

ภาคผนวกที่ 30
ผลการเปรียบเทียบอุปกรณ์และเครื่องมือตรวจวัด

CERTIFICATE OF CALIBRATION

Certificate No. : COF-006-67

Page 1 of 2 Pages

MEASUREMENT ITEM : Top Load Orifice
MANUFACTURER : TISCH
MODEL/TYPE : TE-5025A
SERIAL NUMBER : 2066
ID NUMBER : STS 306-11-0051
CONDITION AS-RECEIVED : Used item
CUSTOMER : STS Green Co., Ltd.
3/23 Moo.5, Lat sawai, Lamlukka District, Pathumthani 12150

RECEIVED DATE : 05 Feb 2024
MEASUREMENT DATE : 13 Feb 2024
ISSUE DATE : 14 Feb 2024

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 23.4 °C and 62.8 %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 (Roots Meter) Model G65/IMC/W2-dp. The WI-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 NIMT (National Metrology Institute of Thailand) via Certificate number: MW-0063-23.

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:

Mr. Parinya Booncharoen
Calibration Department Manager

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 [Ta] °C | Temperature [Tm] °C | Δp_{meter} mmHg | $\Delta p_{Orifice}$ inH ₂ O | Y | Standard Flow [Q_s] m^3/min |
|-------|------------------------|--------------------------|---------------------------|---------------------------|----------------------------|--|-------|--------------------------------------|
| 1 | 0.702 | 759.303 | 23.05 | 22.40 | 54.870 | 1.786 | 1.340 | 0.656 |
| 2 | 0.995 | 759.298 | 23.12 | 22.47 | 59.770 | 3.523 | 1.882 | 0.924 |
| 3 | 1.120 | 759.260 | 23.21 | 22.47 | 43.144 | 4.675 | 2.168 | 1.064 |
| 4 | 1.166 | 759.282 | 23.21 | 22.53 | 30.909 | 5.260 | 2.299 | 1.127 |
| 5 | 1.417 | 759.296 | 23.31 | 22.70 | 30.830 | 7.839 | 2.806 | 1.369 |

Slope (m): **2.05538**
 Intercept (b): **-0.01403**
 Correlation coefficient (r): **0.99972**
 Uncertainty ($k=2$): **0.015 m^3/min**

Table 2: The results of Q actual calibration data

| Plate | Flow rate m^3/min | Pressure [Pa] mmHg | Temperature [Ta] °C | Temperature [Tm] °C | Δp_{meter} mmHg | $\Delta p_{Orifice}$ inH ₂ O | Y | Standard Flow [Q_a] m^3/min |
|-------|------------------------|--------------------------|---------------------------|---------------------------|----------------------------|--|-------|--------------------------------------|
| 1 | 0.702 | 759.303 | 23.05 | 22.40 | 54.870 | 1.786 | 0.835 | 0.652 |
| 2 | 0.995 | 759.298 | 23.12 | 22.47 | 59.770 | 3.523 | 1.172 | 0.919 |
| 3 | 1.120 | 759.260 | 23.21 | 22.47 | 43.144 | 4.675 | 1.351 | 1.059 |
| 4 | 1.166 | 759.282 | 23.21 | 22.53 | 30.909 | 5.260 | 1.433 | 1.121 |
| 5 | 1.417 | 759.296 | 23.31 | 22.70 | 30.830 | 7.839 | 1.749 | 1.363 |

Slope (m): **1.28736**
 Intercept (b): **-0.00873**
 Correlation coefficient (r): **0.99972**
 Uncertainty ($k=2$): **0.015 m^3/min**

End of Certificate of Calibration





Console Sensor Calibration Data Sheet

Console Information

Model #: XC-572-V
 Serial #: A2209632
 Units: Metric
 Type: "English"

Calibration Conditions

Pbar (mm. Hg): 755.2
 Humidity (%): 64.0
 Tamb (°C): 24.9
 Corr. Pbar (mm. Hg): 755.0

Reference Devices

TC Simulator Model: CC-VTR-SH
 Reference #: 091109269
 Barometer Model: 736930
 Reference #: EBARODIALSPE01
 Digital Pressure Calibrator Model: 718 30G
 Reference #: 3891001

Pressure Gauge / Manometer Calibration Data

| Console Vacuum Calibration | | | |
|----------------------------|------------------|----------------|-------------------------------------|
| Reference Point | Reference Vacuum | Console Vacuum | Reference Point Status ⁶ |
| # | in. Hg | in. Hg | Pass/Fail |
| 1 | -5.0 | -5.0 | PASS |
| 2 | -15.0 | -15.0 | PASS |
| 3 | -20.0 | -20.0 | PASS |

| Reference Point ¹ | ΔH Manometer Calibration | | | Reference Point Status ² |
|------------------------------|--------------------------|------------------------------|------------------------------|-------------------------------------|
| | Reference mm H2O | Positive (+) Pitot mm H2O | Negative (-) Pitot mm H2O | |
| # | | | | Pass/Fail |
| 1 | -200.000 | 0.0 | -200.0 | PASS |
| 2 | -150.000 | 0.0 | -150.0 | PASS |
| 3 | -100.000 | 0.0 | -100.0 | PASS |
| 4 | -80.000 | 0.0 | -80.0 | PASS |
| 5 | -50.000 | 0.0 | -50.0 | PASS |
| 6 | 0.000 | 0.0 | 0.0 | PASS |
| 7 | 50.000 | 50.0 | 0.0 | PASS |
| 8 | 80.000 | 80.0 | 0.0 | PASS |
| 9 | 100.000 | 100.0 | 0.0 | PASS |
| 10 | 150.000 | 150.0 | 0.0 | PASS |
| 11 | 200.000 | 200.0 | 0.0 | PASS |
| ΔH Overall Audit Status | | | | PASS |

| Reference Point ¹ | ΔP Manometer Calibration | | | Reference Point Status ² |
|------------------------------|--------------------------|------------------------------|------------------------------|-------------------------------------|
| | Reference mm H2O | Positive (+) Pitot mm H2O | Negative (-) Pitot mm H2O | |
| # | | | | Pass/Fail |
| 1 | -200.000 | 0.0 | -200.0 | PASS |
| 2 | -150.000 | 0.0 | -150.0 | PASS |
| 3 | -100.000 | 0.0 | -100.0 | PASS |
| 4 | -80.000 | 0.0 | -80.0 | PASS |
| 5 | -50.000 | 0.0 | -50.0 | PASS |
| 6 | 0.000 | 0.0 | 0.0 | PASS |
| 7 | 50.000 | 50.0 | 0.0 | PASS |
| 8 | 80.000 | 80.0 | 0.0 | PASS |
| 9 | 100.000 | 100.0 | 0.0 | PASS |
| 10 | 150.000 | 150.0 | 0.0 | PASS |
| 11 | 200.000 | 200.0 | 0.0 | PASS |
| ΔP Overall Audit Status | | | | PASS |

Calibrate By: Danapan P. Approved By: [Signature] Date: 12 Jun 24

Notes

- ¹ Suggested, minimum reference points are 10 (0, 100, 200, 300, 500, 700, 900, 1100, 1500, 1900 °F), can test for more.
- ² For valid test results, the maximum difference between temperature and reference readings should be less than ±5.4 °F (±3 °C), for all thermocouples except for the stack thermocouple which should be less than ±1.5% absolute temperature from the reference reading and the exit thermocouple which should be less than ±2°F (±1 °C) from the reference reading (EPA Method 2, Section 6.3 and EPA Method 5, Section 6.1.7.2.1.1).
- ³ Do not change this cell value, it is instead based on input from Cell H8 at the top of this sheet under "Calibration Conditions"
- ⁴ Absolute temperature difference and other formulas are calculated based on unit input from cell C8 at the top of this sheet under "Meter Console Information"
- ⁵ For valid test results, the maximum difference between console and reference barometric pressure readings should be less than ±0.1 in. Hg (±2.5 mm Hg). (EPA Method 5, Section 6.1.2)
- ⁶ For valid test results, the maximum difference between console and reference vacuum readings should be less than ±0.5 in. Hg (±12.5 mm Hg)
- ⁷ For valid test results, the maximum difference between console and reference vacuum readings should be less than ±0.05 in. H2O (±1.25 mm H2O), or 5% of full scale
- I certify that the above Thermocouple Sensors were calibrated in accordance with US EPA Methods 2 and 5, CFR 40 Part 60.

Nomenclature

P_b - Barometric Pressure
 DGM - Dry Gas Meter
 K_1 - Constant based on standard temp and press
 Θ - Run time, in minutes
 $P_m - \Delta H$ (Meter Pressure, gauge)
 V_m - Volume collected by test meter, corrected for STP
 $Q_{m(std)}$ - Calculated flow rate of test meter
 K' - Critical orifice coefficient
 P_w - Measured pressure of reference meter
 t_w - Temperature measured in reference meter

Equations

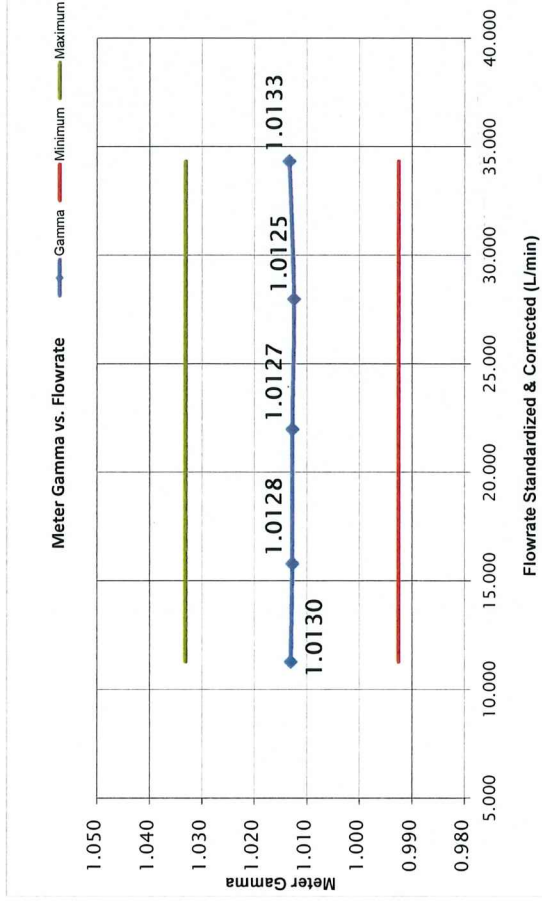
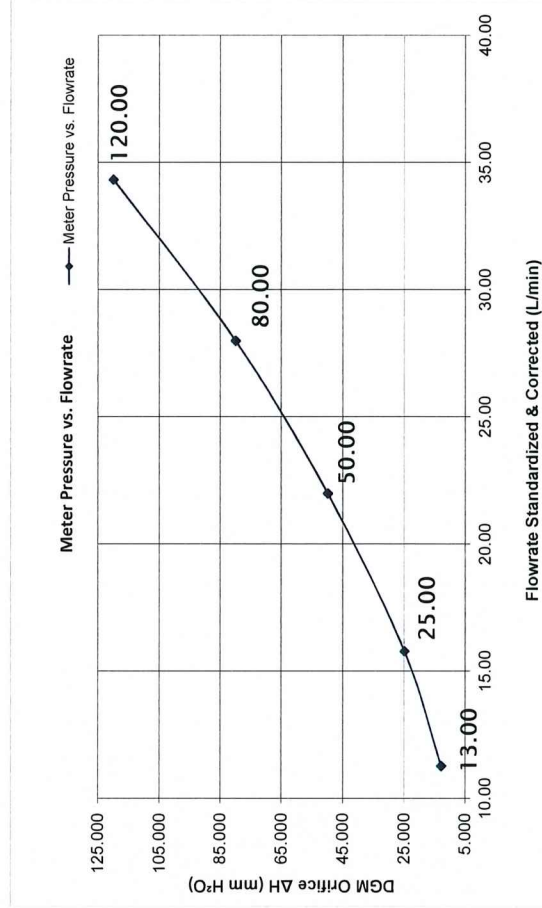
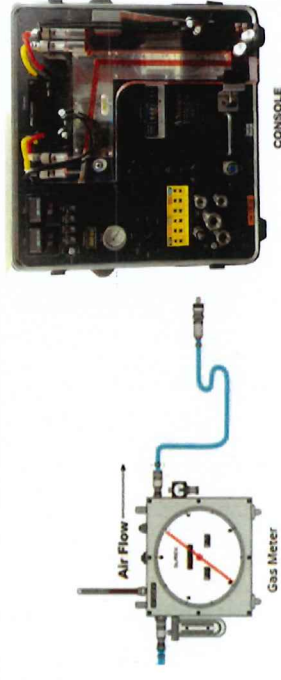
$$V_{w(std)} = Y * K_1 \frac{V_w * (P_{bar} + \frac{P_{m(std)}}{13.6})}{T_w}$$

$$K_1 V_m (P_{bar} + \frac{\Delta H}{13.6})}{T_m}$$

$$K_1 = \frac{T_{std}}{P_{std}} \quad Y = \frac{V_{cr(std)}}{V_{m(std)}} \quad Q_{w(std)} = \frac{V_{w(std)}}{\Theta}$$

$$Metric \Delta H_g = \frac{P_{m(g)} * 0.0011696 * (P_{bar} + \frac{P_{m(g)}}{13.6})}{T_m} * \left(\frac{T_w * \Theta}{V_w * P_{bar}} \right)^2$$

Calibration Train





Certificate of Calibration

Method 5 Pre-Test Calibration - Liters (L)

UUT Meter Console Information

| | | | |
|---------------|----------|------------------------------|-------|
| Model #: | XC-572-V | Bar. Pressure (mm Hg): | 755.2 |
| Serial #: | A2209632 | Ambient Temperature (°C): | 24.9 |
| DGM Model #: | SK25EX | Relative Humidity (%): | 64.0 |
| DGM Serial #: | 00007892 | Altitude (m): | 1.83 |
| | | Bar. Pressure Corr. (mm Hg): | 755.0 |

Calibration Conditions

| | |
|---------------------------|--------|
| Std. Temp. (K): | 293.15 |
| Std. Press. (mm Hg): | 760 |
| K ₁ (K/mm Hg): | 0.3857 |

Factors/Conversions

Reference Equipment

| | |
|--------------------------|-----------|
| Calibration Meter Model: | DGMR-200H |
| Cal. Due Date: | 25-Jul-24 |
| Serial No.: | 0000026 |
| Gamma: | 1.0000 |

