Mar-24 |
| Sound Level Calibrator | 141208123 | NSC : Calibration 0037 | EELBP-16/0366 | 06-Mar-24 |

Condition as received : Normal

Definitions :-

- * ANAB - The ANSI National Accreditation Board
- * NSC - National Standardization Council of Thailand

Calibration Results

Sound Calibration

| Nominal | Measured Value | UUC Error | Uncertainty (±) |
|---------|----------------|-----------|-----------------|
| 94 dB | 93.90 dB | 0.10 dB | 0.2 dB |
| 114 dB | 113.75 dB | 0.25 dB | 0.2 dB |

...End...



CERTIFICATE OF CALIBRATION

NO. 20230113101

Name of Product:

Sound Level Meter

Model:

ST-11D

Serial Number:

820861

Specification:

Class 1

Conclusion:

Pass

Date of calibration:

2023-02-01

Due Date:

2024-01-31

Calibrated

- I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
- II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection: OK

2. Type & serial No. of Microphone: AWA14425-57294

4. Measuring up limit: 140 dBA

3. Adjustments to indicated sound levels:

5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Type of Calibrator: B&K 4231

Sound Pressure Level: 94.0 dB

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

| Nominal frequency / Hz | Frequency weighting / dB | | | Nominal frequency / Hz | Frequency weighting / dB | | |
|------------------------|--------------------------|-------|------|------------------------|--------------------------|-------|------|
| | A | C | Z | | A | C | Z |
| 10 | -71.0 | -14.8 | -0.8 | 1000 | 0.0 | 0.0 | -0.1 |
| 20 | -50.4 | -6.3 | -0.4 | 2000 | 1.3 | -0.2 | -0.1 |
| 31.5 | -39.5 | -3.0 | -0.1 | 4000 | 1.1 | -0.8 | -0.1 |
| 63 | -26.2 | -0.8 | -0.2 | 8000 | -1.0 | -3.0 | 0.0 |
| 125 | -16.2 | -0.2 | -0.1 | 12500 | -11.7 | -13.7 | 0.0 |
| 250 | -8.7 | -0.1 | -0.1 | 16000 | -11.8 | -13.8 | 0.0 |
| 500 | -3.2 | 0.0 | -0.1 | 20000 | -23.8 | -25.8 | -0.3 |



6. Self-generated noise

Microphone replaced by electrical input signal device

| | | |
|---|------------|------------|
| 10.3 dB(A) | 12.2 dB(C) | 19.4 dB(Z) |
| 7. F&S Weighting | | |
| Rate of the F weighting decrease (dB/s) | | 35.1 |
| Rate of the S weighting decrease (dB/s) | | 4.4 |
| Deviation of F&S | | -0.1 |

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB
Max error at 10dB steps upper reference sound level 0.1 dB
Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB
Max error at 10dB steps below reference sound level 0.1 dB
Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

9. Tone burst response (A Weighting) :

| Single Toneburst duration /ms | Toneburst response /dB | | | |
|-------------------------------|------------------------|----------------|-----------|---------------|
| | $L_{Amax}-L_A$ | $L_{Amin}-L_A$ | L_A-L_A | $L_{Aeq}-L_A$ |
| 500 | 0.0 | -4.0 | -2.9 | -7.0 |
| 200 | -0.9 | -7.4 | -6.9 | -7.0 |
| 2 | -18.0 | -26.9 | -26.9 | -7.0 |
| 0.25 | -27.2 | / | -36.0 | -7.0 |

10. Peak C sound level (500Hz) :

| Cycle | One cycle | nominal value | Positive half | nominal value | Negative half | nominal value |
|--------------------|-----------|---------------|---------------|---------------|---------------|---------------|
| $L_{Cpeak-LC(dB)}$ | 3.5 | 3.5 | 2.3 | 2.4 | 2.3 | 2.4 |

11. Overload indication: Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 112.8 dB
Sweep amplitude: 40 dB
Scan cycle time: 60 S; Measurement period: 180 S.

| Items | Measured value/dB | Theoretical calculated value/dB | Error/dB |
|-------------|-------------------|---------------------------------|----------|
| $L_{Aeq,T}$ | 103.2 | 103.2 | 0.0 |
| L5 | 110.8 | 110.8 | 0.0 |
| L10 | 108.8 | 108.8 | 0.0 |
| L50 | 92.9 | 92.8 | 0.1 |
| L90 | 76.9 | 76.8 | 0.1 |
| L95 | 75.0 | 74.9 | 0.1 |

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 °C
Relative humidity: 50 %
Static pressure: 101.8 kPa