UUT Meter (DGM)

| Run Time (seconds) | Orifice, ΔH (mm H ₂ O) | Volume | | Meter Temperature (°C) | | Meter Pressure (in H ₂ O) | Volume (L) | | Reference Meter (WTM) | |
|--------------------|-----------------------------------|-------------------|-------------------|------------------------|-------------------|--------------------------------------|-------------------|-------------------|-----------------------|-------------------|
| | | Initial (L) | Final (L) | Initial | Final | | Initial | Final | Initial | Final |
| Θ | P _{m(g)} | V _{m(i)} | V _{m(f)} | t _{m(i)} | t _{m(f)} | P _w | V _{w(i)} | V _{w(f)} | V _w | t _{w(f)} |
| 840.00 | 13.00 | 11523.8 | 11683.2 | 25.0 | 25.0 | 0.3 | 0.00 | 161.56 | 161.56 | 25.0 |
| 630.00 | 25.00 | 11683.2 | 11850.4 | 25.0 | 25.0 | 0.5 | 0.00 | 169.54 | 169.54 | 25.0 |
| 450.00 | 50.00 | 11850.4 | 12016.8 | 26.0 | 26.0 | 0.6 | 0.00 | 168.53 | 168.53 | 25.0 |
| 390.00 | 80.00 | 12016.8 | 12200.2 | 26.0 | 27.0 | 2.0 | 0.00 | 185.28 | 185.28 | 25.0 |
| 300.00 | 120.00 | 12200.2 | 12373.0 | 27.0 | 28.0 | 2.4 | 0.00 | 174.64 | 174.64 | 25.0 |

Standardized Data

| Reference Meter (L) | | UUT Meter (L) | | Correction Factor | | ΔH @ (mm H ₂ O) | |
|---------------------|---------------------|---------------------|---------------------|-------------------|----------|----------------------------|----------|
| Std. Vol. | Std. Flow | Std. Vol. | Std. Flow | Value | Variance | 0.0212 SCMM | Variance |
| V _{w(Std)} | Q _{w(Std)} | V _{m(Std)} | V _{w(Std)} | Y | ΔY | ΔH@ | ΔΔH@ |
| 157.93 | 11.28 | 155.89 | 11.3 | 1.0130 | 0.0002 | 45.1 | -0.164 |
| 165.80 | 15.79 | 163.71 | 15.8 | 1.0128 | -0.0001 | 44.4 | -0.907 |
| 164.86 | 21.98 | 162.78 | 22.0 | 1.0127 | -0.0001 | 45.8 | 0.502 |
| 181.87 | 27.98 | 179.63 | 28.0 | 1.0125 | -0.0004 | 45.6 | 0.294 |
| 171.59 | 34.32 | 169.34 | 34.3 | 1.0133 | 0.0004 | 45.6 | 0.276 |
| | | | | 1.0129 | Y Avg. | 45.3 | ΔH@ Avg. |

Metric

Pass/Fail Judgment : **Pass**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.

Note: For ΔH_g, orifice pressure differential that equates to 0.0212m³/min at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2inches (5.1mm) H₂O.

Calibrate By: *Dattapan D.*

Approved By:

Date: 12 Jun 24

The instruments listed and described on this certificate have been calibrated against standards traceable to the National Institute of Standards and Technology (N.I.S.T.) and in reference to EPA Method 5, Section 10.3.1.



Verification Test Report

Instruments Information

Page:2/2

Analyzer Type: Flue Gas Analyser
 Model: Optima7

Manufacturer: MRU
 Serial No.: 354748

Calibration Gas information

Standard Gas Mid Range

O2 Conc 2.1 %vol.
 Cd/Ex: 343014/Jul 24,2025
 CO Conc 100.2 ppm
 NO Conc 101.9 ppm
 NOX Conc 101.9 ppm
 SO2 Conc 100.7 ppm
 CO2 Conc 7.597 %
 Cd/Ex: GN0029548/Mar 08,2032

Standard Gas High Range

O2 Conc 10.00 %vol.
 Cd/Ex: 343018/Nov 9,2025
 CO Conc 600.0 ppm
 NO Conc 198.9 ppm
 NOX Conc 198.9 ppm
 SO2 Conc 200.0 ppm
 CO2 Conc 16.00 %
 Cd/Ex: GN0032954/Apr 30,2032

Environment: Temperature 28.4 °C Humidity: 87 %RH

CO calibration test

| Set point | Std.gas (ppm) | Before Adj Reading(ppm) | After Adj Reading(ppm) | Difference | % error |
|-----------|---------------|-------------------------|------------------------|------------|---------|
| Low/Zero | 0.0 | 0 | 0 | 0.0 | 0.0 |
| Mid | 100.2 | 101 | 100 | -0.2 | -0.2 |
| Hight | 600.0 | 607 | 602 | 2.0 | 0.3 |

O2 calibration test

| Set point | Std.gas (ppm) | Before Adj Reading(ppm) | After Adj Reading(ppm) | Difference | % error |
|-----------|---------------|-------------------------|------------------------|------------|---------|
| Low/Zero | 0.0 | 0 | 0 | 0.0 | 0.0 |
| Mid | 2.1 | 2.2 | 2.08 | 0.0 | -1.0 |
| Hight | 10.00 | 10.21 | 10.01 | 0.0 | 0.1 |

Note

Technical Data Calibration results.:Calibration reading response discrepancy

O2 parameter ± 0.2 Vol-% at Range 0-21 Vol-%
 CO2 parameter ± 0.3 Vol-% at Range 0-CO2 Max
 CO parameter ± 5 % at Range 0-500 PPM
 NO parameter ± 5 % at Range 0-1000 PPM
 NO2 parameter ± 5 % at Range 0-1000 PPM
 SO2 parameter ± 5 % at Range 0-2000 PPM

Calibrate By :

Pattanasorn P.

Approve By :

K

Date:

22 Jul 24


neediss
 Neediss Supply Instrument Co., Ltd.

This report not be reproduced except in full, without the written approval of Neediss Supply Instrument Co., Ltd.


www.neediss.com

We know the best thing to save environment



Verification Test Report

Instruments Information

Page:1/2

Analyzer Type: Flue Gas Analyser
Model: Optima7

Manufacturer: MRU
Serial No.: 354748

Calibration Gas information

Standard Gas Mid Range

O2 Conc 2.1 %vol.
Cd/Ex: 343014/Jul 24,2025
CO Conc 100.2 ppm
NO Conc 101.9 ppm
NOX Conc 101.9 ppm
SO2 Conc 100.7 ppm
CO2 Conc 7.597 %
Cd/Ex: GN0029548/Mar 08,2032

Standard Gas High Range

O2 Conc 10.00 %vol.
Cd/Ex: 343018/Nov 9,2025
CO Conc 600.0 ppm
NO Conc 198.9 ppm
NOX Conc 198.9 ppm
SO2 Conc 200.0 ppm
CO2 Conc 16.00 %
Cd/Ex: GN0032954/Apr 30,2032

Environment: Temperature 28.4 °C Humidity: 87 %RH

SO2 calibration test

| Set point | Std.gas (ppm) | Before Adj Reading(ppm) | After Adj Reading(ppm) | Difference | % error |
|-----------|---------------|-------------------------|------------------------|------------|---------|
| Low/Zero | 0.0 | 0 | 0 | 0.0 | 0.0 |
| Mid | 100.7 | 96 | 100 | -0.7 | -0.7 |
| Hight | 200.0 | 197 | 201 | 1.0 | 0.5 |

NO calibration test

| Set point | Std.gas (ppm) | Before Adj Reading(ppm) | After Adj Reading(ppm) | Difference | % error |
|-----------|---------------|-------------------------|------------------------|------------|---------|
| Low/Zero | 0.0 | 0 | 0 | 0.0 | 0.0 |
| Mid | 101.9 | 90 | 101 | -0.9 | -0.9 |
| Hight | 198.9 | 201 | 200 | 1.1 | 0.6 |

NOX calibration test

| Set point | Std.gas (ppm) | Before Adj Reading(ppm) | After Adj Reading(ppm) | Difference | % error |
|-----------|---------------|-------------------------|------------------------|------------|---------|
| Low/Zero | 0.0 | 0 | 0 | 0.0 | 0.0 |
| Mid | 101.9 | 90 | 101 | -0.9 | -0.9 |
| Hight | 198.9 | 201 | 200 | 1.1 | 0.6 |

CO2 calibration test

| Set point | Std.gas (ppm) | Before Adj Reading(ppm) | After Adj Reading(ppm) | Difference | % error |
|-----------|---------------|-------------------------|------------------------|------------|---------|
| Low/Zero | 0.0 | 0 | 0 | 0.0 | 0.0 |
| Mid | 7.597 | 7.94 | 7.6 | 0.0 | 0.0 |
| Hight | 16.00 | 16.68 | 15.98 | 0.0 | -0.1 |

This report not be reproduced except in full, without the written approval of Neediss Supply Instrument Co., Ltd.



Certificate of Calibration

Page 1 of 2

Certificate No.: : WK2402-300-836

Customer : STS Green Co., Ltd
3/23 Moo 5, Phaholyohin-Lamlukka Rd.,
T. Lat Sawai, A. Lumlukka, Pathumthani, 12150

| | | | |
|--------------|--------------------|----------------------|-------------------|
| Instrument | : Sound Calibrator | Ambient Temperature | : (23.0 ± 2) °C |
| Manufacturer | : RION | Humidity | : (50.0 ± 15) %RH |
| Model | : NC-74 | Received Date | : 23-Feb-24 |
| Serial No. | : 34851902 | Calibrated Date | : 26-Feb-24 |
| Identity No. | : STS 306-05-0002 | Issued Date | : 26-Feb-24 |
| Range | : See to Data | Calibration Location | : In Lab |
| Resolution | : See to Data | | |

Calibration Method : CP-WK-A02

Reference standard instruments :

| <u>Instrument</u> | <u>Serial No.</u> | <u>Certificate No.</u> | <u>Due Date</u> | <u>Traceability to</u> |
|----------------------------|-------------------|------------------------|-----------------|------------------------|
| Sound Level Calibrator | 150806450 | EEL BP 99/0266 | 28-Feb-24 | TISTR |
| Sound Level Meter Standard | 200200875 | TTH-0-83732 | 30-Jul-24 | TTH |
| Audio Analyzer | 3413A14479 | | | |
| Condenser Microphone | | | | |

TISTR : Thailand Institute of Scientific and Technological Research.

TTH : Techmaster Asia (Thailand) Co., Ltd.

This result calibrate was found accurate as shown on date place of calibrate only

This certificate is traceability to the International System of Unit (SI)

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

Calibrated by : Mr. Kritsada Oupparattha

Approved by :

Mr. Ratchadawut Rungravee

Authorized Signatory

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.



Calibration Results

Certificate No.: WK2402-300-836

Page 2 of 2

Calibration Result of the Accuracy

Function : Sound Level Measurement

Unit : dB

| UUC Setting | STD Reading dB | Error Value dB | Uncertainty (\pm) dB |
|-------------|-------------------|-------------------|-----------------------------|
| 94 | 93.9 | 0.1 | 0.20 |

Function : Frequency Source Test

Unit : Hz

| Nominal Value | STD Reading | Error | Uncertainty (\pm) |
|---------------|-------------|--------|-----------------------|
| 1000 Hz | 999.9 Hz | 0.1 Hz | 0.0058 Hz |

(X) Without Adjustment () After Adjustment

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.

**** End of Certificate****

Certificate of Calibration

Certificate No. : 67-200078-1

Page : 1 of 2

Submitted by : STS Green Company Limited
3/23 Moo 5, T.Lad Sawai, A.Lumlukka, Pathumthani 12150

Equipment : Electronic Balance
Manufacturer : METTLER TOLEDO **Model :** AB204-S/FACT
Serial No. : 1128483646 **ID No. :** ANB 01
Capacity : 220 g **Resolution :** 0.0001 g

Environment : On site calibration was carried out at the Laboratory, STS Green Company Limited
Ambient Temperature : (25.5 to 25.9) °C
Relative Humidity : (32.1 to 34.0) %
Air Pressure : 1010.0 mbar

Date of Received : 04 March 2024

Date of Calibration : 04 March 2024

Date of Issue : 09 March 2024

Calibrated by : Akaradath Thippichai

Calibration Method : In-house method CAL-M2001 based on UKAS Publication ref : LAB 14
Edition 7 - November 2022

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

Standard Weights

| ID No. | Cert. No. | Due Date | Traceability |
|------------|-----------|-------------|--|
| E261-E2624 | C02232088 | 08 Nov 2024 | National Institute of Metrology (Thailand), (NIMT) |

Approved by :



(Surachai Promthong)

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.



Certificate of Calibration

Certificate No. : 67-200078-1

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 | 0.0001 | 0.00012 |
| 0.01 | 0.0001 | 0.00012 |
| 0.1 | 0.0001 | 0.00012 |
| 1 | 0.0000 | 0.00013 |
| 5 | -0.0001 | 0.00013 |
| 10 | 0.0000 | 0.00013 |
| 20 | -0.0002 | 0.00014 |
| 50 | -0.0001 | 0.00015 |
| 100 | -0.0001 | 0.00020 |
| 150 | -0.0002 | 0.00038 |
| 200 | -0.0001 | 0.00038 |

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

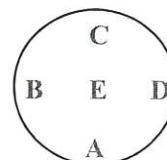
This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2.06$, providing a level of confidence of approximately 95%

Eccentric error

Load test : 50 g

A B C D E

0.0002 0.0001 0.0000 0.0000 0.0000 g



Repeatability

Load test : 200 g

Stdev. : 0.00005 g

- oOo -

Handwritten signature





S K SALES AND SERVICE CO.,LTD.

194/56, 194/57 Thakham Rd. Samae Dam

Bang Khun Thian Bangkok 10150

Tel. : 02-417-2144 Fax : 02-417-2155



Certificate of Calibration

Reference No. : C04561/2401-015 Certificate No. : L2401-1669
Customer : STS GREEN CO.,LTD. Page 1 of 2

: 3/23 Moo 5, Phaholyothin-Lamlukka Rd.,
: T.Lat Sawai, A.Lamlukka, Pathumthani, 12150

Equipment : pH Meter

Manufacturer :

Model :

Serial No. :

ID No. :

Received Date :

Calibrated Date :

Issued Date :

| pH Meter | pH Electrode |
|----------|--------------|
| HORIBA | HORIBA |
| D-51 | 9651 |
| S005100 | 980G0030 |
| PHM-No.7 | - |

: 29 January 2024

: 31 January 2024

: 4 February 2024

| Environment | Start Calibration | Stop Calibration |
|----------------------------|-------------------|------------------|
| Ambient Temperature (°C) | 21.0 | 20.8 |
| Relative Humidity (% RH) | 46 | 45 |

Place of Calibration : Chemical Calibration Laboratory

Calibrated by : Miss Sutida Prasansak

Calibration Method

In-house method : WI-28 based on direct measurement by using certified reference material (CRM)

Condition of this result of calibration

1. Reference standard material

| pH Solution | Lot No. | Exp Date |
|----------------------------|---------|--------------|
| 1) pH Buffer Solution 4.0 | 904723 | 10 June 2025 |
| 2) pH Buffer Solution 7.0 | 904725 | 10 June 2024 |
| 3) pH Buffer Solution 10.0 | 904724 | 10 June 2024 |

2. This result of calibration was found accurate as shown on date and place of calibration for this item only

3. This certificate can be traceable to International System of Unit :

- Through C.P.A.Chem LTD.

Approved by :

☒ Mr.Suphachai Saksri

☐ Mr.Phayak Tootit

☐ Miss Tantaraporn Pettong

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

Calibration Result

Calibration by using standard buffer solution

Performing 3 Point calibration standard curve using buffer : 4,7,10

| STD Buffer Solution (pH) | UUC Reading | | UUC Error | Uncertainty (± pH) | Coverage factor k |
|-----------------------------|---------------|--------------|--------------|-----------------------|----------------------|
| | Before Adjust | After Adjust | | | |
| 4.008 | 4.10 | 3.95 | -0.058 | 0.017 | 2.32 |
| 6.985 | 6.95 | 6.95 | -0.035 | 0.017 | 2.05 |
| 10.010 | 10.12 | 10.13 | 0.120 | 0.020 | 2.65 |

Resolution: 0.01 for pH Function

STD = Standard

UUC = Unit Under Calibration

** End of Calibration Report **




S K SALES AND SERVICE CO.,LTD.
194/56, 194/57 Thakham Rd. Samae Dam
Bang Khun Thian Bangkok 10150
Tel. : 02-417-2144 Fax : 02-417-2155



Certificate of Calibration

Reference No. : C04561/2401-015
Customer : STS GREEN CO.,LTD.
: 3/23 Moo 5, Phaholyothin-Lamlukka Rd.,
: T.Lat Sawai, A.Lamlukka, Pathumthani, 12150
Equipment : Digital Thermometer
Manufacturer : HORIBA
Model : D-51
Serial No. : S005100
ID No. : PHM-No.07
Received Date : 29 January 2024
Calibrated Date : 31 January 2024
Issued Date : 4 February 2024

Certificate No. : L2401-1670

Page 1 of 2

| Environment | Minimum Value | Maximum Value |
|----------------------------|---------------|---------------|
| Ambient Temperature (°C) | 24.7 | 25.3 |
| Relative Humidity (% RH) | 50 | 51 |

Place Of Calibration : Temperature Calibration Room
Calibrated by : Mr. Natthapong Koetphon

Calibration Method

In-house method :SK-WI-01 by comparison technique with temperature standard

Condition of this result of calibration

1. Reference standard instrument

| <u>Instrument</u> | <u>Model</u> | <u>Serial No.</u> | <u>Certificate No.</u> | <u>Due Date</u> |
|---|--------------|-------------------|------------------------|------------------|
| 1) Temperature indicator with PRT probe | 282/AM1730 | 2502100200037 | PSL-T 0522/66 | 26 February 2024 |

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

3. This certificate can be traceable to International System of Unit :

- Through Thailand Institute of Scientific And Technological Research (TISTR)

Approved by :

☒ Mr.Suphachai Saksri

☐ Mr.Phayak Tootit

☐ Miss Tantaraporn Pettong

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

Result of Calibration

This Instrument was Connected with Thermister Probe

Stem Diameter : 16 mm

Immersion Depth : 100 mm

Resolution : 0.1 ($^{\circ}\text{C}$)

Sheath material : Plastic

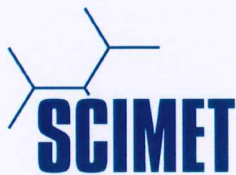
Without Adjustment

| STD Reading ($^{\circ}\text{C}$) | UUC Reading ($^{\circ}\text{C}$) | UUC Error ($^{\circ}\text{C}$) | Measurement Uncertainty (\pm $^{\circ}\text{C}$) |
|---------------------------------------|---------------------------------------|-------------------------------------|---|
| 0.012 | 0.5 | 0.488 | 0.16 |
| 20.016 | 19.8 | -0.216 | 0.16 |
| 25.010 | 24.8 | -0.210 | 0.16 |
| 30.014 | 29.8 | -0.214 | 0.16 |
| 45.009 | 44.8 | -0.209 | 0.16 |

STD= Standard

UUC= Unit Under Calibration

** End of Calibration Report **

**SCIMET Co., Ltd.**

1194 Soi Wachirathamsathit 57, Bangchak,

Phrakhanong, Bangkok 10260 Thailand

Email:scimet2022@gmail.com, Tel: 02 460 9239

<https://www.scimet.co.th>**Certificate No. C16240024**

Calibration Certificate

Equipment: COD Reactor**Model:** DRB 200**Serial No.(or ID):** 20030C0500**Manufacturer:** Hach**Covers:** Open (Max)**Condition:** In Condition**Job No.:** KSMT2402295**Received Date:** 05 September 2024**Issued Date:** 05 September 2024**Page:** 1 of 5**Customer**

STS GREEN CO., LTD.

3/23 Moo 5, Tambol Lat Sawai, Amphur Lam Luk Ka, Pathum Thani 12150 Thailand

Calibration Place

STS GREEN CO., LTD. (Fume Hood Room)

3/23 Moo 5, Tambol Lat Sawai, Amphur Lam Luk Ka, Pathum Thani 12150 Thailand

Calibration Date

05 September 2024

Environment Condition**Temperature:** 27.1 °C ± 0.3 °C**Humidity:** 65.6 %RH ± 3.3 %RH**The Method used**In-house method, based on Direct Measurement with
Standard Thermometer**Traceability**This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co.,Ltd.Certificate No. C23240083

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

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.

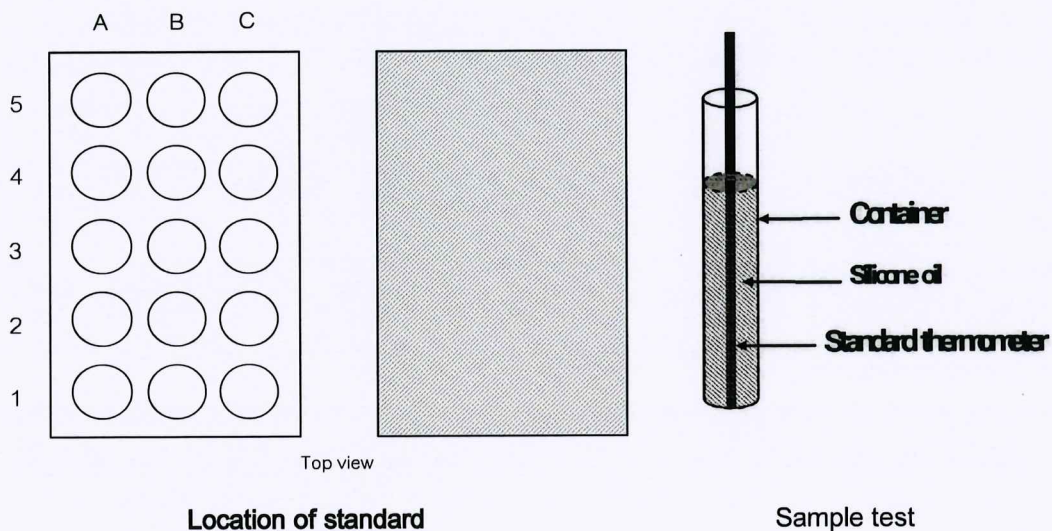
(Mr. Chanachol Moohammudrosol)

Person in charge



(Mr. Thalerngkeat Pongngam)

Authorized signatory



Standard Installation Locations

The standard thermometer touches the lower end of the boring

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the unit under calibration.

Measured Temperature: The average reading of standards at any positions or location.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Calibration Results:
Before Adjustment

| Locations heating Block: | Desired (°C) | Setting (°C) | Unit Under Calibration (°C) |
|--------------------------|--------------|--------------|-----------------------------|
| Left | 150 | 150 | 150 |

| Location heating Block: | Measured Temperature (°C) | Correction (°C) |
|-------------------------|---------------------------|-----------------|
| A1 | 150.80 | -0.80 |
| A2 | 152.34 | -2.34 |
| A3 | 151.23 | -1.23 |
| A4 | 151.24 | -1.24 |
| A5 | 151.11 | -1.11 |
| B1 | 152.31 | -2.31 |
| B2 | 151.50 | -1.50 |
| B3 | 152.33 | -2.33 |
| B4 | 150.51 | -0.51 |
| B5 | 151.51 | -1.51 |
| C1 | 150.25 | -0.25 |
| C2 | 152.48 | -2.48 |
| C3 | 152.52 | -2.52 |
| C4 | 151.86 | -1.86 |
| C5 | 151.56 | -1.56 |

Calibration Results:

After Adjustment

Measured temperature at the spread locations:

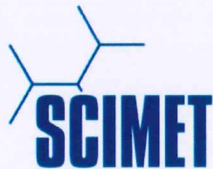
| Locations heating Block: | Setting (°C) | Unit Under Calibration (°C) |
|--------------------------|--------------|-----------------------------|
| <u>Left</u> | 150 | 150 |

| Location heating Block: | Measured Temperature (°C) | Correction (°C) | Uncertainty (\pm °C) |
|-------------------------|---------------------------|-----------------|-------------------------|
| A1 | 149.45 | -0.55 | 0.66 |
| A2 | 151.11 | 1.11 | 0.65 |
| A3 | 149.93 | -0.07 | 0.66 |
| A4 | 150.06 | 0.06 | 0.65 |
| A5 | 149.90 | -0.10 | 0.65 |
| B1 | 151.11 | 1.11 | 0.65 |
| B2 | 150.18 | 0.18 | 0.65 |
| B3 | 151.06 | 1.06 | 0.65 |
| B4 | 149.21 | -0.79 | 0.65 |
| B5 | 150.28 | 0.28 | 0.64 |
| C1 | 149.02 | -0.98 | 0.65 |
| C2 | 151.23 | 1.23 | 0.65 |
| C3 | 151.18 | 1.18 | 0.65 |
| C4 | 150.79 | 0.79 | 0.64 |
| C5 | 150.56 | 0.56 | 0.64 |

Characterization of the unit under calibration:

| Locations heating Block | Desired | Unit Under Calibration (°C) | | Measured Temperature (°C) |
|-------------------------|---------|-----------------------------|---------|---------------------------|
| | (°C) | Setting | Reading | Stability (\pm °C) |
| Left | 150 | 150 | 150 | 0.15 |

The End of Certificate



ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2402295

ชนิดเครื่องมือ: COD Reactor

รุ่น: DRB 200

หมายเลขเครื่อง: 20030C0500

| ตรวจสอบ (รับ) | | รายการตรวจเช็ค | ตรวจสอบ (ส่ง) | | หมายเหตุ |
|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|--------------------------|----------|
| 05 Sep 2024 | | | 05 Sep 2024 | | |
| ปกติ | ไม่ปกติ | | ปกติ | ไม่ปกติ | |
| | | General | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1. สายไฟ | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2. การทำงาน Main Switch | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. การทำงาน Selector Key | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. การแสดงผล Display | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5. สภาพ Hole | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 6. สภาพฝาปิด | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 7. สภาพตัวเครื่อง | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 8. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |

ข้อแนะนำ :

Mr. Chanachol Moohammudrosol
Service Engineer

บริษัท ชายนัมเมก จำกัด (SCIMET CO., LTD.)

1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

F116-00: 08 MAR 2023

Certificate No. C07240028

Calibration Certificate

| | | | |
|--------------------|--------------------|----------------|------------------|
| Equipment: | SPECTROPHOTOMETER | Job No.: | KSMT2400384 |
| Model: | Genesys 20 | Received Date: | 29 February 2024 |
| Serial No.(or ID): | 3SGG222008 (SPE01) | Issued Date: | 29 February 2024 |
| Manufacturer: | Thermo Spectronic | Page: | 1 of 3 |
| Condition: | In Condition | | |

Customer

STS GREEN CO., LTD.
3/23 Moo 5, Tambol Lat Sawai, Amphur Lam Luk Ka, Pathum Thani 12150 Thailand

Calibration Place

STS GREEN CO., LTD. (Room 3)
3/23 Moo 5, Tambol Lat Sawai, Amphur Lam Luk Ka, Pathum Thani 12150 Thailand

Calibration Date

29 February 2024

Environment Condition

Temperature: 25.2 °C \pm 0.4 °C
Humidity: 69.9 %RH \pm 2.8 %RH

The Method used

In-house method, WI07, based on ASTM E 275-08 and
ASTM E 387-04

Traceability

This certificate is traceable to the CRM maintained by National Institute of Standards and Technology (NIST) through Starna Scientific Limited.


The standard for Wavelength Certificate No. 108691 and 108692

The standard for Photometric Certificate No. 109010 , 114655

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

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor ($k=2$) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of SCIMET Co., Ltd.



(Mr. Hattapong Purnil)
Person in charge



(Mr. Thalerngkeat Pongngam)
Authorized signatory

Calibration Results:

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 5 nm and UUC at 8 nm

| Standard Wavelength (nm) | Unit Under Calibration (nm) | Correction (nm) | Uncertainty of Measurement (± nm) |
|-----------------------------|--------------------------------|--------------------|---------------------------------------|
| 361.02 | 360 | 1.02 | 0.59 |
| 417.80 | 418 | -0.20 | 0.59 |
| 441.29 | 442 | -0.71 | 0.59 |
| 479.88 | 479 | 0.88 | 0.59 |
| 513.75 | 514 | -0.25 | 0.59 |
| 528.59 | 528 | 0.59 | 0.59 |
| 537.75 | 538 | -0.25 | 0.59 |
| 641.95 | 642 | -0.05 | 0.59 |
| 684.70 | 685 | -0.30 | 0.59 |
| 740.51 | 741 | -0.49 | 0.59 |
| 807.04 | 807 | 0.04 | 0.59 |
| 879.68 | 880 | -0.32 | 0.59 |

Calibration Results:

Without Adjustment

Photometric Accuracy (Absorbance)

| Wavelength | Standard absorbance (Abs) | Unit Under Calibration (Abs) | Correction (Abs) | Uncertainty of Measurement(\pm Abs) |
|------------|------------------------------|---------------------------------|---------------------|---|
| 420 nm | 0.0000 | 0.000 | 0.0000 | 0.0045 |
| | 0.2373 | 0.240 | -0.0027 | 0.0045 |
| | 0.5617 | 0.563 | -0.0013 | 0.0045 |
| | 0.7392 | 0.738 | 0.0012 | 0.0045 |
| | 1.0550 | 1.056 | -0.0010 | 0.0045 |
| 440 nm | 0.0000 | 0.000 | 0.0000 | 0.0045 |
| | 0.2335 | 0.236 | -0.0025 | 0.0045 |
| | 0.5513 | 0.554 | -0.0027 | 0.0045 |
| | 0.7230 | 0.723 | 0.0000 | 0.0045 |
| | 1.0324 | 1.030 | 0.0024 | 0.0045 |
| 465 nm | 0.0000 | 0.000 | 0.0000 | 0.0045 |
| | 0.2126 | 0.216 | -0.0034 | 0.0045 |
| | 0.5036 | 0.509 | -0.0054 | 0.0045 |
| | 0.6735 | 0.677 | -0.0035 | 0.0045 |
| | 0.9615 | 0.967 | -0.0055 | 0.0045 |
| 546.1 nm | 0.0000 | 0.000 | 0.0000 | 0.0045 |
| | 0.2201 | 0.222 | -0.0019 | 0.0045 |
| | 0.5176 | 0.519 | -0.0014 | 0.0045 |
| | 0.6930 | 0.692 | 0.0010 | 0.0045 |
| | 0.9908 | 0.992 | -0.0012 | 0.0045 |
| 590 nm | 0.0000 | 0.000 | 0.0000 | 0.0045 |
| | 0.2443 | 0.247 | -0.0027 | 0.0045 |
| | 0.5530 | 0.556 | -0.0030 | 0.0045 |
| | 0.7196 | 0.720 | -0.0004 | 0.0045 |
| | 1.0301 | 1.033 | -0.0029 | 0.0045 |
| 635 nm | 0.0000 | 0.000 | 0.0000 | 0.0045 |
| | 0.2646 | 0.266 | -0.0014 | 0.0045 |
| | 0.5370 | 0.541 | -0.0040 | 0.0045 |
| | 0.6862 | 0.689 | -0.0028 | 0.0045 |
| | 0.9822 | 0.987 | -0.0048 | 0.0045 |