Reference equipment used in the calibration:

| Description: | Model | Serial No. | Expiry Date | Traceable To |
|---------------------------------|----------|------------|-------------|--------------|
| Microphone | B&K 4191 | 2929405 | 2024-12-15 | NML |
| Multi function sound calibrator | B&K 4226 | 2288444 | 2024-10-15 | CIGISMEC |
| Signal generator | DS 360 | 33873 | 2024-10-15 | CEPREI |

Test specifications:

- All Scarlet's Sound level Meter has been calibrated in accordance with the requirements as specified in ISO 17025 and the lab calibration procedure SMTP004-CA-152.
- The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
- The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests



CALIBRATION REPORT

Certificate Number : SC230140

Calibration Method

The Unit Under Calibration (UUC) was calibrated by comparison measurement with sound level calibrator. The calibration has been accomplished in an ambient environment controlled, base on the in-house calibration procedure. The identification of the laboratory's calibration procedure employed are CP-7.2-01-107

Calibration Results

Appearance and function of use : Good
Results of Calibration : Without any adjustment
Sound Level Calibration : A
- Frequency Weighting : 0.1 dB
- Resolution

Sound Level Measurement (Slow Mode)

| Parameter | UUC Range | Standard Value | UUC Reading | UUC Error | (±) Uncertainty |
|-----------|-----------|----------------|-------------|-----------|-----------------|
| LFp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.8 dB | -0.07 dB | 0.60 dB |
| LSp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| Llp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |

Sound Level Measurement (Fast Mode)

| Parameter | UUC Range | Standard Value | UUC Reading | UUC Error | (±) Uncertainty |
|-----------|-----------|----------------|-------------|-----------|-----------------|
| LFp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| LSp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| Llp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |

--- End of Certificate ---

CERTIFICATE OF CALIBRATION

Certificate Number : SC230140

| | | | |
|------------------|---|----------------------|-------------|
| Customer Address | Pacific Laboratory Co.,Ltd. 14/5358 Moo 14 Tambol Bang Bua Thong, Amphoe Bang Thong, Nonthaburi 11110 | | |
| Description | Sound Level Meter | W/O Number | SC230140 |
| Manufacturer | Scarllet Tech | Calibration Location | Laboratory |
| Model | ST-11D | Ambient Temperature | 22 ± 2 °C |
| Serial Number | 820967 | Ambient Humidity | 55 ± 15 %RH |
| ID. Number | - | Received Date | 21-Mar-2023 |

This certifies that the above instrument was calibrated in compliance with the Calibration Systems Requirement of ISO/JEC 17025:2017 in accordance with referenced procedures. Standards used to perform this calibration are certified by or traceable to National Institute of Metrology (Thailand) and/or other recognized national measurement institutes which realizes the units of measurement according to the International System of Units (SI Unit).

Measurement uncertainties at the time of test are given where applicable. They are calculated in accordance with the method described in The Expression of Uncertainty and Confidence in Measurement (M3003).

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$ such that the coverage probability corresponds to approximately 95%. This result of calibration was found accurate as shown on date and place of calibration only.

Standard Equipments

| Description | Serial No. | Certificate No. | Traceability | Due Date |
|------------------------|------------|-----------------|--------------|-----------|
| Sound Level Calibrator | 141011576 | CP20220161EA | NIMT | 13-May-24 |

aptitech.com | technical@aptitech.com

Calibration certificates without signatures are not valid. This certificate applied to only the item identified and shall not be reproduced other than in full, without the specific written approval by APTITECH CALIBRATION CO., LTD.

CALIBRATION REPORT

Certificate Number : SC230375

Calibration Method

The Unit Under Calibration (UUC) was calibrated by comparison measurement with sound level calibrator. The calibration has been accomplished in an ambient environment controlled, base on the in-house calibration procedure. The identification of the laboratory's calibration procedure employed are CP-7.2-01-107

Calibration Results

Appearance and function of use : Good
Results of Calibration : Without any adjustment
Sound Level Calibration : A
- Frequency Weighting : A
- Resolution : 0.1 dB

Sound Level Measurement (Slow Mode)

| Parameter | UUC Range | Standard Value | UUC Reading | UUC Error | (±) Uncertainty |
|-----------|-----------|----------------|-------------|-----------|-----------------|
| LFp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| LSp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| Llp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |

Sound Level Measurement (Fast Mode)

| Parameter | UUC Range | Standard Value | UUC Reading | UUC Error | (±) Uncertainty |
|-----------|-----------|----------------|-------------|-----------|-----------------|
| LFp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.8 dB | -0.07 dB | 0.60 dB |
| LSp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| Llp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |

--- End of Certificate ---

CERTIFICATE OF CALIBRATION

Certificate Number : SC230375

Customer : Pacific Laboratory Co., Ltd.
Address : 14/5358 Moo 14 Tambol Bang Bua Thong, Amphoe Bang Thong,
Nonthaburi 11110

Description : Sound Level Meter
Manufacturer : Scarlett Tech
Model : ST-11D
Serial Number : 820968
ID. Number : N/A
W/O Number : SC230375
Calibration Location : Laboratory
Ambient Temperature : $22 \pm 2^\circ\text{C}$
Ambient Humidity : $55 \pm 15\% \text{RH}$
Received Date : 25-Aug-2023

This certifies that the above instrument was calibrated in compliance with the Calibration Systems Requirement of ISO/IEC 17025:2017 in accordance with referenced procedures. Standards used to perform this calibration are certified by or traceable to National Institute of Metrology (Thailand) and/or other recognized national measurement institutes which realizes the units of measurement according to the International System of Units (SI Unit).

Measurement uncertainties at the time of test are given where applicable. They are calculated in accordance with the method described in The Expression of Uncertainty and Confidence in Measurement (M3003).

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor $k=2$ such that the coverage probability corresponds to approximately 95%. This result of calibration was found accurate as shown on date and place of calibration only.

Standard Equipments

Description : Sound Level Calibrator
Serial No. : 141011576
Certificate No. : CP20230261EA
Traceability : TISI: 22-LB0119
Due Date : 05-Jul-24

Authority of Calibration

Calibration Date : 25-Aug-2023
Due Date : 28-Aug-2023
By : Mr. Rattapong Jantanya

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CALIBRATION REPORT

Certificate Number : SC230140

Calibration Method

The Unit Under Calibration (UUC) was calibrated by comparison measurement with sound level calibrator. The calibration has been accomplished in an ambient environment controlled, base on the in-house calibration procedure. The identification of the laboratory's calibration procedure employed are CP-7.2-01-107

Calibration Results

Appearance and function of use : Good
Results of Calibration : Without any adjustment
Sound Level Calibration : A
- Frequency Weighting : 0.1 dB
- Resolution

Sound Level Measurement (Slow Mode)

| Parameter | UUC Range | Standard Value | UUC Reading | UUC Error | (±) Uncertainty |
|-----------|-----------|----------------|-------------|-----------|-----------------|
| LFp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.8 dB | -0.07 dB | 0.60 dB |
| LSp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| Llp | 20-140 dB | 93.86 dB | 93.8 dB | -0.06 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |

Sound Level Measurement (Fast Mode)

| Parameter | UUC Range | Standard Value | UUC Reading | UUC Error | (±) Uncertainty |
|-----------|-----------|----------------|-------------|-----------|-----------------|
| LFp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| LSp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |
| Llp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.60 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.60 dB |

--- End of Certificate ---

CERTIFICATE OF CALIBRATION

Certificate Number : SC230140

Customer : Pacific Laboratory Co., Ltd.
Address : 14/5358 Moo 14 Tambol Bang Bua Thong,
Amphoe Bang Thong, Nonthaburi 11110

Description : Sound Level Meter
Manufacturer : Scarlet Tech
Model : ST-11D
Serial Number : 820967
ID. Number :
W/O Number : SC230140
Calibration Location : Laboratory
Ambient Temperature : 22 ± 2 °C
Ambient Humidity : 55 ± 15 %RH
Received Date : 21-Mar-2023

This certifies that the above instrument was calibrated in compliance with the Calibration Systems Requirement of ISO/IEC 17025:2017 in accordance with referenced procedures. Standards used to perform this calibration are certified by or traceable to National Institute of Metrology (Thailand) and/or other recognized national measurement institutes which realizes the units of measurement according to the International System of Units (SI Unit).

Measurement uncertainties at the time of test are given where applicable. They are calculated in accordance with the method described in The Expression of Uncertainty and Confidence in Measurement (M3003).

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor k=2 such that the coverage probability corresponds to approximately 95%. This result of calibration was found accurate as shown on date and place of calibration only.

Standard Equipments

Description : Sound Level Calibrator
Serial No. : 141011576
Certificate No. : CP20220161EA
Traceability : NIMT
Due Date : 13-May-24

Authority of Calibration

Approved Signatory :
Calibration Date : 23-Mar-2023
Date : 27-Mar-2023
By : Mr. Rattapong Janpanya

Calibration certificates without signatures are not valid. This certificate applied to only the item identified and shall not be reproduced other than in full, without the specific written approval by APTITECH CALIBRATION CO., LTD.