The End of Certificate

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The error of temperature determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, ASTM E 275-08 and ASTM E 387-04. Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk $< 50\%$ PFA.
- ☒ Choice B Non-binary statement with guard band ($w = 1 U$), Pass or Fail Specific Risk $< 2.5\%$ PFA and Condition Pass or Condition Fail Specific Risk $< 50\%$ PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r U$).
- ; PFA – Probability of False Accept



(Mr. Thalerngkeat Pongngam)

Authorized signatory



Refer to Certificate No.: C07240028

Page: 2 of 3

Without Adjustment

Wavelength Accuracy (nm), The spectral bandwidth of Std at 5 nm and UUC at 8 nm

| Unit Under Calibration | Correction | Guard Band (w) | Tolerance (\pm) | Conformity |
|------------------------|------------|----------------|---------------------|------------|
| 360 | 1.02 | 0.59 | 2 | Pass |
| 418 | -0.20 | 0.59 | 2 | Pass |
| 442 | -0.71 | 0.59 | 2 | Pass |
| 479 | 0.88 | 0.59 | 2 | Pass |
| 514 | -0.25 | 0.59 | 2 | Pass |
| 528 | 0.59 | 0.59 | 2 | Pass |
| 538 | -0.25 | 0.59 | 2 | Pass |
| 642 | -0.05 | 0.59 | 2 | Pass |
| 685 | -0.30 | 0.59 | 2 | Pass |
| 741 | -0.49 | 0.59 | 2 | Pass |
| 807 | 0.04 | 0.59 | 2 | Pass |
| 880 | -0.32 | 0.59 | 2 | Pass |

บริษัท ชายนีเมท จำกัด (SCIMET CO., LTD.)

1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239

FC07-03: 30 MAY 2023

Without Adjustment

Photometric Accuracy (Absorbance)

| Wavelength | Unit Under Calibration | Correction | Guard Band (w) | Tolerance (\pm) | Conformity |
|------------|------------------------|------------|----------------|---------------------|------------|
| 420 nm | 0.000 | 0.0000 | 0.0045 | 0.01 | Pass |
| | 0.240 | -0.0027 | 0.0045 | 0.01 | Pass |
| | 0.563 | -0.0013 | 0.0045 | 0.01 | Pass |
| | 0.738 | 0.0012 | 0.0045 | 0.01 | Pass |
| | 1.056 | -0.0010 | 0.0045 | 0.01 | Pass |
| 440 nm | 0.000 | 0.0000 | 0.0045 | 0.01 | Pass |
| | 0.236 | -0.0025 | 0.0045 | 0.01 | Pass |
| | 0.554 | -0.0027 | 0.0045 | 0.01 | Pass |
| | 0.723 | 0.0000 | 0.0045 | 0.01 | Pass |
| | 1.030 | 0.0024 | 0.0045 | 0.01 | Pass |
| 465 nm | 0.000 | 0.0000 | 0.0045 | 0.01 | Pass |
| | 0.216 | -0.0034 | 0.0045 | 0.01 | Pass |
| | 0.509 | -0.0054 | 0.0045 | 0.01 | Pass |
| | 0.677 | -0.0035 | 0.0045 | 0.01 | Pass |
| | 0.967 | -0.0055 | 0.0045 | 0.01 | Pass |
| 546.1 nm | 0.000 | 0.0000 | 0.0045 | 0.01 | Pass |
| | 0.222 | -0.0019 | 0.0045 | 0.01 | Pass |
| | 0.519 | -0.0014 | 0.0045 | 0.01 | Pass |
| | 0.692 | 0.0010 | 0.0045 | 0.01 | Pass |
| | 0.992 | -0.0012 | 0.0045 | 0.01 | Pass |
| 590 nm | 0.000 | 0.0000 | 0.0045 | 0.01 | Pass |
| | 0.247 | -0.0027 | 0.0045 | 0.01 | Pass |
| | 0.556 | -0.0030 | 0.0045 | 0.01 | Pass |
| | 0.720 | -0.0004 | 0.0045 | 0.01 | Pass |
| | 1.033 | -0.0029 | 0.0045 | 0.01 | Pass |
| 635 nm | 0.000 | 0.0000 | 0.0045 | 0.01 | Pass |
| | 0.266 | -0.0014 | 0.0045 | 0.01 | Pass |
| | 0.541 | -0.0040 | 0.0045 | 0.01 | Pass |
| | 0.689 | -0.0028 | 0.0045 | 0.01 | Pass |
| | 0.987 | -0.0048 | 0.0045 | 0.01 | Pass |

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity

บริษัท ชายนันเมท จำกัด (SCIMET CO., LTD.)

1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand
Email: scimet2022@gmail.com, Tel: 02 460 9239



ใบตรวจสอบสภาพเครื่อง Spectrophotometer

เลขที่ใบงาน: KSMT2400384

ชนิดเครื่องมือ: SPECTROPHOTOMETER

รุ่น: Genesys 20

หมายเลขเครื่อง: 3SGG222008

| ตรวจสอบ (รับ) | | รายการตรวจเช็ค | ตรวจสอบ (ส่ง) | | หมายเหตุ |
|-------------------------------------|--------------------------|---|-------------------------------------|--------------------------|----------|
| 29 Feb 2024 | | | 29 Feb 2024 | | |
| ปกติ | ไม่ปกติ | | ปกติ | ไม่ปกติ | |
| | | | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1. ความสมบูรณ์เครื่อง | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. สวิตซ์ ปิด – เปิด เครื่อง (On-Off Swicth) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. ปุ่มกด (Keypad) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 5. หน้าจอ (Display, Screen Contrast) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input type="checkbox"/> | <input type="checkbox"/> | 6. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control) | <input type="checkbox"/> | <input type="checkbox"/> | - |
| <input type="checkbox"/> | <input type="checkbox"/> | 7. ความยาวคลื่น (Wavelength Check) | <input type="checkbox"/> | <input type="checkbox"/> | - |
| <input type="checkbox"/> | <input type="checkbox"/> | 8. แหล่งกำเนิดแสง (UV < 3,000 hour) | <input type="checkbox"/> | <input type="checkbox"/> | - |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 9. แหล่งกำเนิดแสง (Visible < 5,000 hour) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input type="checkbox"/> | <input type="checkbox"/> | 10. ช่องวัดหลายตัวอย่าง (Carousel Module) | <input type="checkbox"/> | <input type="checkbox"/> | - |

เพิ่มเติม/ข้อแนะนำ :

Mr. Hattapong Pumnil

Service Engineer

CERTIFICATE OF CALIBRATION

Page 1 of 3

Certificate No. : 24-065495

Sample Code : 24-26506-002

Customer : STS GREEN COMPANY LIMITED
3/23 Moo 5, Phaholyothin-Lamlukka Rd., Lat Sawai,
Lamlukka, Phatumthani 12150

Location of Calibration : STS GREEN COMPANY LIMITED
(Laboratory)

Equipment : Liquid bath (Water bath)

Manufacturer : Memmert

Model : WNB 45

Serial No. : L715.0065

ID No. : WAB 02

Date of Receipt : 30 May 2024

Date of Calibration : 30 May 2024

Condition of Calibration

| | | | | | |
|----------------|---------------------------|-----------|-----------|-----------|-----------|
| 1. Environment | 1.1 Ambient temperature | : Maximum | 28.1 °C | ; Minimum | 27.1 °C |
| | 1.2 Relative humidity | : Maximum | 56.2 % | ; Minimum | 53.1 % |
| | 1.3 Line voltage supplied | : Maximum | 229.0 VAC | ; Minimum | 222.5 VAC |

2. Calibration method

In-house method WI-CL-023 based on ASTM E 715-80 (Reapproved 2022).

3. Reference standard instrument

| Instrument | ID No. | Certificate No. | Due Date |
|---|-------------------------------|-----------------|--------------|
| Data acquisition with sensor (RTD-Pt100) | LB-DA-08 (RTD-361 to RTD-365) | 23-080340 | 26 July 2024 |

4. This certificate is traceable to the international system of unit (SI Unit).

The measurement is traceable to Asia Medical and Agricultural Laboratory and Research Center Public Company Limited.

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

6. Condition of calibration item : Normal

Calibrated by Mr. Pattanapong Pulngern
Scientist

Approved by (Mr. Somchai Neampunt)
Signed for Director

Issue date 31 May 2024

The uncertainties are for a confidence probability of approximately 95%.

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the unit 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 the Asia Medical and Agricultural Laboratory and Research Center Public Company Limited (AMARC).

REPORT OF CALIBRATION

Certificate No. : 24-065495

Sample Code : 24-26506-002

Results of Calibration

Resolution : 0.1 °C

1. Reporting of Temperature

| Calibration point (°C) | UUC* setting (°C) | UUC* reading (°C) | Measured temperature at each positions (°C) | | | | | Uncertainty ± (°C) | Coverage factor <i>k</i> |
|---------------------------|----------------------|----------------------|---|--------|--------|--------|---------------------|-----------------------|-----------------------------|
| | | | # 1 | # 2 | # 3 | # 4 | # 5 ^{Ref.} | | |
| 85 | 85.0 | 85.0 | 84.936 | 85.026 | 84.925 | 84.966 | 85.275 | 0.21 | 2.00 |
| 93 | 93.0 | 93.0 | 92.970 | 93.064 | 92.936 | 92.992 | 93.278 | 0.21 | 2.00 |

2. Characterization results

| Calibration point (°C) | Stability ± (°C) | Uniformity (°C) | Overall variation (°C) |
|------------------------|------------------|-----------------|------------------------|
| 85 | 0.114 | 0.459 | 0.561 |
| 93 | 0.110 | 0.436 | 0.541 |

Notes

- UUC* = Unit Under Calibration



REPORT OF CALIBRATION

Page 3 of 3

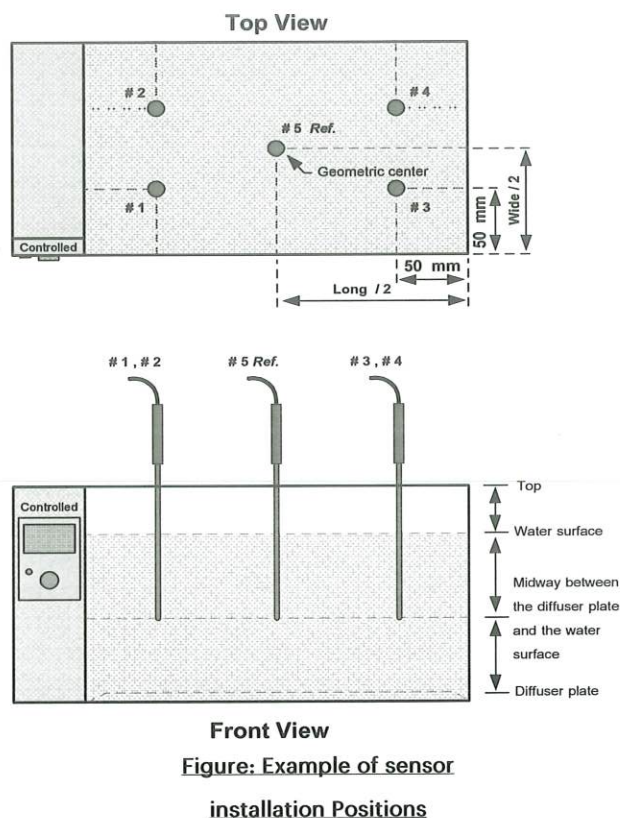
Certificate No. : 24-065495

Sample Code : 24-26506-002

Results of Calibration

Notes

1. Sensor installation locations
 - 1.1 Place five calibrated temperature sensors in the unloaded water bath with diffuser plate in place and at lowest position and water level approximately 38 mm from the top.
 - 1.2 Locate one sensor in each of the four corners of the bath approximately 50 mm from each wall and midway between the diffuser plate and the water surface.
 - 1.3 Locate the fifth sensor within 25 mm of the geometric center of the bath.
2. The quoted uncertainty includes "Stability of bath and loading effect in bath at 20% of uniformity".
3. 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.
4. Stability - one-half of the greatest maximum difference of measured temperatures at any one sensor.
5. Overall variation - the difference of the maximum and the minimum measured temperatures throughout observation time.
6. UUC* reading - the average reading of indicating device that forms the integral part of the bath.
7. Controlled circulation or stirrer moter setting : N/A
8. Cooling system : N/A
9. Calibration results without adjustment.



The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with UKAS M3003.

- End of Report -

**QUALITY CALIBRATION CO., LTD.**

235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com



CERTIFICATE No : 24T7225

REFERENCE No : 73978-2

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : WATER BATH

MANUFACTURER : MEMMERT

MODEL : WTB24

SERIAL No : LD21.0296

ID No : WAB 04

CONDITION AS RECEIVED : USED ITEM

SUBMITTED BY : STS GREEN CO., LTD.
3/23 MOO 5, TAMBOL LAT SAWAI, AMPHUR LAM LUK KA,
PATHUM THANI 12150

CALIBRATED BY : CHAICHARN CH.

CALIBRATION DATE : 18-Jul-24

APPROVED BY :  PONGSAK J.

ISSUED DATE : 24-Jul-24

RECEIVED DATE : 18-Jul-24

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PRIOR WRITTEN APPROVAL OF
QUALITY CALIBRATION CO., LTD.



QUALITY CALIBRATION CO., LTD.

235 Petchkasem 63/2 Road, Laksong, Bangkai, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

www.qcalibration.com

CERTIFICATE No : 24T7225

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
ID NUMBER : WAB 04
RECEIVED DATE : 18-Jul-24
AMBIENT TEMPERATURE : 24 °C ± 1 °C
MODEL : WTB24
SERIAL NUMBER : LD21.0296
CALIBRATION DATE : 18-Jul-24
RELATIVE HUMIDITY : 57 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

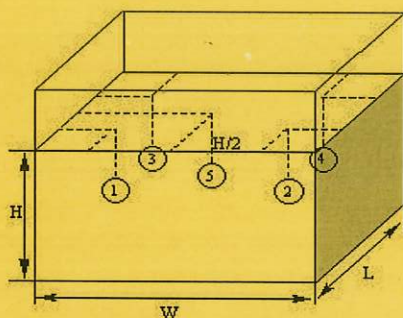
1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO ASTM E715-80 (REAPPROVED 2001) BY COMPARISON WITH CALIBRATED RTD. THE PROBES WERE PLACED ON FIVE POINTS AND LOCATED ONE PROBE IN EACH OF THE FOUR CORNERS OF THE BATH AND PLACED THE FIFTH RTD WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE WATER VOLUME (REFERENCE LOCATION) UNDER NO LOAD CONDITION.

2. REFERENCE STANDARD INSTRUMENTS :-

| INSTRUMENT | MODEL | SERIAL No | CERTIFICATE No | DUE DATE |
|-------------------------|-------|-----------|----------------|-----------|
| 1) DATA LOGGER WITH RTD | 2635A | 7286308 | 24T6471 | 24-Jun-25 |

3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH QUALITY CALIBRATION CO., LTD.

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



PROBE INSTALLATION
POSITION IN THE BATH

GENERAL INFORMATION

| |
|---|
| Overall Variation of Ambient Temperature around the Bath (°C) : 1.9 |
| Overall Variation of Line Voltage (V) : 7 |
| Instrument Condition : Normal |
| Bath Inner Size (W*L*H) : 50*30*20 cm |

BATH PERFORMANCE

| Controller Temperature (°C) | Temperature Stability (±°C) | Radius Uniformity (°C) | Axial Uniformity (°C) | Overall Variation (°C) |
|-----------------------------|-----------------------------|------------------------|-----------------------|------------------------|
| 85.0 | 0.07 | 0.08 | 0.01 | 0.19 |
| 93.0 | 0.25 | 0.14 | 0.01 | 0.52 |

TEMPERATURE MEASUREMENT ACCURACY TEST

| Controller Temp (°C) | Indicating Temp (°C) | Measured Temperature (°C) at Spread Locations | | | | | Uncertainty (± °C) |
|----------------------|----------------------|---|-------|-------|-------|--------|--------------------|
| | | #1 | #2 | #3 | #4 | Ref. 5 | |
| 85.0 | 85.0 | 85.14 | 85.07 | 85.11 | 85.09 | 85.06 | 0.16 |
| 93.0 | 93.0 | 92.97 | 93.02 | 93.11 | 93.04 | 93.04 | 0.32 |

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE BATH.

NOTE 2 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

Certificate of Calibration

Certificate No. : 67-400083-1

Page : 1 of 2

Submitted by : STS Green Company Limited
3/23 Moo 5, T. Lad Sawai, A. Lumlukka, Pathumthani 12150

Equipment : Temperature controlled enclosure (Oven)
Manufacturer : Memmert **Model :** UFE 500
Range : N/A °C **Resolution :** 0.5 °C
Serial No. : G509.0607 **ID No. :** HOA 03

Environment : On site calibration was carried out at the Laboratory, STS Green Company Limited
Ambient Temperature : (29.0 to 30.0) °C
Relative Humidity : (60 to 65) %
Line Voltage : (223.5 to 224.5) V

Date of Received : 16 February 2024

Date of Calibration : 16 February 2024

Date of Issue : 20 February 2024

Calibrated by : Permpon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units
 Standard Digital Thermometer with Thermocouple probe

| ID No. | Cert. No. | Due Date | Traceability |
|-----------------|-------------|-------------|---|
| 400029 & 400030 | 66-400595-1 | 26 Apr 2024 | National Institute of Metrology Thailand (NIMT) |

Approved by :

(Surachai Promthong)

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.



Certificate of Calibration

Certificate No. : 67-400083-1

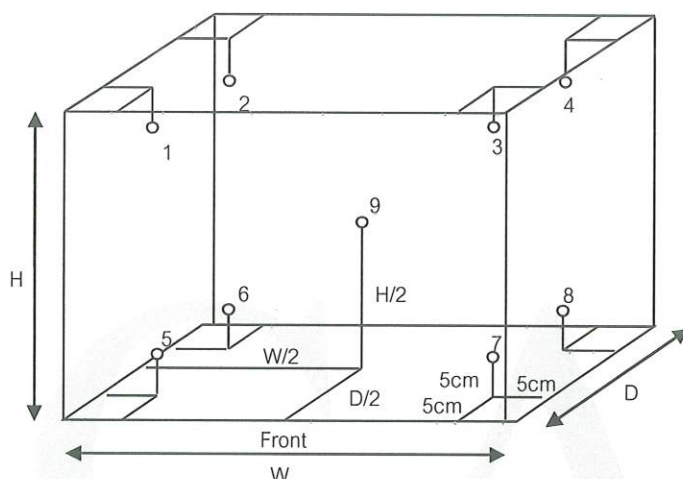
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.56 m

D = 0.40 m

H = 0.48 m

Capacity = 0.11 m³

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Temperature (°C) @ Sensor No. | | | | | | | | | Uncertainty (± °C) |
|--------------------|-----------------------------|--------------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 104.0 | 104.0 | 104.0 | 104.2 | 104.0 | 104.2 | 104.2 | 103.9 | 103.9 | 103.8 | 103.8 | 103.8 | 0.80 |
| 180.0 | 180.0 | 180.0 | 180.9 | 180.3 | 180.6 | 180.4 | 180.1 | 180.1 | 179.7 | 179.7 | 179.7 | 1.0 |

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Uniformity (°C) | Measured Stability (°C) | Overall Variation (°C) |
|--------------------|-----------------------------|--------------------------------|-----------------------------|----------------------------|---------------------------|
| 104.0 | 104.0 | 104.0 | 0.7 | 0.3 | 0.8 |
| 180.0 | 180.0 | 180.0 | 1.4 | 0.3 | 1.6 |

Remark The uncertainty is not combine uniformity of the air chamber

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 $k = 2$, providing a level of confidence of approximately 95%

- o0o -

Signature



Certificate of Calibration

Certificate No. : 67-400083-3

Page : 1 of 2

Submitted by : STS Green Company Limited
3/23 Moo 5, T. Lad Sawai, A. Lumlukka, Pathumthani 12150

Equipment : Temperature controlled enclosure (Incubator)
Manufacturer : Memmert Model : IPP 500
Range : N/A Resolution : 0.1 °C
Serial No. : R509.0061 ID No. : COI 01

Environment : On site calibration was carried out at the Laboratory, STS Green Company Limited
Ambient Temperature : (26.0 to 26.5) °C
Relative Humidity : (60 to 65) %
Line Voltage : (223.5 to 224.5) V

Date of Received : 16 February 2024

Date of Calibration : 16 February 2024

Date of Issue : 20 February 2024

Calibrated by : Permpon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units
Standard Digital Thermometer with RTD Probe

| ID No. | Cert. No. | Due Date | Traceability |
|-----------------|-------------|-------------|---|
| 400029 & 400043 | 66-400593-1 | 25 Apr 2024 | National Institute of Metrology Thailand (NIMT) |

Approved by :



(Surachai Promthong)

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.



Certificate of Calibration

Certificate No. : 67-400083-3

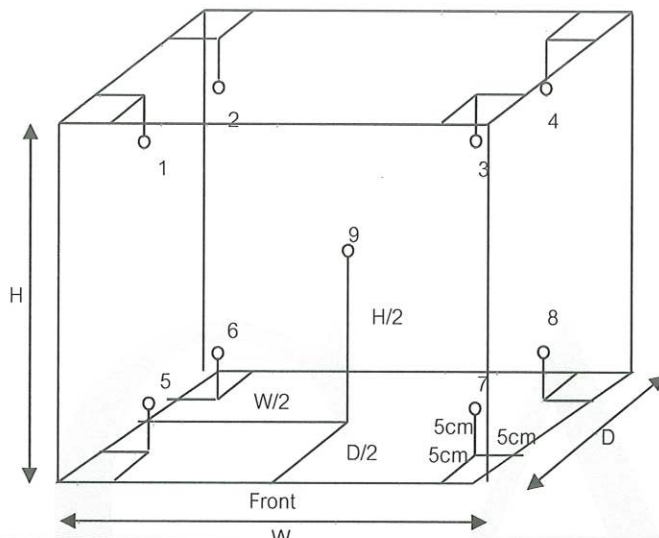
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.56 m

D = 0.40 m

H = 0.48 m

Capacity = 0.11 m³

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Temperature (°C) @ Sensor No. | | | | | | | | | Uncertainty (± °C) |
|--------------------|-----------------------------|--------------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 20.0 | 20.0 | 20.0 | 19.68 | 19.76 | 19.75 | 19.80 | 19.64 | 19.60 | 19.96 | 20.01 | 19.69 | 0.30 |

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Uniformity (°C) | Measured Stability (°C) | Overall Variation (°C) |
|--------------------|-----------------------------|--------------------------------|-----------------------------|----------------------------|---------------------------|
| 20.0 | 20.0 | 20.0 | 0.34 | 0.03 | 0.45 |

Remark The uncertainty is not combine uniformity of the air chamber

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 $k = 2$, providing a level of confidence of approximately 95%

- oOo -



Certificate of Calibration

Certificate No. : 67-400083-2

Page : 1 of 2

Submitted by : STS Green Company Limited
3/23 Moo 5, T. Lad Sawai, A. Lumlukka, Pathumthani 12150

Equipment : Temperature controlled enclosure (Incubator)
Manufacturer : Memmert **Model :** INE 500
Range : N/A °C **Resolution :** 0.1 °C
Serial No. : E506.0391 **ID No. :** INC 01

Environment : On site calibration was carried out at the Laboratory, STS Green Company Limited
Ambient Temperature : (29.0 to 30.0) °C
Relative Humidity : (60 to 65) %
Line Voltage : (223.5 to 224.5) V

Date of Received : 16 February 2024

Date of Calibration : 16 February 2024

Date of Issue : 20 February 2024

Calibrated by : Permpon Chanpu

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units
Standard Digital Thermometer with RTD Probe

| ID No. | Cert. No. | Due Date | Traceability |
|-----------------|-------------|-------------|---|
| 400029 & 400048 | 66-400454-1 | 05 Feb 2024 | National Institute of Metrology Thailand (NIMT) |

Approved by :



(Surachai Promthong)

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.



Certificate of Calibration

Certificate No. : 67-400083-2

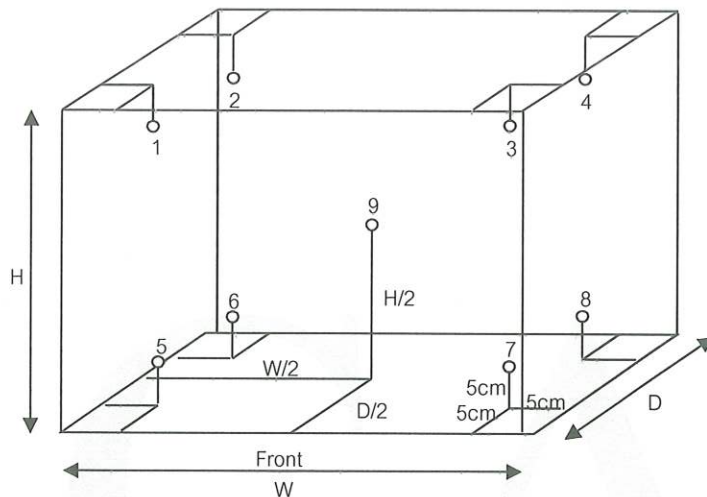
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.56 m

D = 0.40 m

H = 0.48 m

Capacity = 0.11 m³

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Temperature (°C) @ Sensor No. | | | | | | | | | Uncertainty (± °C) |
|--------------------|-----------------------------|--------------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 44.5 | 44.5 | 44.5 | 44.52 | 44.64 | 44.53 | 44.43 | 44.50 | 44.52 | 44.40 | 44.58 | 44.10 | 0.33 |

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Uniformity (°C) | Measured Stability (°C) | Overall Variation (°C) |
|--------------------|-----------------------------|--------------------------------|-----------------------------|----------------------------|---------------------------|
| 44.5 | 44.5 | 44.5 | 0.59 | 0.06 | 0.59 |

Remark The uncertainty is not combine uniformity of the air chamber

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 $k = 2$, providing a level of confidence of approximately 95%

- o0o -

Handwritten signature



Certificate of Calibration

Certificate No. : 67-400083-7

Page : 1 of 2

Submitted by : STS Green Company Limited
3/23 Moo 5, T. Lad Sawai, A. Lumlukka, Pathumthani 12150

Equipment : Temperature controlled enclosure (Refrigerator)
Manufacturer : Accuplus Model : i250
Range : N/A °C Resolution : 0.1 °C
Serial No. : i250402-0910-0328 ID No. : STS 322-00-0019

Environment : On site calibration was carried out at the Laboratory, STS Green Company Limited
Ambient Temperature : (30.0 to 31.0) °C
Relative Humidity : (60 to 65) %
Line Voltage : (222.0 to 225.0) V

Date of Received : 16 February 2024

Date of Calibration : 16 February 2024

Date of Issue : 20 February 2024

Calibrated by : Kittisak Kokaeo

Calibration Method : CAL-M4004, TLAS G-20

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units
Standard Digital Thermometer with Thermocouple probe

| ID No. | Cert. No. | Due Date | Traceability |
|-----------------|-------------|-------------|---|
| 400046 & 400023 | 66-400547-1 | 04 Apr 2024 | National Institute of Metrology Thailand (NIMT) |

Approved by :

(Surachai Promthong)

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.