CERTIFICATE OF CALIBRATION

NO. 20221215052

| | |
|----------------------|-------------------|
| Name of Product: | Sound Level Meter |
| Model: | ST-110 |
| Serial Number: | 820385 |
| Specification: | Class 1 |
| Conclusion: | Pass |
| Date of calibration: | 2023-12-15 |
| Due Date: | 2024-12-14 |



Ca

- I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
- II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection: OK

2. Type & serial No. of Microphone: AWA14425-52473

4. Measuring up limit: 140.dBA

3. Adjustments to indicated sound levels:
Type of Callibrator: B&K 4231
Sound Pressure Level 94.0_dB
Equivalent Free-field Sound Level (reference environment conditions) 93.8_dB

5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests,)

Equivalent Free-field Sound Level (reference environment conditions) 93.8_dB

| Nominal frequency /Hz | Frequency weighting / dB | | | Nominal frequency /Hz | Frequency weighting / dB | | |
|-----------------------|--------------------------|-------|------|-----------------------|--------------------------|-------|------|
| | A | C | Z | | A | C | Z |
| 10 | -71.1 | -14.6 | 0.2 | 1000 | 0.0 | 0.0 | -0.1 |
| 20 | -50.4 | -6.4 | -0.4 | 2000 | 0.1 | 0.0 | 0.0 |
| 31.5 | -39.4 | -2.2 | 0.1 | 4000 | 1.3 | -0.1 | 0.0 |
| 63 | -26.2 | -0.8 | -0.1 | 8000 | 1.2 | -0.8 | 0.0 |
| 125 | -16.3 | -0.1 | -0.2 | 12500 | -5.7 | -7.2 | 0.1 |
| 250 | -8.5 | 0.2 | 0.0 | 16000 | -11.7 | -13.5 | 0.2 |
| 500 | -3.2 | 0.1 | 0.1 | 20000 | -23.9 | -25.8 | -0.3 |

6. Self-generated noise

Microphone replaced by electrical input signal device

| | | |
|-----------|------------|------------|
| 7.3 dB(A) | 11.2 dB(C) | 13.3 dB(Z) |
|-----------|------------|------------|

7. F&S Weighting

| | |
|---|------|
| Rate of the F weighting decrease (dB/s) | 35.1 |
| Rate of the S weighting decrease (dB/s) | 4.3 |
| Deviation of F&S | -0.1 |

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0_dB

Max error at 10dB steps upper reference sound level -0.1_dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0_dB

Max error at 10dB steps below reference sound level 0.1_dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1_dB

9. Tone burst response (A Weighting) :

| Single Toneburst duration /ms | Toneburst response /dB | | | |
|-------------------------------|------------------------------------|-------------------------------------|----------------------------------|-------------------------------------|
| | L _{10ms} -L _{1s} | L _{100ms} -L _{1s} | L _{1s} -L _{1s} | L _{100ms} -L _{1s} |
| 500 | 0.0 | -4.0 | -2.9 | -7.0 |
| 200 | -1.0 | -7.4 | -6.9 | -7.0 |
| 50 | -18.1 | -26.9 | -26.9 | -7.0 |
| 10 | -27.1 | / | -36.0 | -7.0 |

10. Peak C sound level (500Hz) :

| Cycle | One cycle | nominal value | Positive half | nominal value | Negative half | nominal value |
|---------------|-----------|---------------|---------------|---------------|---------------|---------------|
| LCpeak-LC(dB) | 3.5 | 3.5 | 2.3 | 2.4 | 2.3 | 2.4 |

11. Overload indication: Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 112.8_dB

Sweep amplitude: 40_dB

Scan cycle time: 60_S; Measurement period: 180_S;

| Items | Measured value/dB | Theoretical calculated value/dB | Error/dB |
|--------------------|-------------------|---------------------------------|----------|
| L _{Aeq,T} | 103.2 | 103.2 | 0.0 |
| L _S | 110.8 | 110.8 | 0.0 |
| L _{L10} | 108.8 | 108.8 | 0.0 |
| L _{S0} | 92.9 | 92.8 | 0.1 |
| L _{S0} | 76.9 | 76.8 | 0.1 |
| L _{S5} | 75.0 | 74.9 | 0.1 |

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 °C
Relative humidity: 60 %
Static pressure: 101.8 kPa

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests



CERTIFICATE OF CALIBRATION

NO. 20221215051

| | |
|----------------------|-------------------|
| Name of Product: | Sound Level Meter |
| Model: | ST-11D |
| Serial Number: | 820384 |
| Specification: | Class 1 |
| Conclusion: | Pass |
| Date of calibration: | 2023-12-15 |
| Due Date: | 2024-12-14 |

Calibrated by

- I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass them, and applies only to the unit identified above.
- II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection: OK

2. Type & serial No. of Microphone: AWA14425-54570

4. Measuring up limit: 140 dBA

3. Adjustments to indicated sound levels:

5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Type of Calibrator: B&K 4231

Sound Pressure Level 94.0 dB

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

| Nominal frequency /Hz | Frequency weighting / dB | | | Nominal frequency /Hz | Frequency weighting / dB | | |
|-----------------------|--------------------------|-------|------|-----------------------|--------------------------|-------|------|
| | A | C | Z | | A | C | Z |
| 10 | -71.0 | -14.6 | 0.2 | 1000 | 0.0 | 0.0 | -0.1 |
| 20 | -50.3 | -6.4 | -0.4 | 2000 | 0.1 | 0.0 | 0.0 |
| 31.5 | -39.4 | -2.2 | 0.1 | 4000 | 1.3 | -0.1 | 0.0 |
| 63 | -26.1 | -0.8 | -0.1 | 8000 | 1.2 | -0.8 | 0.0 |
| 125 | -16.3 | -0.2 | -0.2 | 12500 | -5.7 | -7.2 | 0.1 |
| 250 | -8.6 | 0.1 | 0.0 | 16000 | -11.7 | -13.7 | 0.2 |
| 500 | -3.2 | 0.1 | 0.0 | 20000 | -23.9 | -25.8 | -0.6 |

6. Self-generated noise
Microphone replaced by electrical input signal device

| | | |
|-----------|-----------|------------|
| 8.8 dB(A) | 8.4 dB(C) | 15.9 dB(Z) |
|-----------|-----------|------------|

7. F&S Weighting

| | |
|---|------|
| Rate of the F weighting decrease (dB/s) | 35.1 |
| Rate of the S weighting decrease (dB/s) | 4.4 |
| Deviation of F&S | -0.1 |

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB
Max error at 10dB steps upper reference sound level -0.1 dB
Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB
Max error at 10dB steps below reference sound level 0.1 dB
Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

9. Tone burst response (A Weighting) :

| Single Toneburst duration /ms | Toneburst response /dB | | | |
|-------------------------------|------------------------------------|------------------------------------|----------------------------------|------------------------------------|
| | L _{lower} -L _a | L _{upper} -L _a | L _{ref} -L _a | L _{upper} -L _a |
| 500 | 0.0 | -4.0 | -2.9 | -7.0 |
| 200 | -1.0 | -7.4 | -6.9 | -7.0 |
| 50 | -18.1 | -26.9 | -26.9 | -7.0 |
| 10 | -27.2 | / | -36.0 | -7.0 |

10. Peak C sound level (500Hz) :

| Cycle | One cycle | nominal value | positive half | nominal value | Negative half | nominal value |
|---------------|-----------|---------------|---------------|---------------|---------------|---------------|
| LCpeak-LC(dB) | 3.4 | 3.5 | 2.3 | 2.4 | 2.3 | 2.4 |

11. Overload indication: Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 112.8 dB
Sweep amplitude: 40 dB
Scan cycle time: 60 S; Measurement period: 180 S.

| Items | Measured value/dB | Theoretical calculated value/dB | Error/dB |
|--------------------|-------------------|---------------------------------|----------|
| L _{Aeq,T} | 103.2 | 103.2 | 0.0 |
| L _S | 110.8 | 110.8 | 0.0 |
| L ₁₀ | 108.8 | 108.8 | 0.0 |
| L ₅₀ | 92.9 | 92.8 | 0.1 |
| L ₉₀ | 76.9 | 76.8 | 0.1 |
| L ₉₅ | 75.0 | 74.9 | 0.1 |

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 °C
Relative humidity: 60 %
Static pressure: 101.8 kPa

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests



CERTIFICATE OF CALIBRATION

NO. 2022121505Z

Name of Product:

Model:

Serial Number:

Specification:

Conclusion:

Date of calibration:

Due Date:

Sound Level Meter

ST-11D

820385

Class 1

Pass

2023-12-15

2024-12-14

Calibration

- I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass them, and applies only to the unit identified above.
- II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlett Tech Co Ltd Taiwan.