Certificate of Calibration

Certificate No. : 67-400083-7

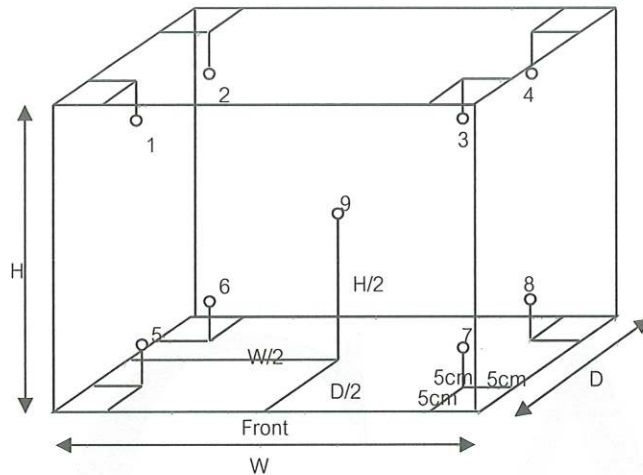
Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

This instrument was setting air ventilation at position 0 (close)



Inside of Chamber

W = 0.50 m

D = 0.50 m

H = 1.05 m

Capacity = 0.26 m³

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Temperature (°C) @ Sensor No. | | | | | | | | | Uncertainty (± °C) |
|--------------------|-----------------------------|--------------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----------------------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 3.0 | 3.0 | 3.0 | 2.8 | 2.7 | 3.2 | 3.9 | 3.5 | 3.6 | 3.1 | 3.0 | 3.1 | 0.65 |

| Test Point (°C) | Setting Temperature (°C) | Indicating Temperature (°C) | Measured Uniformity (°C) | Measured Stability (°C) | Overall Variation (°C) |
|--------------------|-----------------------------|--------------------------------|-----------------------------|----------------------------|---------------------------|
| 3.0 | 3.0 | 3.0 | 1.1 | 0.3 | 1.5 |

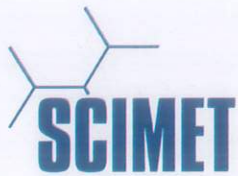
Remark The uncertainty is not combine uniformity of the air chamber

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 $k = 2$, providing a level of confidence of approximately 95%

- o0o -





SCIMET Co., Ltd.
1194 Soi Wachirathamsathit 57, Bangchak,
Phrakhanong, Bangkok 10260 Thailand
Email:scimet2022@gmail.com, Tel: 02 460 9239
https://www.scimet.co.th



Certificate No. C17240182

Calibration Certificate

| | | | |
|--------------------|----------------------|----------------|--------------|
| Equipment: | Incubator | Job No.: | KSMT2401410 |
| Model: | IN260 | Received Date: | 21 June 2024 |
| Serial No.(or ID): | D618.0091 (INC 05) | Issued Date: | 24 June 2024 |
| Manufacturer: | Memmert | Page: | 1 of 3 |
| Condition: | In Condition | | |
| Ventilation Valve: | Closed | Shelves(pc.): | 3 |

Customer

STS GREEN CO., LTD.
3/23 Moo 5, Tambol Lat Sawai, Amphur Lam Luk Ka, Pathum Thani 12150 Thailand

Calibration Place

STS GREEN CO., LTD. (Room 2)
3/23 Moo 5, Tambol Lat Sawai, Amphur Lam Luk Ka, Pathum Thani 12150 Thailand

Calibration Date

21 June 2024

Environment Condition

Temperature: 27.6 °C ± 0.1 °C
Humidity: 54.5 %RH ± 2.2 %RH

The Method used

In-house method, WI17, based on TLAS-G20

Traceability

This certificate is traceable to the SI Units maintained by
National Institute of Metrology (NIMT), Thailand through
SCIMET Co.,Ltd.Certificate No. C23240006

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

The measurement uncertainty stated
is the expanded uncertainty which is
obtained from the standard uncertainty
multiplied by the coverage factor ($k=2$) to
provide a level of confidence of
approximately 95%. It is determined in
accordance with the Guide to Expression
of Uncertainty in Measurement (GUM).

These results may be affected by
deviations from specified conditions. The
results relate only to the items tested,
calibrated or sampled. The report shall
not be reproduced except in full without
approval of SCIMET Co., Ltd.

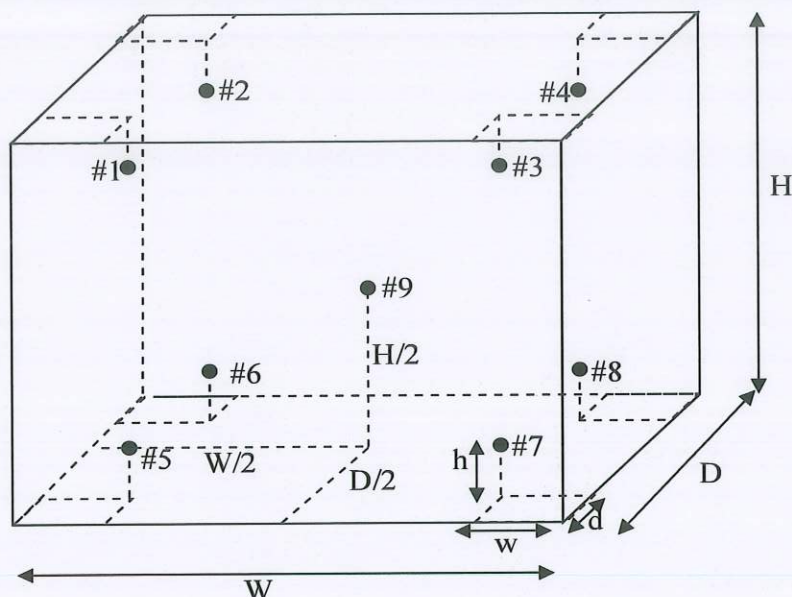
(Mr. Hattapong Pumnil)

Person in charge



(Mr. Thalerngkeat Pongngam)

Authorized signatory



Standard Installation Locations

Volume (Calibration Zone)= 118 (Liters)

Inside chamber: $W = 64$ (cm) $D = 50$ (cm) $H = 80$ (cm)

Standard Locations (#1, #2, #3, #4): $w = 7$ (cm) $d = 5$ (cm) $h = 8$ (cm)

Standard Locations (#5, #6, #7, #8): $w = 7$ (cm) $d = 5$ (cm) $h = 13$ (cm)

#9: Geometric center of the chamber

| Position of Std | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 | #9 |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Channel of Logger | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 |

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured temperatures throughout observation time.

Calibration Results:

Before adjustment

| Desired | Setting | Indicating | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 | #9 |
|---------|---------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 44.5 | 44.5 | 44.5 | 44.95 | 44.74 | 44.96 | 44.50 | 44.90 | 45.02 | 45.00 | 45.50 | 44.56 |

After adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 44.5 °C

| Locations | Measured Temperature (°C) | Correction (°C) | Uncertainty (± °C) |
|-----------|------------------------------|--------------------|-----------------------|
| #1 | 44.75 | 0.25 | 0.25 |
| #2 | 44.56 | 0.06 | 0.25 |
| #3 | 44.78 | 0.28 | 0.25 |
| #4 | 44.38 | -0.12 | 0.25 |
| #5 | 44.57 | 0.07 | 0.26 |
| #6 | 44.66 | 0.16 | 0.26 |
| #7 | 44.64 | 0.14 | 0.26 |
| #8 | 44.79 | 0.29 | 0.26 |
| #9 | 44.24 | -0.26 | 0.25 |

Temperature Distribution

| Desired (°C) | Setting (°C) | Indicating (°C) | Measured Temperature at Spread Locations (°C) | | | | | | | | | Uncertainty (± °C)* |
|-----------------|-----------------|--------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|------------------------|
| | | | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 | #9 | |
| 44.5 | 44.5 | 44.5 | 44.75 | 44.56 | 44.78 | 44.38 | 44.57 | 44.66 | 44.64 | 44.79 | 44.24 | 0.26 |

Chamber Characterization

| Indicating (°C) | Measured Uniformity (°C) | Measured Stability (± °C) | Overall Variation (°C) |
|--------------------|-----------------------------|------------------------------|---------------------------|
| 44.5 | 0.63 | 0.08 | 0.66 |

Note: * Maximum uncertainty of the each position

The End of Certificate

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

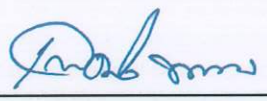
The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

- Decision rule :** ☐ Choice A Binary Statement for Simple Acceptance Rule ($w = 0$), Specific Risk < 50% PFA.
- ☒ Choice B Non-binary statement with guard band ($w = 1 U$), Pass or Fail Specific Risk < 2.5% PFA and Condition Pass or Condition Fail Specific Risk < 50% PFA.
- ☐ Choice C Customer defined, Customers may define arbitrary multiple of r to have applied as guard band ($w = r U$).
- ; PFA: Probability of False Accept




(Mr. Thalerngkeat Pongngam)
Authorized signatory

After adjustment

Desired Temperature : 44.5°C

Tolerances : 1.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 44.5 °C

| Locations | Measured (°C) | Correction of UUC. (°C) | Guard band (W) (± °C) | Tolerance (± °C) | Conformity |
|-----------|------------------|-------------------------------|--------------------------|---------------------|------------|
| #1 | 44.75 | 0.25 | 0.25 | 1.0 | Pass |
| #2 | 44.56 | 0.06 | 0.25 | 1.0 | Pass |
| #3 | 44.78 | 0.28 | 0.25 | 1.0 | Pass |
| #4 | 44.38 | -0.12 | 0.25 | 1.0 | Pass |
| #5 | 44.57 | 0.07 | 0.26 | 1.0 | Pass |
| #6 | 44.66 | 0.16 | 0.26 | 1.0 | Pass |
| #7 | 44.64 | 0.14 | 0.26 | 1.0 | Pass |
| #8 | 44.79 | 0.29 | 0.26 | 1.0 | Pass |
| #9 | 44.24 | -0.26 | 0.25 | 1.0 | Pass |

Correction of UUC.* = Measured Temperature - Desired Temperature

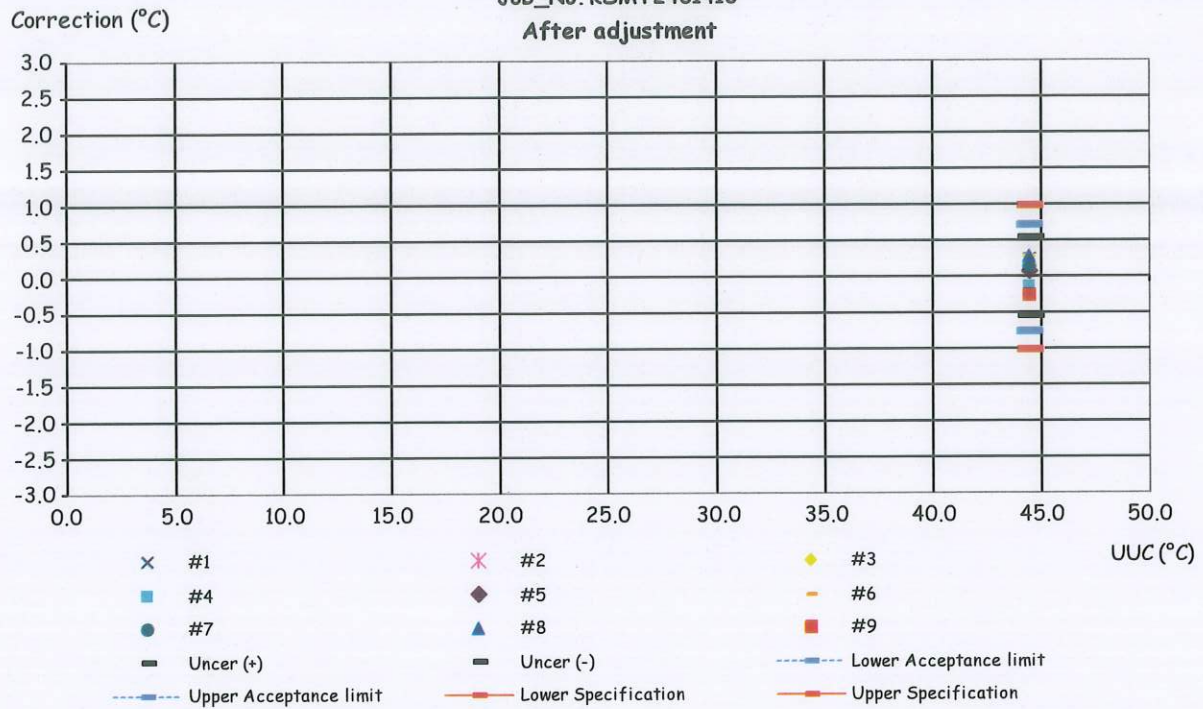
The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity

Corr_Distribution & Max_Measurement Uncertainty

Job_No. KSMT2401410

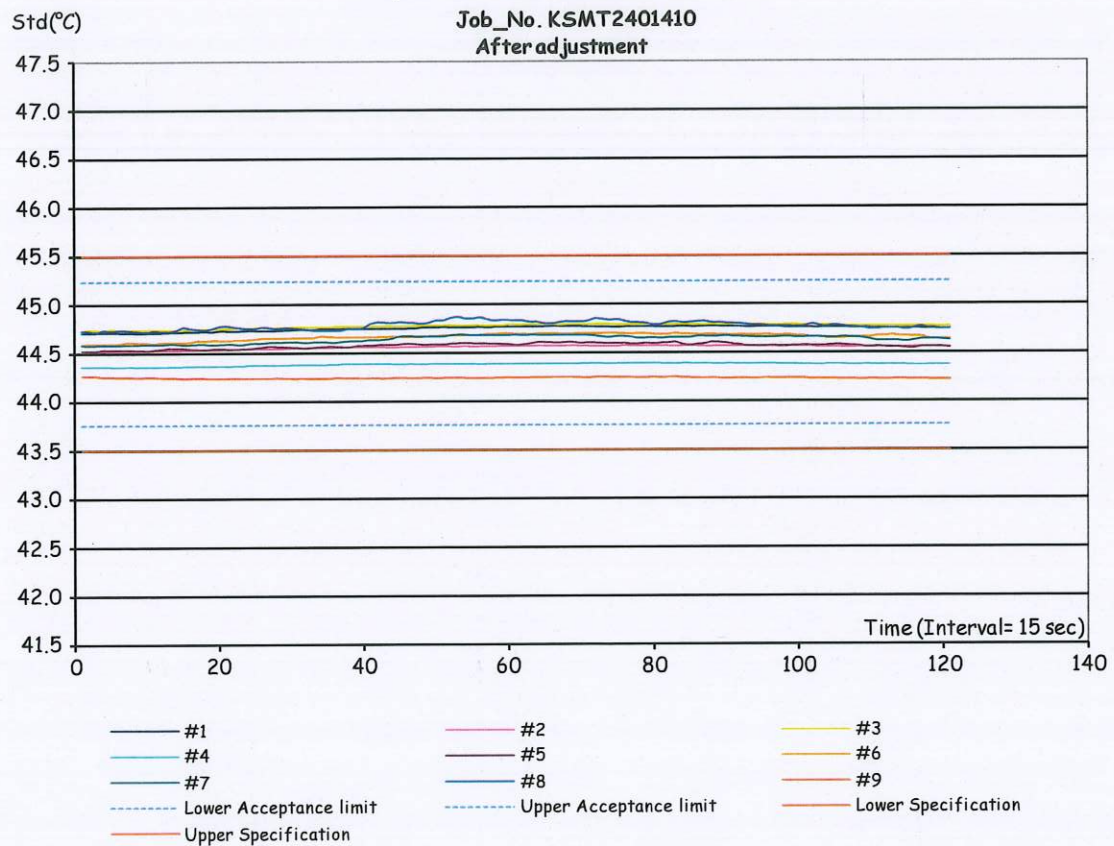
After adjustment

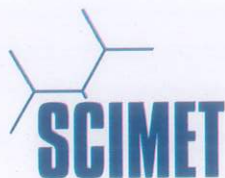


Temperature Distribution @ 44.5°C

Job_No. KSMT2401410

After adjustment





ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: KSMT2401410

ชนิดเครื่องมือ: Incubator

รุ่น: IN260

หมายเลขเครื่อง: D618.0091 (INC 05)

| ตรวจสอบ (รับ) | | รายการตรวจเช็ค | ตรวจสอบ (ส่ง) | | หมายเหตุ |
|-------------------------------------|--------------------------|--------------------------------------|-------------------------------------|--------------------------|----------|
| 21 Jun 2024 | | | 21 Jun 2024 | | |
| ปกติ | ไม่ปกติ | | ปกติ | ไม่ปกติ | |
| | | General | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 1. สายไฟ | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2. การทำงาน Main Switch | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. การทำงาน Selector Key | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. การแสดงผล Display | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input type="checkbox"/> | <input type="checkbox"/> | 5. การทำงาน พัดลม | <input type="checkbox"/> | <input type="checkbox"/> | ไม่มี |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 6. สภาพ Lever of Ventilation valve | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 7. สภาพ Lever door open / close | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 8. สภาพ Door seal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 9. การทำงานของระบบ Safety | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input type="checkbox"/> | <input type="checkbox"/> | 10. การทำงานของระบบทำความเย็น | <input type="checkbox"/> | <input type="checkbox"/> | ไม่มี |
| <input type="checkbox"/> | <input type="checkbox"/> | 11. การทำงานของระบบทำความชื้น | <input type="checkbox"/> | <input type="checkbox"/> | ไม่มี |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 12. สภาพตัวเครื่อง | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 13. สภาพแวดล้อม ณ สถานที่ตั้งเครื่อง | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |

ข้อแนะนำ :

Mr. Hattapong Pumnil

Service Engineer

บริษัท ชายนัมเมท จำกัด (SCIMET CO., LTD.)

1194 Soi Wachirathamsathit 57, Bangchak, Phrakhanong, Bangkok 10260 Thailand

Email: scimet2022@gmail.com, Tel: 02 460 9239

F117-00: 08 MAR 2023

Certificate of System Qualification

AA-OQ

System ID: EL08093194
Organization Name: STS Green Co.,Ltd.
Organization Location: 3/23 Moo 5, T.Ladsawai, A.Lumlukka Pathumthani 12150

Date: March 7, 2024 11:30:56 AM
EQP Name: AgilentRecommended
EQP Revision: AA.02.51
Overall Qualification Status: Pass

CDS Logon Verification

Logon: gamlerts

Overall CDS Logon Verification Test Status

Pass

Absorption Sensitivity

Absorbance: 0.727 Abs
Agilent Recommended: \geq 0.550

Overall Absorption Sensitivity Test Status

Pass

Absorption Linearity

Correlation Coefficient (r): 1.000
Agilent Recommended: \geq 0.995

Overall Absorption Linearity Test Status

Pass

Absorption Precision

Absorbance RSD: 0.455 %
Agilent Recommended: \leq 0.500

Overall Absorption Precision Test Status

Pass

Date: March 7, 2024 11:30:56 AM
System ID: EL08093194

Remaining AA Tests Evaluation

| | |
|--------------------------------|------|
| Wavelength Accuracy | Pass |
| Photometric Noise (BC Off) | Pass |
| Photometric Noise (BC On) | Pass |
| Background Correction Accuracy | Pass |
| Flame Emission | Pass |

Overall Remaining AA Tests Evaluation Status

| |
|------|
| Pass |
|------|

Instrument Details

Purpose

This section describes the as found system configuration.

Details

AA Spectrometer 1

| | |
|-------------------|----------------------|
| Manufacturer | Agilent Technologies |
| Name | 240FS AA |
| Model Number | 240FS AA |
| Atomization Type | Flame Only |
| Serial Number | EL08093194 |
| Firmware Revision | 2.07 |

Vapor Generator 1

| | |
|---------------|----------------------|
| Manufacturer | Agilent Technologies |
| Name | VGA77 |
| Model Number | VGA77 |
| Serial Number | MY14230003 |

Electronic Signature

Purpose

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

Details

| | |
|--------------------------|---|
| Full Name of Signer: | Uthai Ngamlertsirichai |
| Logged On User Name: | uthai.ngamlertsirichai@agilent.com |
| Signature Creation Date: | March 7, 2024 |
| Reason for Signature: | Executed protocol and published this original version of document |

Regulatory Disclaimer

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

Warranty

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

User Name: uthai.ngamlertsirichai
Report Generated by Hostname: AG-5CG3311L8Y

System Id: EL08093194
Print Date: March 7, 2024 11:30:57 AM

STS_OQHW_AA240FS_7Mar24 Transaction log :

| Time | Transaction State | Activity Performed | Type of Transaction | Optional Information |
|---------------------------|-------------------|--------------------|---|---|
| March 7, 2024 11:02:34 AM | Audit | SessionCreated | Session | None |
| March 7, 2024 11:02:35 AM | Start | Configuration | Session | None |
| March 7, 2024 11:02:35 AM | Audit | Entitlement | Licensing | User is FieldEngineer and does not require an unlock code |
| March 7, 2024 11:06:15 AM | Audit | AceRestarted | Session | None |
| March 7, 2024 11:06:15 AM | Audit | SessionReloaded | Session | None |
| March 7, 2024 11:07:47 AM | Audit | EqpLoaded | Session | EQP details for primary technique [Aa] - File path: [ProtocolPacks/Aa/Configurations/02.51/Aa.02.51.eqp], EQP File Name: [Aa.02.51.eqp], EQP Name: [AgilentRecommended], Protocol Revision :[Aa.02.51] |
| March 7, 2024 11:08:21 AM | End | Configuration | Session | None |
| March 7, 2024 11:08:25 AM | Start | Qualification | Session | OQ |
| March 7, 2024 11:08:25 AM | Start | Execution | CDS Logon Verification : Qualitative test | None |
| March 7, 2024 11:11:13 AM | End | Execution | CDS Logon Verification : Qualitative test | Run Count : 1 |
| March 7, 2024 11:11:15 AM | Start | Execution | Absorption Sensitivity : Flame Test : AA Spectrometer 1, 240FS AA: Setpoint 1 | None |
| March 7, 2024 11:12:35 AM | End | Execution | Absorption Sensitivity : Flame Test : AA Spectrometer 1, 240FS AA: Setpoint 1 | Run Count : 1 |
| March 7, 2024 11:12:37 AM | Start | Execution | Absorption Linearity : Flame Test : AA Spectrometer 1, 240FS AA: Setpoint 1 | None |

User Name: uthai.ngamlertsirichai
Report Generated by Hostname: AG-5CG3311L8Y

System Id: EL08093194
Print Date: March 7, 2024 11:30:57 AM

STS_OQHW_AA240FS_7Mar24 Transaction log :

| Time | Transaction State | Activity Performed | Type of Transaction | Optional Information |
|---------------------------|-------------------|--------------------|---|-----------------------------------|
| March 7, 2024 11:14:48 AM | End | Execution | Absorption Linearity : Flame Test : AA Spectrometer 1, 240FS AA: Setpoint 1 | Run Count : 1 |
| March 7, 2024 11:14:51 AM | Start | Execution | Absorption Precision : Flame Test : AA Spectrometer 1, 240FS AA: Setpoint 1 | None |
| March 7, 2024 11:15:35 AM | End | Execution | Absorption Precision : Flame Test : AA Spectrometer 1, 240FS AA: Setpoint 1 | Run Count : 1 |
| March 7, 2024 11:15:37 AM | Start | Execution | Remaining AA Tests Evaluation : Flame AA Spectrometer 1, 240FS AA: Setpoint | None |
| March 7, 2024 11:15:58 AM | End | Execution | Remaining AA Tests Evaluation : Flame AA Spectrometer 1, 240FS AA: Setpoint | Run Count : 1 |
| March 7, 2024 11:16:05 AM | End | Qualification | Session | OQ |
| March 7, 2024 11:16:05 AM | Start | Reporting | Session | None |
| March 7, 2024 11:29:27 AM | Audit | Reporting | Session | Report Generated : Certificate |
| March 7, 2024 11:30:00 AM | Audit | Reporting | Session | Report Generated : Report |

Certificate of System Qualification

AA-OQ

System ID: EL08093193
Organization Name: STS Green Co.,Ltd.
Organization Location: 3/23 Moo 5, T.Ladsawai, A.Lumlukka Pathumthani 12150

Date: March 7, 2024 3:09:03 PM
EQP Name: AgilentRecommended
EQP Revision: AA.02.51
Overall Qualification Status: Pass

CDS Logon Verification

Logon: gamlerts

Overall CDS Logon Verification Test Status

Pass

Absorption Sensitivity

Absorbance: 0.160 Abs
Agilent Recommended: \geq 0.150

Overall Absorption Sensitivity Test Status

Pass

Absorption Linearity

Correlation Coefficient (r): 1.000
Agilent Recommended: \geq 0.996

Overall Absorption Linearity Test Status

Pass

Absorption Precision

Absorbance RSD: 0.423 %
Agilent Recommended: \leq 4.000

Overall Absorption Precision Test Status

Pass

Date: March 7, 2024 3:09:03 PM
System ID: EL08093193

Remaining AA Tests Evaluation

| | |
|---------------------------------------|------|
| Wavelength Accuracy | Pass |
| Zeeman Magnetic Sensitivity Ratio | Pass |
| Zeeman Background Correction Accuracy | Pass |

Overall Remaining AA Tests Evaluation Status

Pass

Instrument Details

Purpose

This section describes the as found system configuration.

Details

AA Spectrometer 1

| | |
|-------------------|----------------------|
| Manufacturer | Agilent Technologies |
| Name | 240Z AA |
| Model Number | 240Z AA |
| Atomization Type | Furnace Only |
| Serial Number | EL08093193 |
| Firmware Revision | 2.07 |

Graphite Tube Atomizer 1

| | |
|---------------|----------------------|
| Manufacturer | Agilent Technologies |
| Name | GTA120 |
| Model Number | GTA120 |
| Serial Number | EL08083104 |

Sample Dispenser 1

| | |
|---------------|----------------------|
| Manufacturer | Agilent Technologies |
| Name | PSD120 |
| Model Number | PSD120 |
| Serial Number | EL08093696 |

Electronic Signature

Purpose

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

Details

| | |
|--------------------------|---|
| Full Name of Signer: | Uthai Ngamlertsirichai |
| Logged On User Name: | uthai.ngamlertsirichai@agilent.com |
| Signature Creation Date: | March 7, 2024 |
| Reason for Signature: | Executed protocol and published this original version of document |

Regulatory Disclaimer

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

Warranty

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

User Name: uthai.ngamlertsirichai
Report Generated by Hostname: AG-5CG3311L8Y

System Id: EL08093193
Print Date: March 7, 2024 3:09:07 PM

STS_OQHW_AA240Z_7Mar24 Transaction log :

| Time | Transaction State | Activity Performed | Type of Transaction | Optional Information |
|--------------------------|-------------------|--------------------|--|---|
| March 7, 2024 2:30:19 PM | Audit | SessionCreated | Session | None |
| March 7, 2024 2:30:19 PM | Start | Configuration | Session | None |
| March 7, 2024 2:30:19 PM | Audit | Entitlement | Licensing | User is FieldEngineer and does not require an unlock code |
| March 7, 2024 2:32:44 PM | Audit | EqpLoaded | Session | EQP details for primary technique [Aa] - File path: [ProtocolPacks/Aa/Configurations/02.51/Aa.02.51.eqp], EQP File Name: [Aa.02.51.eqp], EQP Name: [AgilentRecommended], Protocol Revision :[Aa.02.51] |
| March 7, 2024 2:32:47 PM | End | Configuration | Session | None |
| March 7, 2024 2:32:51 PM | Start | Qualification | Session | OQ |
| March 7, 2024 2:32:51 PM | Start | Execution | CDS Logon Verification : Qualitative test | None |
| March 7, 2024 2:34:04 PM | End | Execution | CDS Logon Verification : Qualitative test | Run Count : 1 |
| March 7, 2024 2:34:07 PM | Start | Execution | Absorption Sensitivity : Furnace Test : AA Spectrometer 1, 240Z AA: Setpoint 1 | None |
| March 7, 2024 2:34:55 PM | End | Execution | Absorption Sensitivity : Furnace Test : AA Spectrometer 1, 240Z AA: Setpoint 1 | Run Count : 1 |
| March 7, 2024 2:34:57 PM | Start | Execution | Absorption Linearity : Furnace Test : AA Spectrometer 1, 240Z AA: Setpoint 1 | None |
| March 7, 2024 2:37:29 PM | End | Execution | Absorption Linearity : Furnace Test : AA Spectrometer 1, 240Z AA: Setpoint 1 | Run Count : 1 |

Page 1 / 2

User Name: uthai.ngamlertsirichai
Report Generated by Hostname: AG-5CG3311L8Y

System Id: EL08093193
Print Date: March 7, 2024 3:09:07 PM

STS_OQHW_AA240Z_7Mar24 Transaction log :

| Time | Transaction State | Activity Performed | Type of Transaction | Optional Information |
|--------------------------|-------------------|--------------------|--|-----------------------------------|
| March 7, 2024 2:37:33 PM | Start | Execution | Absorption Precision : Furnace Test : AA Spectrometer 1, 240Z AA: Setpoint 1 | None |
| March 7, 2024 2:37:46 PM | End | Execution | Absorption Precision : Furnace Test : AA Spectrometer 1, 240Z AA: Setpoint 1 | Run Count : 1 |
| March 7, 2024 2:37:48 PM | Start | Execution | Remaining AA Tests Evaluation : Zeeman AA Spectrometer 1, 240Z AA: Setpoint | None |
| March 7, 2024 2:37:58 PM | End | Execution | Remaining AA Tests Evaluation : Zeeman AA Spectrometer 1, 240Z AA: Setpoint | Run Count : 1 |
| March 7, 2024 2:37:59 PM | End | Qualification | Session | OQ |
| March 7, 2024 2:37:59 PM | Start | Reporting | Session | None |
| March 7, 2024 3:02:17 PM | Audit | Reporting | Session | Report Generated : Certificate |
| March 7, 2024 3:02:48 PM | Audit | Reporting | Session | Report Generated : Report |



Certificate of Calibration

Certificate No. : WK2404-300-150

Page 1 of 3

Customer : STS Green Co., Ltd
3/23 Moo 5, Phaholyohin-Lamlukka Rd.,
T. Lat Sawai, A. Lumlukka, Pathumthani, 12150

| | | | |
|--------------|----------------------------|---------------------|-------------------|
| Instrument | : Heat Stress Monitor | Ambient Temperature | : (23.0 ± 2) °C |
| Manufacturer | : Quest | Humidity | : (50.0 ± 15) %RH |
| Model | : QUESTemp [®] 34 | Received Date | : 19-Apr-24 |
| Serial No. | : TEI100016 | Calibrated Date | : 22-Apr-24 |
| Identity No. | : STS 306-09-0002 | Issued Date | : 22-Apr-24 |
| Range | : See to Data | Calibrated Location | : In Lab |
| Resolution | : 0.1 °C | | |

Calibration Method : CP-WK-T01

Standard Instrument

| <u>Instrument</u> | <u>Serial No.</u> | <u>Certificate No.</u> | <u>Due Date</u> | <u>Traceability to</u> |
|---|-------------------|------------------------|-----------------|------------------------|
| Temperature & Humidity Indicator with Sensor | HTD072K230577 | CC287923000003451F | 9-Jul-25 | SANSEL |

SANSEL CALIBRATION LABORATORIES

This result calibrate was found accurate as shown on date place of calibrate only

This certificate is traceability to the International System of Unit (SI)

The reported expanded uncertainty it was multipiled by a coverage factor $k = 2$ providing a level of confidence approximately 95 %

Calibrated by : Mr.Kritsada Ouparattha

Approved by :

Mr. Ratchadawut Rungravee
Authorized Signatory

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.



Calibration Results

Certificate No. : WK2404-300-150

Page 2 of 3

Calibration Result of the Accuracy

Table : Temperature Measurement @ Wet Bulb

Range : 20 °C to 40 °C

Resolution : 0.1 °C

Unit : °C

| Temperature Setting | STD Reading | UUC Reading | Error | Uncertainty (± °C) |
|---------------------|-------------|-------------|-------|----------------------|
| 20.00 | 20.02 | 19.8 | -0.22 | 0.33 |
| 25.00 | 25.03 | 24.8 | -0.23 | 0.33 |
| 30.00 | 30.01 | 29.8 | -0.21 | 0.33 |
| 35.00 | 35.02 | 34.8 | -0.22 | 0.33 |
| 40.00 | 40.03 | 39.8 | -0.23 | 0.33 |

Table : Temperature Measurement @ Dry Bulb

Range : 20 °C to 40 °C

Resolution : 0.1 °C

Unit : °C

| Temperature Setting | STD Reading | UUC Reading | Error | Uncertainty (± °C) |
|---------------------|-------------|-------------|-------|----------------------|
| 20.00 | 20.02 | 19.6 | -0.42 | 0.33 |
| 25.00 | 25.03 | 24.6 | -0.43 | 0.33 |
| 30.00 | 30.01 | 29.6 | -0.41 | 0.33 |
| 35.00 | 35.02 | 34.6 | -0.42 | 0.33 |
| 40.00 | 40.03 | 39.6 | -0.43 | 0.33 |

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.



Calibration Results

Certificate No. : WK2404-300-150

Page 3 of 3

Calibration Result of the Accuracy

Table : Temperature Measurement @ Globe Bulb

Range : 20 °C to 40 °C

Resolution : 0.1 °C

Unit : °C

| Temperature Setting | STD Reading | UUC Reading | Error | Uncertainty (± °C) |
|---------------------|-------------|-------------|-------|----------------------|
| 20.00 | 20.02 | 19.6 | -0.42 | 0.33 |
| 25.00 | 25.03 | 24.6 | -0.43 | 0.33 |
| 30.00 | 30.01 | 29.6 | -0.41 | 0.33 |
| 35.00 | 35.02 | 34.6 | -0.42 | 0.33 |
| 40.00 | 40.03 | 39.6 | -0.43 | 0.33 |

(X) Without Adjustment () After Adjustment

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.

**** End of Certificate****



Certificate of Calibration

Certificate No. : WK2403-304-77

Page 1 of 3

Customer : STS Green Co., Ltd
3/23 Moo 5, Phaholyohin-Lamlukka Rd.,
T. Lat Sawai, A. Lumlukka, Pathumthani, 12150

| | | | |
|--------------|-----------------------|---------------------|-----------------|
| Instrument | : Heat Stress Monitor | Ambient Temperature | : (23 ± 2) °C |
| Manufacturer | : Quest | Humidity | : (50 ± 15) %RH |
| Model | : QUESTemp°34 | Received Date | : 15-Mar-24 |
| Serial No. | : TEI100014 | Calibrated Date | : 16-Mar-24 |
| Identity No. | : STS 306-09-0001 | Issued Date | : 16-Mar-24 |
| Range | : See to data | Calibrated Location | : In Lab |
| Resolution | : See to data | | |

Calibration Method : CP-WK-T01

Standard Instrument

| <u>Instrument</u> | <u>Serial No.</u> | <u>Certificate No.</u> | <u>Due Date</u> | <u>Traceability to</u> |
|---|-------------------|------------------------|-----------------|------------------------|
| Temperature & Humidity Indicator with Sensor | HTD072K230577 | CC287923000003451F | 9-Jul-25 | SANSEL |

SANSEL CALIBRATION LABORATORIES

This result calibrate was found accurate as shown on date place of calibrate only

This certificate is traceability to the International System of Unit (SI)

The reported expanded uncertainty it was multiplied by a coverage factor $k = 2$ providing a level of confidence approximately 95 %

Calibrated by : Mr.Kritsada Ouparattha

Approved by :


Mr. Ratchadawut Rungravee
Authorized Signatory

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.



Calibration Results

Certificate No. : WK2403-304-77

Page 2 of 3

Calibration Result of the Accuracy

Function : Temperature Measurement @ Wet Bulb

Range : 20 °C to 40 °C

Resolution : 0.1 °C

Unit : °C

| Temperature Setting | STD Reading | UUC Reading | Error | Uncertainty (± °C) |
|---------------------|-------------|-------------|-------|----------------------|
| 20.0 | 20.12 | 20.2 | 0.08 | 0.33 |
| 25.0 | 25.15 | 25.1 | -0.05 | 0.33 |
| 30.0 | 30.18 | 30.2 | 0.02 | 0.33 |
| 35.0 | 35.15 | 35.2 | 0.05 | 0.33 |
| 40.0 | 40.23 | 40.2 | -0.03 | 0.33 |

Function : Temperature Measurement @ Dry Bulb

Range : 20 °C to 40 °C

Resolution : 0.1 °C

Unit : °C

| Temperature Setting | STD Reading | UUC Reading | Error | Uncertainty (± °C) |
|---------------------|-------------|-------------|-------|----------------------|
| 20.0 | 20.25 | 19.8 | -0.45 | 0.33 |
| 25.0 | 25.12 | 25.1 | -0.02 | 0.33 |
| 30.0 | 30.24 | 30.1 | -0.14 | 0.33 |
| 35.0 | 35.14 | 35.1 | -0.04 | 0.33 |
| 40.0 | 40.25 | 39.8 | -0.45 | 0.33 |

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.



Calibration Results

Certificate No. : WK2403-304-77

Page 3 of 3

Calibration Result of the Accuracy

Function : Temperature Measurement @ Globe Bulb

Range : 20 °C to 40 °C

Resolution : 0.1 °C

Unit : °C

| Temperature Setting | STD Reading | UUC Reading | Error | Uncertainty (± °C) |
|---------------------|-------------|-------------|-------|----------------------|
| 20.0 | 20.11 | 20.1 | -0.01 | 0.33 |
| 25.0 | 25.17 | 25.3 | 0.13 | 0.33 |
| 30.0 | 30.28 | 30.2 | -0.08 | 0.33 |
| 35.0 | 35.32 | 34.8 | -0.52 | 0.33 |
| 40.0 | 40.23 | 39.7 | -0.53 | 0.33 |

(X) Without Adjustment () After Adjustment

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.

**** End of Certificate****

Request No. 21-68/0017

MTC No. EEL. BP. 39/1067

CALIBRATION CERTIFICATE

Submitted by : STS GREEN CO.,LTD.

Address : 3/23 Moo 5, Phaholyothin-Lamlukka Rd., T.Lat Sawai, A.Lamlukka, Pathumthani, 12150.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Dose Badge Reader

Manufacturer : Cirrus Research plc

Model : RC 110A

Serial No. : 85126

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$

Relative Humidity : $(50 \pm 15) \%$

Ambient Pressure : $(101.325 \pm 1.500) \text{ kPa}$

Standards used :

1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.
3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.
4. Digital Multimeter Agilent 34401A S/N MY44005560.
5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.
6. Audio Analyzer Panasonic VP-7722A S/N 041477D122.
7. Condenser Microphone B&K 4180 S/N 2633526.

Calibration Procedure: CP-102-04 based on IEC 60942-2003; The sound pressure level generated by sound calibrator under test shall be measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 9 Oct. 2024

Date of Calibration : 16 Oct. 2024

1 / 2 ✓

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.5

Head Office

35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9036
Fax. (66) 0 2577 9009

Office/Laboratory

668 Mu 2 Tambon Bangpoomai, Amphoe Muang Samutprakan,
Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

Office

196 Phahonyothin Road, Ladyao, Chatuchak,
Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0017

MTC No. EEL. BP. 39/1067

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

Nominal Output of Unit Under Test = 114 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

1. Sound Pressure Level

| Standard Microphone Type | Measured Sound Pressure Level (dB) | Deviated value (dB) | Uncertainty (dB) | Tolerance limit IEC60942:2003 Class 2 |
|-----------------------------|---------------------------------------|------------------------|---------------------|--|
| 1/2 inch Bruel&Kjaer 4180 | 113.89 | -0.11 | ± 0.10 | ± 0.75 dB |

2. Frequency

| Standard Microphone Type | Measured Frequency (Hz) | Deviated value (Hz) | Uncertainty (Hz) | Tolerance limit IEC60942:2003 Class 2 |
|-----------------------------|----------------------------|------------------------|---------------------|--|
| 1/2 inch Bruel&Kjaer 4180 | 1004.1 | 4.1 | ± 1.5 | $\pm 2.0\%$ |

3. Total Distortion


| Standard Microphone Type | Measured Total Distortion (%) | Uncertainty (%) | Tolerance limit IEC60942:2003 Class 2 |
|-----------------------------|----------------------------------|--------------------|--|
| 1/2 inch Bruel&Kjaer 4180 | 0.50 | ± 0.50 | $\pm 4.0\%$ |

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :


(Mr. Weerachai Deechaiyae)

Approved by :


(Mr. Prawate Kluaypa)
Director

Date of Calibration : 16 Oct. 2024

Date of Issue : 17 Oct. 2024

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Ref : 2011267100903662005

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.5

Head Office

35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9036
Fax. (66) 0 2577 9009

Office/Laboratory

668 Mu 2 Tambon Bangpoomai, Amphoe Muang Samutprakan,
Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

Office

196 Phahonyothin Road, Ladyao, Chatuchak,
Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-67/0354

MTC No. EEL. BP. 66/0367

CALIBRATION CERTIFICATE

Submitted by : STS GREEN CO.,LTD.

Address : 3/23 Moo 5 Phaholyothin - Lumlukka Rd., Lat sawai, Lumlukka, Pathumthani 12150.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Acoustic Calibrator

Manufacturer : Quest Technologies

Model : QC-10

Serial No. : QIK070114

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$

Relative Humidity : $(50 \pm 15) \%$

Ambient Pressure : $(101.325 \pm 1.500) \text{ kPa}$

Standards used : 1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.

2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.

3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.

4. Digital Multimeter Agilent 34401A S/N MY44005560.

5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.

6. Audio Analyzer Keithley 2015-P S/N 4106495.

7. Condenser Microphone Bruel&Kjaer 4180 S/N 2889871.

Calibration Procedure: CP-102-04 based on IEC 60942-2003; The sound pressure level generated by sound calibrator under test shall be measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 20 Mar. 2024

Date of Calibration : 26 Mar. 2024

1 / 2 ✓

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.5

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang,
Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9036
Fax. (66) 0 2577 9009

Office/Laboratory
668 Mu 2 Tambon Bangpoomai, Amphoe Muang Samutprakan,
Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

Office
196 Phahonyothin Road, Ladyao, Chatuchak,
Bangkok 10900, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
(66) 08 1889 6827

Request No. 21-67/0354

MTC No. EEL. BP. 66/0367

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

Nominal Output of Unit Under Test = 114 dB re 20 μ Pa at 1000 Hz

Acoustic Output in dB re 20 μ Pa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

1. Sound Pressure Level

| Standard Microphone Type | Measured Sound Pressure Level (dB) | Deviated value (dB) | Uncertainty (dB) | Tolerance limit IEC60942:2003 Class 1 |
|-----------------------------|---------------------------------------|------------------------|---------------------|--|
| 1/2 inch Bruel&Kjaer 4180 | 114.13 | 0.13 | ± 0.10 | ± 0.40 dB |

2. Frequency

| Standard Microphone Type | Measured Frequency (Hz) | Deviated value (Hz) | Uncertainty (Hz) | Tolerance limit IEC60942:2003 Class 1 |
|-----------------------------|----------------------------|------------------------|---------------------|--|
| 1/2 inch Bruel&Kjaer 4180 | 993.9 | -6.1 | ± 1.5 | $\pm 1.0\%$ |

3. Total Distortion


| Standard Microphone Type | Measured Total Distortion (%) | Uncertainty (%) | Tolerance limit IEC60942:2003 Class 1 |
|-----------------------------|----------------------------------|--------------------|--|
| 1/2 inch Bruel&Kjaer 4180 | 0.39 | ± 0.50 | $\pm 3.0\%$ |

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :


.....
(Mr. Weerachai Deechaiyai)

Approved by :


.....
(Mr. Prawate Kluaypa)



Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 26 Mar. 2024

Date of Issue : 27 Mar. 2024

Ref : 2011267032001133001

End of Certificate

2 / 2

The results relate only to the items tested/calibrated or value assigned.

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.5



Certificate of Calibration

Certificate No.: WK2403-186-2

Page 1 of 2

Customer : STS GREEN CO.,LTD
3/23 Moo.5, T.Latsawai, A.Lamlukka,
Pathumthani 12150

Instrument : Light Meter
Manufacturer : Tenmars
Model : TM-721
Serial No. : 220600301
Identity No. : STS 306-23-0007
Range : See to Data
Resolution : See to Data
Calibration Method : CP-WK-PR04

Ambient Temperature : $(23 \pm 2) ^\circ\text{C}$
Humidity : $(50 \pm 15) \% \text{RH}$
Received Date : 19-Mar-24
Calibrated Date : 20-Mar-24
Issued Date : 26-Mar-24
Calibrated Location : In Lab

Reference standard instruments :

| <u>Instrument</u> | <u>Serial No.</u> | <u>Certificate No.</u> | <u>Due Date</u> | <u>Traceability to</u> |
|---|-------------------|------------------------|-----------------|------------------------|
| Standard Light Meter Illuminance standard lamp | S.008960 | 23PH676 | 27-Dec-24 | TPA |

TPA : Technology Promotion Association (Thailand-Japan)

This result calibrate was found accurate as shown on date place of calibrate only

This certificate is traceability to the International System of Unit (SI)

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

Calibrated by : Mr.Nattapong Phakagasama

Approved by :

Ms. Budsagorn Patcha

Authorized Signatory

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.



Calibration Results

Certificate No. : WK2403-186-2

Page 2 of 2

Calibration Result of the Accuracy

Function : Light Measurement

Range : 1000 lux 2000 lux

Unit : lux

| Range | STD Setting | UUC Reading | Error | Uncertainty (± lux) |
|-------|----------------|----------------|-------|--------------------------|
| 1000 | 1005 | 990 | -15 | 16 |
| 1500 | 1505 | 1482 | -23 | 24 |
| 2000 | 2000 | 1971 | -29 | 32 |

(X) Without Adjustment () After Adjustment

This certificate may not be reproduced except in full unless permission for the reproduction has been obtained in writing from the laboratory.

**** End of Certificate****