1. Preliminary inspection: OK

2. Type & serial No. of Microphone: AWA14425-52473

4. Measuring up limit: 140.dBA

3. Adjustments to indicated sound levels:
5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests,)

Type of Calibrator: B&K 4231

Sound Pressure Level 94.0_dB

Equivalent Free-field Sound Level (reference environment conditions) 93.8_dB

| Nominal frequency /Hz | Frequency weighting / dB | | | Frequency weighting / dB | | |
|-----------------------|--------------------------|-------|------|--------------------------|-------|------|
| | A | C | Z | A | C | Z |
| 10 | -71.1 | -14.6 | 0.2 | 0.0 | 0.0 | -0.1 |
| 20 | -50.4 | -6.4 | -0.4 | 0.1 | 0.0 | 0.0 |
| 31.5 | -39.4 | -2.2 | 0.1 | 1.3 | -0.1 | 0.0 |
| 63 | -26.2 | -0.8 | -0.1 | 1.2 | -0.8 | 0.0 |
| 125 | -16.3 | -0.1 | -0.2 | -5.7 | -7.2 | 0.1 |
| 250 | -8.5 | 0.2 | 0.0 | -11.7 | -13.5 | 0.2 |
| 500 | -3.2 | 0.1 | 0.1 | -23.9 | -25.8 | -0.3 |

6. Self-generated noise

Microphone replaced by electrical input signal device

| | | |
|-----------|------------|------------|
| 7.3 dB(A) | 11.2 dB(C) | 13.3 dB(Z) |
|-----------|------------|------------|

7. F&S Weighting

| | |
|---|------|
| Rate of the F weighting decrease (dB/s) | 35.1 |
| Rate of the S weighting decrease (dB/s) | 4.3 |
| Deviation of F&S | -0.1 |

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB

Max error at 10dB steps upper reference sound level -0.1 dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB

Max error at 10dB steps below reference sound level 0.1 dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

9. Tone burst response (A Weighting) :

| Single Toneburst duration /ms | Toneburst response /dB | | |
|-------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| | L _{10ms} -L ₁ | L _{10ms} -L ₁ | L _{10ms} -L ₁ |
| 500 | 0.0 | -4.0 | -2.9 |
| 200 | -1.0 | -7.4 | -6.9 |
| 50 | -18.1 | -26.9 | -26.9 |
| 10 | -27.1 | / | -36.0 |

10. Peak C sound level (500Hz) :

| Cycle | One cycle | nominal value | Positive half | nominal value | Negative half | nominal value |
|---------------|-----------|---------------|---------------|---------------|---------------|---------------|
| LCpeak-LC(dB) | 3.5 | 3.5 | 2.3 | 2.4 | 2.3 | 2.4 |

11. Overload indication: Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 112.8 dB

Sweep amplitude: 40 dB

Scan cycle time: 60 S; Measurement period: 180 S.

| Items | Measured value/dB | Theoretical calculated value/dB | Error/dB |
|--------------------|-------------------|---------------------------------|----------|
| L _{Aeq,T} | 103.2 | 103.2 | 0.0 |
| L ₅ | 110.8 | 110.8 | 0.0 |
| L ₁₀ | 108.8 | 108.8 | 0.0 |
| L ₅₀ | 92.9 | 92.8 | 0.1 |
| L ₉₀ | 76.9 | 76.8 | 0.1 |
| L ₉₅ | 75.0 | 74.9 | 0.1 |

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 °C
Relative humidity: 60 %
Static pressure: 101.8 kPa

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests



CERTIFICATE OF CALIBRATION

NO. 20221215051

| | |
|----------------------|-------------------|
| Name of Product: | Sound Level Meter |
| Model: | ST-11D |
| Serial Number: | 820384 |
| Specification: | Class 1 |
| Conclusion: | Pass |
| Date of calibration: | 2023-12-15 |
| Due Date: | 2024-12-14 |

Calibrated by



- This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass them, and applies only to the unit identified above.
- This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection: OK

2. Type & serial No. of Microphone: AWA14425-5457Q

4. Measuring up limit: 140 dBA

3. Adjustments to indicated sound levels:

5. Frequency weightings: (Acoustic signal tests for Z weighting, other electric signal tests.)

Type of Calibrator: B&K 4231

Sound Pressure Level 94.0 dB

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

| Nominal frequency /Hz | Frequency weighting / dB | | | Nominal frequency /Hz | Frequency weighting / dB | | |
|-----------------------|--------------------------|-------|------|-----------------------|--------------------------|-------|------|
| | A | C | Z | | A | C | Z |
| 10 | -71.0 | -14.6 | 0.2 | 1000 | 0.0 | 0.0 | -0.1 |
| 20 | -50.3 | -6.4 | -0.4 | 2000 | 0.1 | 0.0 | 0.0 |
| 31.5 | -39.4 | -2.2 | 0.1 | 4000 | 1.3 | -0.1 | 0.0 |
| 63 | -26.1 | -0.8 | -0.1 | 8000 | 1.2 | -0.8 | 0.0 |
| 125 | -16.3 | -0.2 | -0.2 | 12500 | -5.7 | -7.2 | 0.1 |
| 250 | -8.6 | 0.1 | 0.0 | 16000 | -11.7 | -13.7 | 0.2 |
| 500 | -3.2 | 0.1 | 0.0 | 20000 | -23.9 | -25.8 | -0.6 |

6. Self-generated noise

Microphone replaced by electrical input signal device

| | | |
|-----------|-----------|------------|
| 8.8 dB(A) | 8.4 dB(C) | 15.9 dB(Z) |
|-----------|-----------|------------|

7. F&S Weighting

| | |
|---|------|
| Rate of the F weighting decrease (dB/s) | 35.1 |
| Rate of the S weighting decrease (dB/s) | 4.4 |
| Deviation of F&S | -0.1 |

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB

Max error at 10dB steps upper reference sound level -0.1 dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB

Max error at 10dB steps below reference sound level 0.1 dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

9. Tone burst response (A Weighting) :

| Single Toneburst duration /ms | Toneburst response /dB | | | |
|-------------------------------|-----------------------------------|-----------------------------------|--------------------------------|-----------------------------------|
| | L _{10ms} -L ₄ | L _{10ms} -L ₄ | L ₄ -L ₄ | L _{10ms} -L ₄ |
| 500 | 0.0 | -4.0 | -2.9 | -7.0 |
| 200 | -1.0 | -7.4 | -6.9 | -7.0 |
| 50 | -18.1 | -26.9 | -26.9 | -7.0 |
| 10 | -27.2 | / | -36.0 | -7.0 |

10. Peak C sound level (500Hz) :

| Cycle | One cycle | nominal value | Positive half | nominal value | Negative half | nominal value |
|---------------|-----------|---------------|---------------|---------------|---------------|---------------|
| LCpeak-LC(dB) | 3.4 | 3.5 | 2.3 | 2.4 | 2.3 | 2.4 |

11. Overload indication: Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 112.8 dB

Sweep amplitude: 40 dB

Scan cycle time: 60 S; Measurement period: 180 S.

| Items | Measured value/dB | Theoretical calculated value/dB | Error/dB |
|--------------------|-------------------|---------------------------------|----------|
| L _{Aeq,T} | 103.2 | 103.2 | 0.0 |
| L _S | 110.8 | 110.8 | 0.0 |
| L ₁₀ | 108.8 | 108.8 | 0.0 |
| L ₅₀ | 92.9 | 92.8 | 0.1 |
| L ₉₀ | 76.9 | 76.8 | 0.1 |
| L ₉₅ | 75.0 | 74.9 | 0.1 |

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 °C

Relative humidity: 60 %

Static pressure: 101.8 kPa

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests

CERTIFICATE OF CALIBRATION

Certificate Number : SC240093

Customer
Address : Pacific Laboratory Co., Ltd.
: 14/5358 Moo 14 Tambol Bang Bua Thong, Amphoe Bang Thong,
Nonthaburi 11110

Description
Manufacturer : Sound Level Meter
Model : Scarlet Tech
Serial Number : ST-11D
ID. Number : 820967
N/A

W/O Number
Calibration Location : SC240093
Ambient Temperature : Laboratory
Ambient Humidity : 22 ± 2 °C
Received Date : 55 ± 15 %RH
: 23-Mar-2024

This certifies that the above instrument was calibrated in compliance with the Calibration Systems Requirement of ISO/IEC 17025:2017 in accordance with referenced procedures. Standards used to perform this calibration are certified by or traceable to National Institute of Metrology (Thailand) and/or other recognized national measurement institutes which realizes the units of measurement according to the International System of Units (SI Unit).

Measurement uncertainties at the time of test are given where applicable. They are calculated in accordance with the method described in The Expression of Uncertainty and Confidence in Measurement (M3003).

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by coverage factor k=2 such that the coverage probability corresponds to approximately 95%. This result of calibration was found accurate as shown on date and place of calibration only.

Description
Sound Level Calibrator

Serial No.
141011576

Certificate No.
CP20230261EA

Traceability
TISI: 22-LB0119

Due Date
05-Jul-24

Standard Equipments

Authority of Calibration

Calibration Date : 23-Mar-2024
Issued Date : 26-Mar-2024
Calibrated By : Ms. Hathaichanok Kaewsrirasi

[Laboratory Manager]

[Technical Manager]

Our signatures are not valid. This certificate applied to only the item identified and shall not be reproduced other than in full, without the specific written approval by APTITECH CALIBRATION CO., LTD.

CALIBRATION REPORT

Certificate Number : SC240093

Calibration Method

The Unit Under Calibration (UUC) was calibrated by comparison measurement with sound level calibrator. The calibration has been accomplished in an ambient environment controlled, base on the in-house calibration procedure. The identification of the laboratory's calibration procedure employed are CP-7.2-01-107

Calibration Results

Appearance and function of use : Good
Results of Calibration : Without any adjustment
Sound Level Calibration
- Frequency Weighting : A
- Resolution : 0.1 dB

Sound Level Measurement (Slow Mode)

| Parameter | UUC Range | Standard Value | UUC Reading | UUC Error | (#) Uncertainty |
|-----------|-----------|----------------|-------------|-----------|-----------------|
| LFp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.61 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.61 dB |
| LSp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.61 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.61 dB |
| Lip | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.61 dB |
| | | 113.87 dB | 113.7 dB | -0.17 dB | 0.61 dB |

Sound Level Measurement (Fast Mode)

| Parameter | UUC Range | Standard Value | UUC Reading | UUC Error | (#) Uncertainty |
|-----------|-----------|----------------|-------------|-----------|-----------------|
| LFp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.61 dB |
| | | 113.87 dB | 113.8 dB | -0.07 dB | 0.61 dB |
| LSp | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.61 dB |
| | | 113.87 dB | 113.8 dB | -0.07 dB | 0.61 dB |
| Lip | 20-140 dB | 93.86 dB | 93.7 dB | -0.16 dB | 0.61 dB |
| | | 113.87 dB | 113.8 dB | -0.07 dB | 0.61 dB |

--- End of Certificate ---



CERTIFICATE OF CALIBRATION

NO. 20221215051

Name of Product:

Sound Level Meter

Model:

SF-11D

Serial Number:

820384

Specification:

Class 1

Conclusion:

Pass

Date of calibration:

2023-12-15

Due Date:

2024-12-14

Calibration

- I.

This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass them, and applies only to the unit identified above.
- II.

This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
- III.

This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.
1. Preliminary inspection:

OK
2. Type & serial No. of Microphone:

AWA14425-54570
3. Adjustments to indicated sound levels:

Measuring up limit: 140.dBA
4. Measuring up limit:

140.dBA
5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Type of Calibrator: B&K 4231

Sound Pressure Level 94.0_dB

Equivalent Free-field Sound Level (reference environment conditions) 93.8_dB

| Nominal frequency /Hz | Frequency weighting / dB | | | Nominal frequency /Hz | Frequency weighting / dB | | |
|-----------------------|--------------------------|-------|------|-----------------------|--------------------------|-------|------|
| | A | C | Z | | A | C | Z |
| 10 | -71.0 | -14.6 | 0.2 | 1000 | 0.0 | 0.0 | -0.1 |
| 20 | -50.3 | -6.4 | -0.4 | 2000 | 0.1 | 0.0 | 0.0 |
| 31.5 | -39.4 | -2.2 | 0.1 | 4000 | 1.3 | -0.1 | 0.0 |
| 63 | -26.1 | -0.8 | -0.1 | 8000 | 1.2 | -0.8 | 0.0 |
| 125 | -16.3 | -0.2 | -0.2 | 12500 | -5.7 | -7.2 | 0.1 |
| 250 | -8.6 | 0.1 | 0.0 | 16000 | -11.7 | -13.7 | 0.2 |
| 500 | -3.2 | 0.1 | 0.0 | 20000 | -23.9 | -25.8 | -0.6 |

| Items | Measured value/dB | Theoretical calculated value/dB | Error/dB |
|--------|-------------------|---------------------------------|----------|
| LAeq,T | 103.2 | 103.2 | 0.0 |
| LS | 110.8 | 110.8 | 0.0 |
| L10 | 108.8 | 108.8 | 0.0 |
| L50 | 92.9 | 92.8 | 0.1 |
| L90 | 76.9 | 76.8 | 0.1 |
| L95 | 75.0 | 74.9 | 0.1 |

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 °C
Relative humidity: 60 %
Static pressure: 101.8 kPa

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests