

ภาคผนวกที่ 28  
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	$\Delta p_{meter}$ mmHg	$\Delta p_{Orifice}$ inH <sub>2</sub> 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	$\Delta p_{meter}$ mmHg	$\Delta p_{Orifice}$ inH <sub>2</sub> 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\*\*\*



**Envi Equipment Service Co., Ltd.**

110/254 Moo 3, Tumbon Bang Rak Phatthana, Amphur Bang Bua Thong, Nonthaburi 11110

Tel. 098 362 9152, 089 478 7885

E-mail: sales@envi-ees.com

Certificate No. : E23-08062

Page : 1 of 3

**CERTIFICATE OF CALIBRATION**

**Customer** : S.P.J. Scientific Co., Ltd.

**Address** : 80 Soi Nakkeera Lamthong 3, Thap Chang, Saphansoong, Bangkok 10250

**Description of Equipment** : Standard Probe Method 5

**Manufacturer** : Apex Instrument

**Model Number** : PS-5HV

**Serial Number** : -

**ID./Control No.** : -

**Environment Conditions** : Temperature (25 ± 2) °C  
: Humidity (50 ± 15) % RH

**Cal. Date** : 01/08/2023

**Issue Date** : 01/08/2023

**Calibration Method or Calibration Procedure Used**

US EPA Method (United State Environmental Protection Agency)

This certificate is traceable to national standard, which realize the units of measurement according to the International System of Units (IS).

**Result of Calibration**

This certificate may not be reproduced other than in full except with prior Written approval of the Technical Manager, Envi Equipment Service Company Limited.

These reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level

Calibrated by : Mr. Sanya Sangnil

Approved by : (Mr. Mana Fuekhud)  
Technical Manager





## CALIBRATION RESULTS

### S-Type Geometric Pitot Tube Calibration

#### Sampling System Equipment Information

Probe Model	:	PS-5HV
Probe Number	:	-
Pitot Number	:	-
Pitot Tube Type	:	S-type

#### Calibration Condition

Date	:	1 August 2023
Barometric Pressure	:	757.49 mm Hg
Digital Caliper	:	CD-6" ASX
Serial number	:	A18008059

Pitot tube/Probe: # PS-5HV			
Parameter	Value	Allowable Range	Check
Assembly level?	Yes	Yes	Pass
Ports Damage?	No	No	Pass
$\alpha 1$	0	$-10^{\circ} < \alpha 1 < +10^{\circ}$	Pass
$\alpha 2$	1	$-10^{\circ} < \alpha 2 < +10^{\circ}$	Pass
$\beta 1$	0	$-5^{\circ} < \beta 1 < +5^{\circ}$	Pass
$\beta 2$	0	$-5^{\circ} < \beta 2 < +5^{\circ}$	Pass
$\gamma$	0	N/A	-
$\sigma$	0	N/A	-
Dt	0.373	.188" to .375"	Pass
A	0.995	$2.1Dt \leq A \leq 3Dt$	Pass
A/2Dt	1.333	$1.05 \leq P_A/Dt \leq 1.5$	Pass
$Z = A \tan \gamma$	0.074	$Z \leq .125"$	Pass
$W = A \tan \sigma$	0.018	$W \leq .031"$	Pass

#### Remark:

I certified that probe model: PS-5HV meets or exceeds all specifications, criteria and/or applicable design and is hereby assigned a pitot tube certification factor of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.



## THERMOCOUPLES SYSTEM CALIBRATION

Sampling System Equipment Information	
Probe Model Number	PS-5HV
Probe Serial Number	-
Meter Box Model Number	JENCO 765 KF
Meter Box Serial Number	JC 13129

Calibration Conditions			
Date	Time	01/08/2023	14:00 PM
Calibration Reference No.		SER23-08026	
Reference Thermometer		DIGICON	
Serial Number		183169105	

Thermocouple of Standard Dual Probe = length 5 foot			
Set Point	Reference Thermocouple	Probe Thermocouple	Difference
100	100.0	98.0	0.54
250	250.0	247.0	0.57
300	300.0	298.0	0.35
350	350.0	348.0	0.32



## Envi Equipment Service Co., Ltd.

110/254 Moo 3, Tumbon Bang Rak Phatthana, Amphur Bang Bua Thong, Nonthaburi 11110

Tel. 098 362 9152, 089 478 7885

E-mail: sales@envi-ees.com

Certificate No. : E23-08063

Page : 1 of 3

### CERTIFICATE OF CALIBRATION

Customer : S.P.J. Scientific Co., Ltd.  
Address : 80 Soi Nakkeera Lamthong 3, Thap Chang, Saphansoong, Bangkok 10250  
Description of Equipment : Standard Probe Method 5  
Manufacturer : Apex Instrument  
Model Number : PS-6HV  
Serial Number : -  
ID./Control No. : -  
Environment Conditions : Temperature (25 ± 2) °C  
: Humidity (50 ± 15) % RH  
Cal. Date : 02/08/2023  
Issue Date : 02/08/2023

#### Calibration Method or Calibration Procedure Used

US EPA Method (United State Environmental Protection Agency)

This certificate is traceable to national standard, which realize the units of measurement according to the International System of Units (IS).

#### Result of Calibration

This certificate may not be reproduced other than in full except with prior Written approval of the Technical Manager, Envi Equipment Service Company Limited.

These reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level

Calibrated by : Mr. Sanya Sangnil

Approved by :



(Mr. Mana Fuekhudl)

Technical Manger



## CALIBRATION RESULTS

### S-Type Geometric Pitot Tube Calibration

#### Sampling System Equipment Information

Probe Model	: PS-6HV
Probe Number	: "
Pitot Number	: A10985
Pitot Tube Type	: S-type

#### Calibration Condition

Date	: 2 August 2023
Barometric Pressure	: 756.74 mm Hg
Digital Caliper	: CD-6" ASX
Serial number	: A18008059

Pitot tube/Probe: # PS-6HV			
Parameter	Value	Allowable Range	Check
Assembly level?	Yes	Yes	Pass
Ports Damage?	No	No	Pass
$\alpha 1$	0	$-10^\circ < \alpha 1 < +10^\circ$	Pass
$\alpha 2$	1	$-10^\circ < \alpha 2 < +10^\circ$	Pass
$\beta 1$	0	$-5^\circ < \beta 1 < +5^\circ$	Pass
$\beta 2$	0	$-5^\circ < \beta 2 < +5^\circ$	Pass
$\gamma$	0	N/A	-
$\sigma$	0	N/A	-
Dt	0.375	.188 " to .375 "	Pass
A	0.876	$2.1Dt \leq A \leq 3Dt$	Pass
A/2Dt	1.168	$1.05 \leq Pn/Dt \leq 1.5$	Pass
$Z = A \tan \gamma$	0.065	$Z \leq .125"$	Pass
$W = A \tan \sigma$	0.020	$W \leq .031"$	Pass

#### Remark:

I certified that probe model: PS-6HV and Pitot tube no. A10985 meets or exceeds all specifications, criteria and/or applicable design and is hereby assigned a pitot tube certification factor of 0.84. See 40 CFR Pt. 60, App. A, EPA Method 2.





**THERMOCOUPLES SYSTEM CALIBRATION**

Sampling System Equipment Information	
Probe Model Number	PS-6HV
Probe Serial Number	-
Meter Box Model Number	JENCO 765 KF
Meter Box Serial Number	JC 13129

Calibration Conditions			
Date	Time	02/08/2023	02:30 PM
Calibration Reference No.		SER23-08026	
Reference Thermometer		DIGICON	
Serial Number		183169105	

Thermocouple of Standard Dual Probe = length 6 foot			
Set Point	Reference Thermocouple	Probe Thermocouple	Difference
100	100.0	99.0	0.27
250	250.0	249.0	0.19
300	300.0	298.0	0.35
350	350.0	349.0	0.16



Envi Equipment Service Co., Ltd.

110/254 Moo 3, Tumbon Bang Rak Phatthana, Amphur Bang Bua Thong, Nonthaburi 11110

Tel. 098 362 9152, 089 478 7885

E-mail: sales@envi-ees.com

Certificate No. : E23-10088

Page : 1 of 6

## CERTIFICATE OF CALIBRATION

Customer : S.P.J. Scientific Co., Ltd.  
Address : 80 Soi Nakkeera Lamthong 3, Thap Chang, Saphansoong, Bangkok 10250  
Description of Equipment : Console meter  
Manufacturer : Apex Instrument  
Model Number : XC-572-OV  
Serial Number : 1105032  
ID./Control No. : -  
Environment Conditions : Temperature (25 ± 2) °C  
: Humidity (50 ± 15) % RH  
Cal. Date : 18/10/2023  
Issue Date : 18/10/2023

### Calibration Method or Calibration Procedure Used

US EPA Method (United State Environmental Protection Agency)


This certificate is traceable to national standard, which realize the units of measurement according to the International System of Units (IS).

### Result of Calibration

This certificate may not be reproduced other than in full except with prior Written approval of the Technical Manager, Envi Equipment Service Company Limited.

These reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level

Calibrated by : Mr. Sanya Sangnil

Approved by :   
(Mr. Mana Fuekhud)  
Technical Manger





**METHOD 5 CONSOLE CALIBRATION  
USING REFERENCE WET GAS METER W-NK-2.5-B-Z No.547425  
5-POINT METRIC UNIT**

Meter Console Information	
Console Model Number	XC-572-OV
Console Serial Number	1105032
DGM Model Number	SK25EX
DGM Serial Number	00009890

Calibration Conditions			
Date	Time	18/10/2023	10:25 AM
Calibration Reference No.		SER23-08032	
Barometric Pressure		759.99	mmHg
Calibration Meter Gamma		0.999	

Factors/Conversions		
Std Temp	293	K
Std Press	760	mm Hg
K <sub>1</sub>	0.386	
Console Leak Check		PASS

Calibration Data									
Run Time	Metering Console					Calibration Meter			
Elapsed	DGM Orifice DH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final
(Q)	(P <sub>m</sub> )	(V <sub>mi</sub> )	(V <sub>mf</sub> )	(t <sub>mi</sub> )	(t <sub>mf</sub> )	(V <sub>wi</sub> )	(V <sub>wf</sub> )	(t <sub>wi</sub> )	(t <sub>wf</sub> )
min	mm H <sub>2</sub> O	m <sup>3</sup>	m <sup>3</sup>	°C	°C	m <sup>3</sup>	m <sup>3</sup>	°C	°C
12.52	13.0	0.1390	0.2790	29	29	177.12918	177.26696	29	29
12.47	13.0	0.2790	0.4190	28	28	177.26696	177.40352	29	29
8.63	26.0	0.4260	0.5660	28	28	177.40722	177.54364	28	28
8.63	26.0	0.5660	0.7060	28	28	177.54364	177.67978	28	28
13.93	40.0	0.7120	0.9920	28	28	177.68154	177.96128	28	28
13.90	40.0	0.9920	1.2720	28	28	177.96128	178.24020	28	28
10.47	70.0	1.2840	1.5640	28	28	178.25542	178.53342	27	27
10.50	70.0	1.5640	1.8440	29	29	178.53342	178.81236	27	27
9.22	90.0	1.8550	2.1350	29	29	178.83678	179.11452	27	27
9.22	90.0	2.1350	2.4150	29	29	179.11452	179.39258	27	27



**METHOD 5 CONSOLE CALIBRATION  
USING REFERENCE WET GAS METER W-NK-2.5-B-Z No.547425  
5-POINT METRIC UNIT**

Meter Console Information	
Console Model Number	XC-572-OV
Console Serial Number	1105032
DGM Model Number	SK25EX
DGM Serial Number	00009890

Calibration Conditions			
Date	Time	18/10/2023	10:25 AM
Calibration Reference No.	SER23-08032		
Barometric Pressure	759.99		
Calibration Meter Gamma	0.999		

Factors/Conversions		
Std Temp	293	K
Std Press	760	mm Hg
K <sub>1</sub>	0.386	
Console Leak Check	PASS	

Calibration Data								
Results								
Standardized Data				Dry Gas Meter				
Dry Gas Meter		Calibration Meter		Calibration Factor		Flowrate		
(V <sub>m(std)</sub> )	(Q <sub>m(std)</sub> )	(V <sub>w(std)</sub> )	(Q <sub>w(std)</sub> )	Value	Variation	Std & Corr	.0212 m <sup>3</sup> /min	Variation
m <sup>3</sup>	m <sup>3</sup> /min	m <sup>3</sup>	m <sup>3</sup> /min	(Y)	(ΔY)	(Q <sub>m(std)</sub> (corr))	(ΔH@)	(ΔH@)
						m <sup>3</sup> /min	mm H <sub>2</sub> O	
0.136	0.011	0.134	0.011	0.982	0.000	0.011	50.089	2.375
0.136	0.011	0.132	0.011	0.973	-0.009	0.011	50.582	2.868
0.137	0.016	0.133	0.015	0.971	-0.011	0.015	48.576	0.862
0.137	0.016	0.132	0.015	0.969	-0.013	0.015	48.776	1.062
0.274	0.020	0.272	0.020	0.994	0.012	0.020	46.417	-1.297
0.274	0.020	0.271	0.020	0.991	0.009	0.020	46.468	-1.246
0.275	0.026	0.271	0.026	0.985	0.003	0.026	46.527	-1.187
0.275	0.026	0.272	0.026	0.989	0.006	0.026	46.509	-1.205
0.276	0.030	0.271	0.029	0.982	0.000	0.029	46.651	-1.063
0.276	0.030	0.271	0.029	0.984	0.001	0.029	46.544	-1.170
				0.982	Y Average		47.714	ΔH@ Average

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.

For ΔH@, orifice pressure differential that equates to 0.75 cfm (0.0212 m<sup>3</sup>/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is ±0.2 inches (5.1mm)





Meter Console Information	
Console Model Number	XC-572-OV
Console Serial Number	1105032
DGM Model Number	SK25EX
DGM Serial Number	00009890

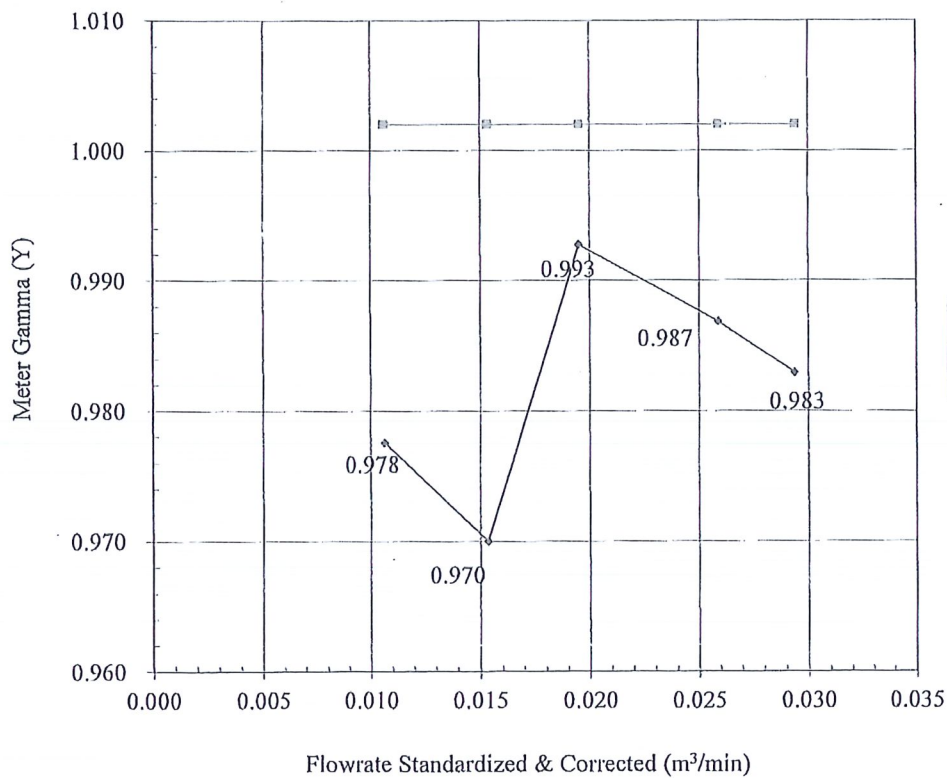
Calibration Conditions			
Date	Time	18/10/2023	10:25 AM
Calibration Reference No.		SER23-08032	
Barometric Pressure		759.99	
Calibration Meter Gamma		0.999	

Factors/Conversions		
Std Temp	293	K
Std Press	760	mm Hg
K <sub>1</sub>	0.386	
Console Leak Check		PASS

Calibration Date: 18-10-2023

Calibration Reference No: SER23-08032

Meter Gamma vs Flowrate



Console Serial: 1105032

Console Model: XC-572-OV



Meter Console Information	
Console Model Number	XC-572-OV
Console Serial Number	1105032
DGM Model Number	SK25EX
DGM Serial Number	00009890

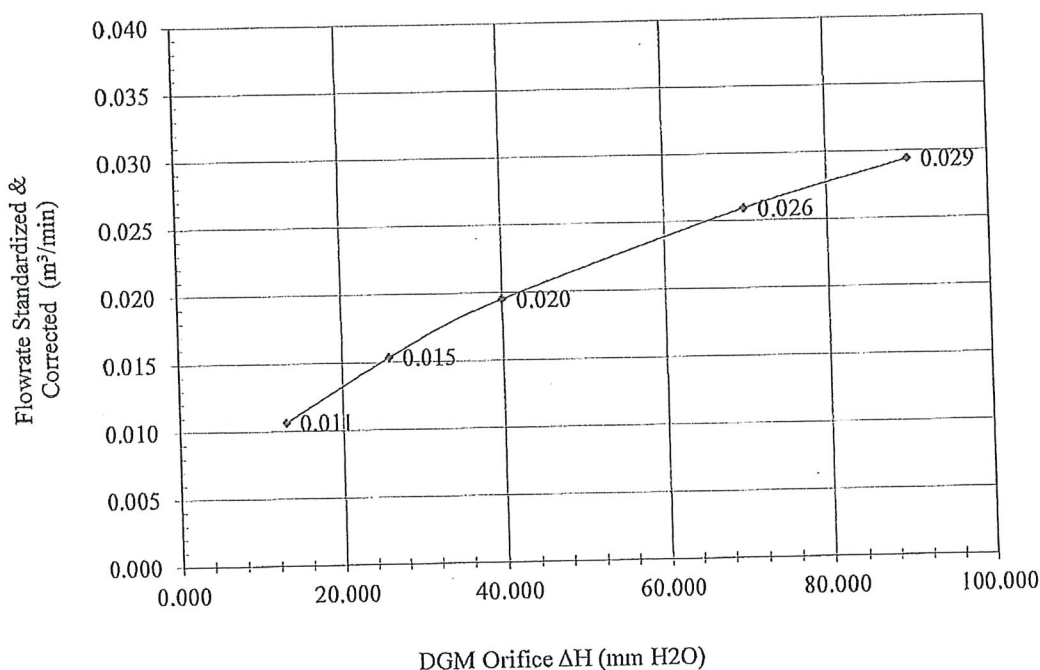
Calibration Conditions			
Date	Time	18/10/2023	10:25 AM
Calibration Reference No.	SER23-08032		
Barometric Pressure	759.99		
Calibration Meter Gamma	0.999		

Factors/Conversions		
Std Temp	293	K
Std Press	760	mm Hg
K <sub>1</sub>	0.386	
Console Leak Check	PASS	

Calibration Date: 18-10-2023

Calibration Reference No: SER23-08032

Meter Pressure vs Flowrate



Console Serial: 1105032

Console Model: XC-572-OV





## THERMOCOUPLES SYSTEM CALIBRATION

Sampling System Equipment Information	
Console Model Number	XC-572-OV
Console Serial Number	1105032
DGM Model Number	SK25EX
DGM Serial Number	00009890
Meter Box Model Number	JENCO 765 KF
Meter Box Serial Number	JC 10953

Calibration Conditions			
Date	Time	18/10/2023	00:20 PM
Calibration Reference No.		SER23-08032	
Reference Thermometer		DIGICON	
Serial Number		183169105	

Results											
Console Thermocouple Simulator											
Channel and test point	Meter Box Channel Temperature Reading (°C)										
	-18.0	25.0	38.0	93.0	149.0	260.0	371.0	482.0	593.0	816.0	1038.0
Stack	-18.0	24.0	36.0	91.0	147.0	257.0	368.0	479.0	590.0	812.0	1032.0
Aux	-18.0	24.0	36.0	91.0	147.0						
Probe	-18.0	24.0	36.0	91.0	147.0						
Filter	-18.0	24.0	36.0	91.0	147.0						
Oven	-18.0	24.0	36.0	91.0	147.0						
Exit	-18.0	24.0	36.0								

Stack      ± 1.50%      Absolute  
 Probe      ± 3.0 °C  
 Filter      ± 3.0 °C

### Tolerance Range

Meter      ± 3.0 °C  
 Exit      ± 2.0 °C



## Envi Equipment Service Co., Ltd.

110/254 Moo 3, Tumbon Bang Rak Phatthana, Amphur Bang Bua Thong, Nonthaburi 11110

Tel. 098 362 9152, 089 478 7885

E-mail: sales@envi-ees.com

Certificate No. : E23-08061

Page : 1 of 2

## CERTIFICATE OF CALIBRATION

Customer : S.P.J. Scientific Co., Ltd.  
Address : 80 Soi Nakkeera Lamthong 3, Thap Chang, Saphansoong, Bangkok 10250  
Description of Equipment : Stainless Steel Nozzle  
Manufacturer : Apex Instrument  
Model Number : NS SET  
Serial Number : -  
ID./Control No. : -  
Environment Conditions : Temperature (25 ± 2) °C  
: Humidity (50 ± 15) % RH  
Cal. Date : 02/08/2023  
Issue Date : 02/08/2023

### Calibration Method or Calibration Procedure Used

US EPA Method (United State Environmental Protection Agency)


This certificate is traceable to national standard, which realize the units of measurement according to the International System of Units (IS).

### Result of Calibration

This certificate may not be reproduced other than in full except with prior Written approval of the Technical Manager, Envi Equipment Service Company Limited.

These reported uncertainties of measurement are expanded by a coverage factor of  $k=2$ , providing a 95% confidence level

Calibrated by : Mr. Sanya Sangnil

Approved by :   
(Mr. Mana Fuekhud)  
Technical Manger





## CALIBRATION RESULTS

### Sampling System Equipment Information

Nozzle Model : NS SET  
Nozzle Number : -  
Nozzle Type : Stainless Steel

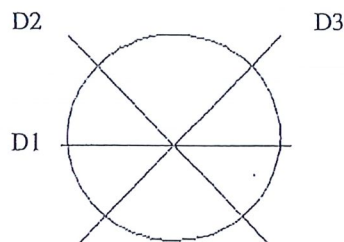
### Calibration Condition

Date : 2 August 2023  
Barometric Pressure : 756.74 mm Hg  
Calibration Device : Vernier, 0-150 mm  
Method Reference : US, EPA Method

Nozzle ID	Nozzle Diameter				Different	(D1 + D2 + D3) / 3
Size		D1	D2	D3	$\Delta D$	Davg
	mm	mm	mm	mm	mm	mm
NS-4	3.18	3.21	3.22	3.22	0.006	3.217
NS-6	4.76	4.68	4.69	4.68	0.006	4.683
NS-8	6.35	6.18	6.17	6.18	0.006	6.177
NS-10	7.94	7.75	7.73	7.75	0.012	7.743
NS-12	9.52	9.57	9.58	9.59	0.010	9.580
NS-14	11.11	10.84	10.85	10.84	0.006	10.843
NS-16	12.70	12.61	12.60	12.60	0.006	12.603

### Remark:

D1, D2, D3 = There difference nozzle diameters, mm; diameter must be within 0.025 mm  
 $\Delta D$  = Maximum difference between any two diameters, must be  $\leq 0.100$  mm  
 Davg =  $(D_1 + D_2 + D_3) / 3$



**Certificate No:** G 660420

**Date of issue :** 24-Jul-23

**Instrument description :** Flue Gas Analyzer  
**Instrument model :** Testo 350 New  
**Instrument serial no. :** 02512133/304  
**Control unit serial no. :** 02536316/304  
**ID no. or control no. :** SPJ-FGAB-05  
**Manufacturer :** Testo SE & Co. KGaA  
**Probe description :** -  
**Probe model :** -  
**Probe serial :** -  
**Customer name :** S.P.J SCIENTIFIC CO.,LTD.  
**Customer address :** 80 SOI NAKKILA LAEM THONG 3, THAP CHANG, KHET SAPHAN SUNG, BANGKOK 10250

**Total pages of certificate :** 2 Pages  
**Receiving no. :** L-232342  
**Receiving date. :** 24-Jul-23  
**Parameter of calibration :** Gas Calibration(Oxygen 2.498,10.04,21.02 %vol, Carbon Monoxide 80.14,1003 ppm  
 Nitrogen Dioxide 80.96 ppm, Nitric Oxide 151.5 ppm, Sulphur Dioxide 100.8 ppm)  
**Condition of UUC. :** Used  
**Ambient condition :** All of the Measurment ware caried out the stabilized labotary  
 Temperature : 23  $\pm$  5  $^{\circ}$ C  
 Humidity : 55  $\pm$  15 %RH  
**Calibration place :** 17/121 Sol Ngamwongwan 47 Yaek 48, Toongsonghong, Laksi, Bangkok 10210  
**Calibration procedure no. :** This instrument was calibrated by comparison with Standard gas mixture according  
 to calibration work instration no. WI-CL-19-C

*The calibration certificate expanded uncertainty of measurement is stated as the standard uncertainty of measurent  
 Multiplied by coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.  
 This certificate is applied only to item under test Environmental condition.  
 This Calibration Certificate may not be reporduced other than in full except with the permission of the issuing laboratory.  
 Calibration certificates without signature and seal not valid and The results relate only to the items tested/calibrated.  
 This calibration certificate documents are tracebility to national standards, which realize measurement according to the  
 International System of Units (SI).*

**Date of calibration :** 24-Jul-23

Mr. Kwanchai Khamdoun  
Calibration Technician

Mrs. Nongluck Wongsettee  
Technical Manager

### Standard References (Table 1)

Standard	Certificate No.	Vendor	Due date
Oxygen ( O <sub>2</sub> ) 2.498 % Vol	4219/21	Linde	30-Sep-25
Oxygen ( O <sub>2</sub> ) 10.04 % Vol	CG-0153-21	Nimt	18-Nov-26
Oxygen ( O <sub>2</sub> ) 21.02 % Vol	CG-0041-22	Nimt	10-Feb-27
Carbon monoxide ( CO ) 80.14 ppm	CG-0040-22	Nimt	14-Feb-27
Carbon monoxide ( CO ) 1003 ppm	2583/22	Linde	09-Aug-24
Nitrogen Dioxide ( NO <sub>2</sub> ) 80.96 ppm	3240/21	Linde	26-Jun-24
Nitric Oxide ( NO ) 151.5 ppm	0161/23	Linde	22-Jan-25
Sulphur Dioxide ( SO <sub>2</sub> ) 100.8 ppm	3507/22	Linde	09-Nov-24

### Measured room conditions

Temperature : 22.5 °C Humidity : 65.3 %RH Pressure : 1004.6 mbar

### Calibration conditions

Gas Temperature : 23 °C Flow rate : 1,200 ml/min Gas pressure : 1022.2 mbar

### Calibration Results (before adjustment) (Table 2)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O <sub>2</sub> (%Vol)	2.498	2.58	0.082	0.15
O <sub>2</sub> (%Vol)	10.04	10.09	0.05	0.20
O <sub>2</sub> (%Vol)	21.02	21.08	0.06	0.30
CO (ppm)	80.14	83	2.86	3.0
CO (ppm)	1003	1015	12	12
NO <sub>2</sub> (ppm)	80.96	76.4	-4.56	8.0
NO (ppm)	151.5	144	-7.5	8.0
SO <sub>2</sub> (ppm)	100.8	102	1.2	6.0

### Calibration Results (after adjustment) (Table 3)

Parameter of Standard	Standard Values	Mean of UUC	Error	Uncertainty (±)
O <sub>2</sub> (%Vol)	2.498	2.58	0.082	0.15
O <sub>2</sub> (%Vol)	10.04	10.09	0.05	0.20
O <sub>2</sub> (%Vol)	21.02	21.08	0.06	0.30
CO (ppm)	80.14	83	2.86	3.0
CO (ppm)	1003	1015	12	12
NO <sub>2</sub> (ppm)	80.96	81.2	0.24	8.0
NO (ppm)	151.5	151	-0.5	8.0
SO <sub>2</sub> (ppm)	100.8	102	1.2	6.0

Remark : 1 cmol/mol = 1 %vol. , 1 µmol/mol = 1 ppm.

## End of Report





CENTRAL LABORATORY (THAILAND) CO., LTD.  
<http://www.centrallabthai.com>

# CERTIFICATE OF CALIBRATION



Certificate No. 23-MAS-0747

Page 1 of 3

Equipment : Non-Automatic Weighing Instrument (Electronic Balance)

Instrument Type : Single interval

Environment : under following environment condition

Manufacturer : METTLER TOLEDO

Room Temperature : ( 20 - 30 ) °C

Model : AL204

Relative Humidity : ( 40 - 60 ) %RH

Serial No. : 1228320221

Maximum Capacity : 210 g

ID No. : SPJ-TE-012

Readability (d) : 0.0001 g

Received No. : CAHO23/01261-007

Adjustment : External Calibration by Customer Weight  
applying test load 200 g

Calibration Date : 20 June 2023

(S/N or ID.) : SPJ-TE-047

Equipment condition : Good

Location : BALANCE ROOM

Customer name : S.P.J. SCIENTIFIC COMPANY LIMITED

Customer address : 80 Soi Nakkilalaemthong 3, Thab Chang, Saphansong, Bangkok 10250

## Condition of calibration results :

1. This calibration method is calibrate by direct measurement method against standard weight according to WI-MAS-003-CC on

EURAMET Calibration Guild No. 18 Version 4.0 (11/2015)

2. This certificate is traceable to the International System of Unit (SI Unit).

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

4. This calibration certificate may not be reproduced other than in full except with the permission of CLT Calibration Laboratory.

Calibrated by : Natthawut

Approved by :

Issue Date : 21 June 2023

Nutpongorn Rattanapon

FM-WI-MAS-003-003-CC-R00(23/03/64)P1/3

Central Laboratory (Thailand) Co., Ltd.

Callibration Service Center : No. 2179 Phaholyothin Road., Ladyao, Jatujak, Bangkok 10900 Thailand  
Tel : (662) 940 5993 Ext. 263, 262, 217, 214 Fax : (662) 579 4877 E-mail : clt.callibration@gmail.com





CENTRAL LABORATORY (THAILAND) CO., LTD.

<http://www.centallabthai.com>

# REPORT of CALIBRATION

NSC-TISI-TIS 17025  
CALIBRATION 0125

Certificate No.

23-MAS-0747

Page 2 of 3

Standard Weight Size

Class

Standard ID No.

Certificate No.

Due Date

Traceability

Set 1 mg to 200 g

E2

SWE-02-CC

M23010605

17 Jan 2025

TCS(M23010605)

This certificate is traceable to SI unit

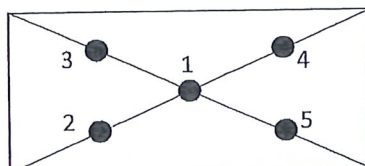
## MEASUREMENT RESULTS

### 1. Repeatability (applied 10 times)

Test Load (g)	Standard deviation (g)
200	0.000052

### 2. Eccentricity Test (Set to zero -> Test load put on position 1 -> removed -> Test load put on next position -> removed -> etc.)

Test load : 100 g



Loading Position	Error Indication from Position 1 (g)
Front left (2)	0.0001
Back left (3)	0.0001
Back right (4)	0.0001
Front right (5)	0.0001
Maximum deviation (g)	0.0001

MPE  $\leq 0.0005$  g

### 3. Error of Indications (Set to zero -> Put on smallest test load -> removed -> Increasing put on next test load -> removed -> etc.)

Calibration Requirement

Test Load (g)	Error of Indication, E (g)	Expanded Uncertainty, U(E) (g)	Coverage factor, k
0	0.0000	0.00013	2.18
50	0.0000	0.00016	2.06
100	0.0000	0.00019	2.03
150	-0.0001	0.00025	2.00
200	-0.0001	0.00028	2.00

Customer Requirement

Test Load (g)	Error of Indication, E (g)	Expanded Uncertainty, U(E) (g)	Coverage factor, k
0.05	0.0000	0.00015	2.11
0.1	0.0000	0.00015	2.11
0.5	0.0000	0.00015	2.11
1	0.0000	0.00015	2.11
2	0.0000	0.00015	2.11
5	0.0000	0.00015	2.10
10	0.0000	0.00015	2.09
20	0.0000	0.00016	2.08

Remark : This results of calibration was found accurate as shown on environment condition, date and person of calibration only.

Approved by :

Nutpongorn Rattanapon



CENTRAL LABORATORY (THAILAND) CO., LTD.

<http://www.centrallabthai.com>

# REPORT of CALIBRATION



Certificate No.

Page 3 of 3

CERTIFICATE CALIBRATION

## Measurement Uncertainty of the Weighing Instrument in Use

This information shall be used for the estimation of the uncertainty under consideration of the same ambient calibration and under the following conditions which is determined by

- 1) Effect of eccentric application of load on indication.
- 2) The device adjustment functionality by External Calibration customer weight applying test load 200 g  
(S/N or ID.) : SPJ-TE-047
- 3) Temperature coefficient for the evaluation of the measurement uncertainty in use :  $2.5 \times 10^{-6} ^\circ\text{C}$   
 $10 ^\circ\text{C}$
- 4) Temperature range on site for the evaluation of the measurement uncertainty in use :
- 5) The device may be use Tare function for weighing.

## Linearization of The Weighing Results Equation

The value R represents the net load indication in the unit of measure of the device.

The value W represents the Weighing Results of the device.

1	Range	The Weighing Results Equation (g)	Examples value (g)	
			Net load [R]	Weighing Results [W]
1	0 g - 200 g	$W = R - (-3.933\text{E-}07 \times R)$	63.0000	63.0000

## Linearization of Uncertainty Equation with adjust of the device

Expanded uncertainty of The Weighing Results providing a coverage probability of approximately 95%

1	Range	Uncertainty Equation with adjust (g)	Examples value (g)	
			Net load [R]	Uncertainty [U]
1	0 g - 200 g	$U = 1.322\text{E-}04 + (1.391\text{E-}05 \times R)$	63.0000	0.0011

## Linearization of Uncertainty Equation without adjust of the device

Expanded uncertainty of The Weighing Results providing a coverage probability of approximately 95%

1	Range	Uncertainty Equation without adjust (g)	Examples value (g)	
			Net load [R]	Uncertainty [U]
1	0 g - 200 g	$U = 1.322\text{E-}04 + (1.430\text{E-}05 \times R)$	63.0000	0.0011

Approved by :

Nutpongorn Rattanapon

~ End of Report ~



## Certificate of Calibration

Certificate No. : WK2406-302-17

Page 1 of 2

**Customer** : STS GREEN CO., LTD.  
3/23 Moo 5, Phaholyothin-Lumlukka Rd.,  
T.Lat Sawai, A.Lumlukka, Pathumthani, 12150

**Instrument** : Sound Calibrator  
**Manufacturer** : RION  
**Model** : NC-74  
**Serial No.** : 34667824  
**Identity No.** : ACM05  
**Range** : See to Data  
**Resolution** : See to Data

**Ambient Temperature** :  $(23 \pm 2)^{\circ}\text{C}$   
**Humidity** :  $(50 \pm 15) \% \text{RH}$   
**Received Date** : 12-Jun-24  
**Calibrated Date** : 13-Jun-24  
**Issued Date** : 13-Jun-24  
**Calibrated Location** : In Lab

**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>
Data Acquisition/Switch Unit with Microphone	MY41022839	WK2401-049-1	5-Jan-25	WK Electric Co.,Ltd.
Sound Level Calibrator	10049416	EEL.BP.196/0166	27-Jan-25	TISTR

TISTR : Thailand Institute of Scientific and Technological Research.

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 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. WK2406-302-17

Page 2 of 2

### Calibration Results

Function : Sound Pressure Level Measurement @ 1kHz

Nominal Value (dB)	STD Value (dB)	Error (dB)	(±) Uncertainty (dB)
94.0	94.30	0.10	0.061

Function : Frequency Source Test @ Amplitude 5 V

Nominal Value (Hz)	STD Value (Hz)	Error (Hz)	(±) Uncertainty (Hz)
1000.0	1000.20	-0.20	0.0058

(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

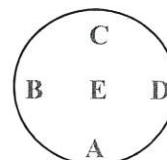
Nominal Value (g)	Correction (g)	Uncertainty $\pm$ (g)
0.001	0.0001	0.00012
0.01	0.0001	0.00012
0.1	0.0001	0.00012
1	0.0000	0.00013
5	-0.0001	0.00013
10	0.0000	0.00013
20	-0.0002	0.00014
50	-0.0001	0.00015
100	-0.0001	0.00020
150	-0.0002	0.00038
200	-0.0001	0.00038

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 : HORIBA  
Model : D-51  
Serial No. : S005100  
ID No. : PHM-No.7  
Received Date : 29 January 2024  
Calibrated Date : 31 January 2024  
Issued Date : 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:095-552-4939

Certificate No. C16230003

## Calibration Certificate

Equipment: COD Reactor

Model: DRB200

Serial No.(or ID): 20030C0500 ( DIR 02 )

Manufacturer: Hach

Covers: Open (Max)

Condition: In Condition

Job No.: KSMT2300407

Received Date: 08 September 2023

Issued Date: 08 September 2023

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

08 September 2023

### Environment Condition

Temperature: 24.7 °C  $\pm$  1.1 °C

Humidity: 59.1 %RH  $\pm$  4.5 %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  
Quality Reborn Co.,Ltd.Certificate No. QR23-1906

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.

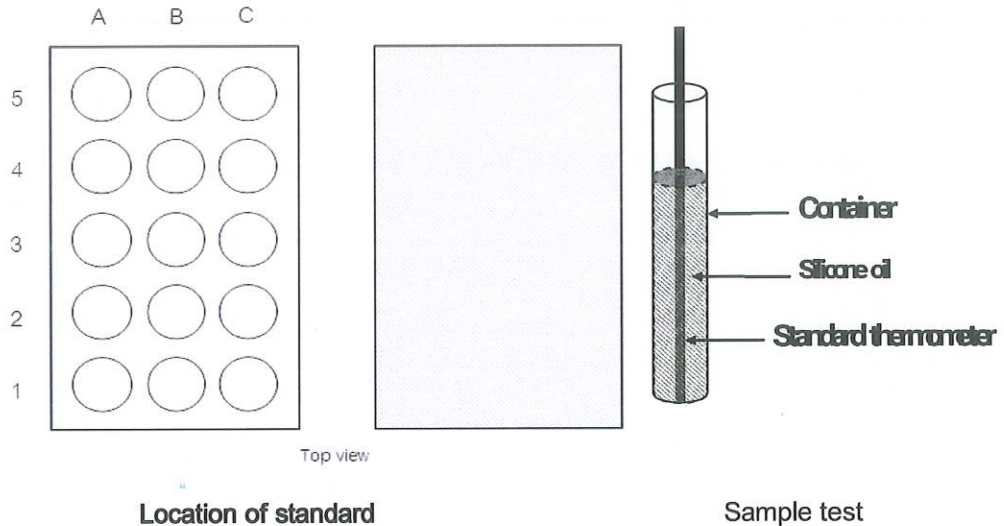
(Mongkolwat Hasanon)

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 of UUC (°C)
A1	153.70	3.70
A2	153.39	3.39
A3	153.94	3.94
A4	155.49	5.49
A5	154.21	4.21
B1	153.81	3.81
B2	154.70	4.70
B3	154.96	4.96
B4	154.46	4.46
B5	154.65	4.65
C1	153.61	3.61
C2	154.61	4.61
C3	153.15	3.15
C4	155.15	5.15
C5	155.08	5.08

## 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 of UUC (°C)	Uncertainty ( $\pm$ °C)
A1	149.56	-0.44	0.64
A2	149.33	-0.67	0.64
A3	150.07	0.07	0.64
A4	151.56	1.56	0.64
A5	149.91	-0.09	0.64
B1	149.85	-0.15	0.64
B2	150.54	0.54	0.64
B3	150.85	0.85	0.64
B4	150.39	0.39	0.64
B5	150.59	0.59	0.64
C1	149.40	-0.60	0.64
C2	150.53	0.53	0.64
C3	149.06	-0.94	0.64
C4	151.17	1.17	0.64
C5	151.01	1.01	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	0.12

**The End of Certificate**





## ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: C16230003

ชนิดเครื่องมือ: COD Reactor

รุ่น: DRB200

หมายเลขเครื่อง: 20030C0500 ( DIR 02 )

ตรวจสอบ (รับ)		รายการตรวจเช็ค	ตรวจสอบ (ส่ง)		หมายเหตุ
08 Sep 2023			08 Sep 2023		
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. Mongkolwat Hasanon

Service Engineer

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 ± 0.4 °C  
Humidity: 69.9 %RH ± 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



# ISOCAL TECHNOLOGY CO.,LTD.

## Industrial Instrument Calibration Center

170/405 Moo 3 Serithai Rd., Kannayao Kannayao Bangkok 10230

Tel. 0-2906-3040-1 Fax. 0-2919-9948



## Certificate of Calibration

Certificate Number : 23-06-202/2TO

Page : 1 of 3

Customer : STS Green Co.,Ltd.

3/23 Moo 5, Lat Sawai

Lum Luk Ka , Patum Thani 12150

---


Equipment Name : Water Bath  
Model : -  
Serial No. : L715.0065  
ID No. : WAB02  
Manufacture : Memmert  
Environment : Ambient Temperature 25.7 °C  
: Relative Humidity 48 %  
Location of Calibration : Lab Room  
Date of Received : 23-Jun-2023  
Date of Calibration : 23-Jun-2023  
Date of Issued : 27-Jun-2023  
Condition as received : Normal  
Calibration Method : Calibration Procedure Number WI-10A-71

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

This certificate is issued in accordance with ISO/IEC 17025:2017 and the conditions of accreditation granted by the Accreditation Body which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory, The result relate only to the item calibrated.

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

Calibrated by : Miss. Watchara Inchaidee  
Technicial

Approved by :   
( Mr. Narong Phetjaroon )





# ISOCAL TECHNOLOGY CO.,LTD.

## Calibration Report

Certificate Number : 23-06-202/2TO

Page : 2 of 3

### Equipment Standards Used

Description	Serial No.	Traceability to	Certificate No.	Cal. Due Date
Data Acquisition/Switch Unit	MY41028589	NIMT	22-12-145/15TI	15-Dec-23

#### Definitions :-

\* NIMT - National Institute of Metrology, Thailand



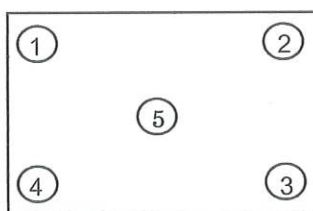
# ISOCAL TECHNOLOGY CO.,LTD.

## Calibration Report

Certificate Number : 23-06-202/2TO

Page : 3 of 3

**Result of Calibration :** Adjustment ( No )  
**Function :** Temperature Generator  
**Scale Range :** 85 °C to 93 °C  
**Resolution :** 0.1 °C



Position of Test

UUC		Position	Standard Reading ( °C )	Error ( °C )	Uniformity ( °C )	Stability ( °C )	Uncertainty ( °C )
Setting ( °C )	Reading ( °C )						
85.0	85.0	1	85.46	-0.46	0.64	0.32	0.77
		2	85.39	-0.39			
		3	85.36	-0.36			
		4	85.52	-0.52			
		5	85.48	-0.48			
93.0	93.0	1	93.18	-0.18	0.54	0.33	0.77
		2	93.27	-0.27			
		3	93.44	-0.44			
		4	93.46	-0.46			
		5	93.39	-0.39			

... END ...



# 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 : 23T7163  
REFERENCE No : 69975-3

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 : 24-Jul-23

APPROVED BY :   
PONGSAK J.

ISSUED DATE : 31-Jul-23

RECEIVED DATE : 24-Jul-23

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





CERTIFICATE No : 23T7163

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : WATER BATH  
MANUFACTURER : MEMMERT  
ID NUMBER : WAB 04  
RECEIVED DATE : 24-Jul-23  
AMBIENT TEMPERATURE : 27 °C ± 1 °C

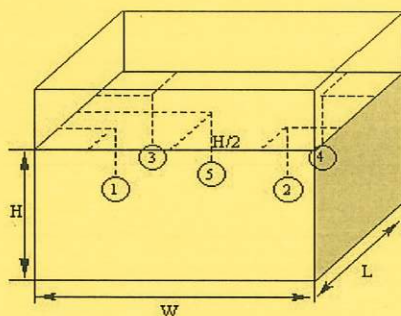
MODEL : WTB24  
SERIAL NUMBER : LD21.0296  
CALIBRATION DATE : 24-Jul-23  
RELATIVE HUMIDITY : 53 %RH ± 10 % RH

### 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	22T7513	05-Aug-23
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) : 1.3
Overall Variation of Line Voltage (V) : 10
Instrument Condition : Normal
Bath Inner Size (W*L*H) : 50.5*30*20.5 cm

### BATH PERFORMANCE

Controller Temperature (°C)	Temperature Stability (±°C)	Radius Uniformity (°C)	Axial Uniformity (°C)	Overall Variation (°C)
85.0	0.14	0.10	0.09	0.32
93.0	0.28	0.22	0.07	0.59

### 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	85.08	85.16	85.12	85.14	85.17	0.23
93.0	93.0	92.80	93.02	92.93	93.00	93.02	0.36

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



**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 : 23T7161

REFERENCE No : 69975-1

PAGE : 1 OF 2

**Certificate of Calibration**

**EQUIPMENT** : HOT AIR OVEN

**MANUFACTURER** : MEMMERT

**MODEL** : UFE500

**SERIAL No** : G509.0605

**ID No** : HOA 02

**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** : 24-Jul-23

**APPROVED BY** :   
PONGSAK J.

**ISSUED DATE** : 31-Jul-23

**RECEIVED DATE** : 24-Jul-23





CERTIFICATE No : 23T7161

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : HOT AIR OVEN  
MANUFACTURER : MEMMERT  
MODEL : UFE500  
ID No : HOA 02  
RECEIVED DATE : 24-Jul-23  
AMBIENT TEMPERATURE : 33 °C ± 1 °C

S/N : G509.0605  
CALIBRATION DATE : 24-Jul-23  
RELATIVE HUMIDITY : 56 %RH ± 10 %RH

### CONDITION OF THIS RESULTS OF CALIBRATION

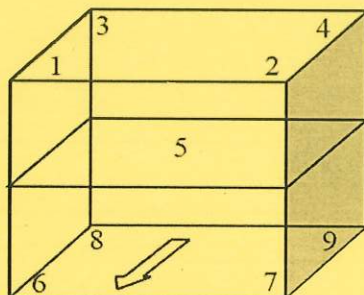
1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO TLAS G-20 BY COMPARISON WITH CALIBRATED THERMOCOUPLE TYPE K UNDER NO LOAD CONDITION. THE THERMOCOUPLES WERE PLACED ON NINE POINTS AND LOCATED ONE THERMOCOUPLE IN EACH OF THE EIGHT CORNERS OF THE CHAMBER AND WAS AWAY FROM THE EACH WALL OF 5 cm TO 10 cm. AND PLACED THE NINTH THERMOCOUPLE WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE CHAMBER. THE UNIFORMITY WAS MEASURED BETWEEN REFERENCE PROBE AND OTHER PROBES AT THE SAME TIME.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH TC TYPE K	HYDRA 2635A	6635300	22T7509	10-Aug-23

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



FRONT

#### GENERAL INFORMATION

Overall Ambient Temperature around the Chamber (°C) variation : 0
Overall Line Voltage (V) variation : 2
Instrument Condition : Normal
Chamber Size (W*L*H): 56*40*48 cm; Vent =0%

#### CHAMBER PERFORMANCE

Controller Temperature (°C)	Indicating Temperature (°C)	Temperature Stability (±°C)	Temperature Uniformity (°C)	Overall Variation (°C)
104.0	104.0	0.12	1.05	1.27
180.0	180.0	0.39	2.07	2.48

#### TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations									Uncertainty (±°C)
		#1	#2	#3	#4	Ref. 5	#6	#7	#8	#9	
104.0	104.0	104.17	103.85	103.80	103.73	103.83	104.20	104.76	104.00	104.04	0.75
180.0	180.0	180.08	179.40	179.59	179.34	179.55	180.43	181.17	180.02	180.09	1.1

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

NOTE 2: LOCATION 5 WAS REFERENCE LOCATION.

NOTE 3 : 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

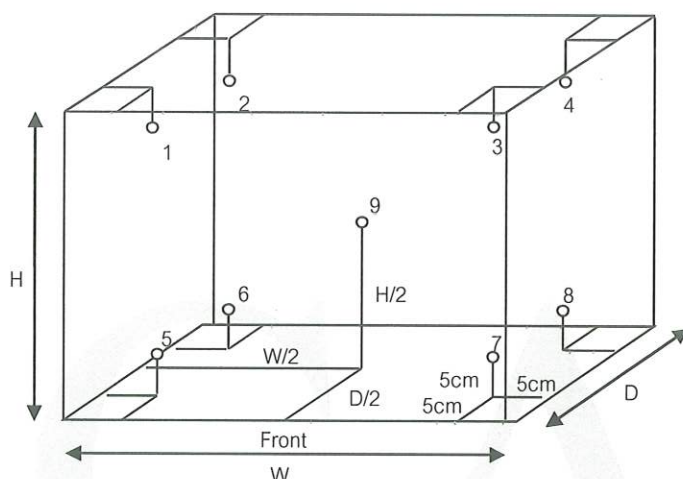
Page : 2 of 2

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 m<sup>3</sup>

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%

- oOo -

*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

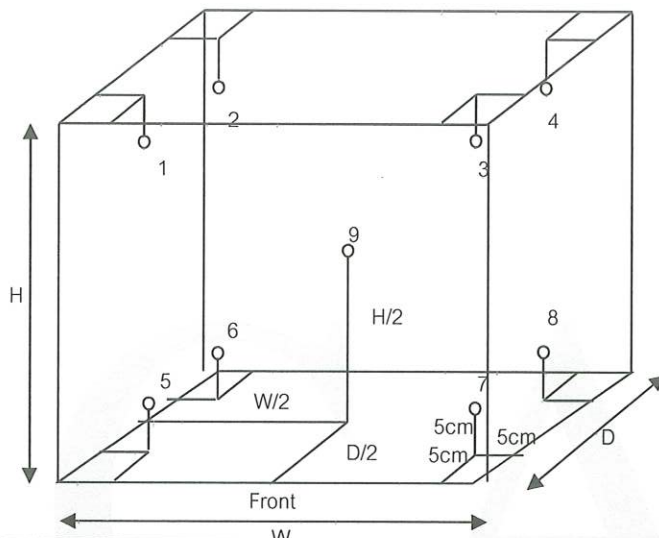
Page : 2 of 2

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 m<sup>3</sup>

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 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-Lam Lukka Rd.,  
T. Lat Sawai, A. Lam Lukka, Pathumthani, 12150

Instrument	: Heat Stress Monitor	Ambient Temperature	: (23.0 ± 2) °C
Manufacturer	: Quest	Humidity	: (50.0 ± 15) %RH
Model	: QUESTemp <sup>®</sup> 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\*\*\*\*



# Certificate of Calibration

Certificate No. : WK2401-300-61

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 <sup>®</sup> 34	Received Date	: 16-Jan-24
Serial No.	: TEB030028	Calibrated Date	: 18-Jan-24
Identity No.	: STS 306-19-0020	Issued Date	: 18-Jan-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	HTD022K232487	CC287923000001305F	2-Mar-24	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. : WK2401-300-61

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	20.3	0.28	0.33
25.00	25.01	25.3	0.29	0.33
30.00	30.02	30.3	0.28	0.33
35.00	35.02	35.3	0.28	0.33
40.00	40.03	40.3	0.27	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	20.2	0.18	0.33
25.00	25.01	25.2	0.19	0.33
30.00	30.02	30.2	0.18	0.33
35.00	35.02	35.2	0.18	0.33
40.00	40.03	40.2	0.17	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. : WK2401-300-61

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	20.3	0.28	0.33
25.00	25.01	25.3	0.29	0.33
30.00	30.02	30.3	0.28	0.33
35.00	35.02	35.3	0.28	0.33
40.00	40.03	40.3	0.27	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.: WK2303-244-3

Page 1 of 2

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

Instrument : Sound Level Meter  
Manufacturer : RION  
Model : NL-42  
Serial No. : 00371920  
Identity No. : SLM36  
Range : See to Data  
Resolution : 0.1 dB  
Calibration Method : CP-WK-A01

Ambient Temperature :  $(23 \pm 2) ^\circ\text{C}$   
Humidity :  $(50 \pm 15) \% \text{RH}$   
Received Date : 17-Mar-23  
Calibrated Date : 17-Mar-23  
Issued Date : 21-Mar-23  
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>
Sound Level Calibrator	10049416	EEL.BP. 196/0166	27-Jan-25	TISTR

TISTR : Thailand Institute of Scientific and Technological Research.

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.Chotiwat Thanakulphan

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. : WK2303-244-3

Page 2 of 2

### Calibration Result of the Accuracy

Function : Sound Level Measurement at 1 kHz

Range : A Mode : Fast Resolution : 0.1 dB

STD Setting	UUC Reading	Error	Uncertainty ( ± dB )
94	93.7	-0.3	0.20
114	113.7	-0.3	0.20

Range : A Mode : Slow Resolution : 0.1 dB

STD Setting	UUC Reading	Error	Uncertainty ( ± dB )
94	93.7	-0.3	0.20
114	113.7	-0.3	0.20

Range : C Mode : Fast Resolution : 0.1 dB

STD Setting	UUC Reading	Error	Uncertainty ( ± dB )
94	93.7	-0.3	0.20
114	113.7	-0.3	0.20

Range : C Mode : Slow Resolution : 0.1 dB

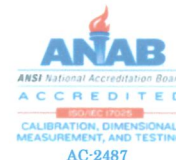
STD Setting	UUC Reading	Error	Uncertainty ( ± dB )
94	93.7	-0.3	0.20
114	113.7	-0.3	0.20

( 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.: WK2303-244-4

Page 1 of 2

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

Instrument : Sound Level Meter  
Manufacturer : RION  
Model : NL-42  
Serial No. : 00457919  
Identity No. : SLM26  
Range : See to Data  
Resolution : 0.1 dB  
Calibration Method : CP-WK-A01

Ambient Temperature :  $(23 \pm 2) ^\circ\text{C}$   
Humidity :  $(50 \pm 15) \% \text{RH}$   
Received Date : 17-Mar-23  
Calibrated Date : 17-Mar-23  
Issued Date : 21-Mar-23  
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>
Sound Level Calibrator	10049416	EEL.BP. 196/0166	27-Jan-25	TISTR

TISTR : Thailand Institute of Scientific and Technological Research.

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.Chotiwat Thanakulphan

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. : WK2303-244-4

Page 2 of 2

### Calibration Result of the Accuracy

Function : Sound Level Measurement at 1 kHz

Range : A Mode : Fast Resolution : 0.1 dB

STD Setting	UUC Reading	Error	Uncertainty ( ± dB )
94	93.7	-0.3	0.20
114	113.7	-0.3	0.20

Range : A Mode : Slow Resolution : 0.1 dB

STD Setting	UUC Reading	Error	Uncertainty ( ± dB )
94	93.7	-0.3	0.20
114	113.8	-0.2	0.20

Range : C Mode : Fast Resolution : 0.1 dB

STD Setting	UUC Reading	Error	Uncertainty ( ± dB )
94	93.8	-0.2	0.20
114	113.8	-0.2	0.20

Range : C Mode : Slow Resolution : 0.1 dB

STD Setting	UUC Reading	Error	Uncertainty ( ± dB )
94	93.7	-0.3	0.20
114	113.8	-0.2	0.20

( 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\*\*\*\*



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

**Request No.** 21-67/0355

**MTC No. EEL. BP.** 67/0367

## CALIBRATION CERTIFICATE

**Submitted by** : STS Green Co.,Ltd.

**Address** : 3/23 Moo 5, 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 :**

**Ambient Environment**

Description : Noise Dosimeter

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

Manufacturer : Quest

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

Model : NoisePro DL Dosimeter

Ambient Pressure :  $(101.325 \pm 1.5) \text{ kPa}$

Serial No. : NLK070067

Microphone : STS 302-14-0002

**Standards used :**

Multifunction Acoustic Calibrator Brüel&Kjær 4226 S/N 2810358 with Coupler UA0915 S/N 2810358.

**Calibration Procedure :**

This instrument was calibrated by using calibration procedure no CP-102-01, which was based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). This calibration procedure was related to the acoustical signal test of frequency weightings using a multifunction acoustic calibrator.

This instrument has been calibrated against standards maintained at the 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.

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%.

**Date of Receipt** : 20 Mar. 2024

**Date of Calibration** : 3 Apr. 2024

1 / 2

*G. Samy*

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. 21-67/0355


MTC No. EEL. BP. 67/0367

Acoustic signal test of frequency weightings

Frequency (Hz)	Deviation from various frequency curve		Uncertainty (+dB)	Tolerance limits class 2 (+dB)
	C-weighting (dB)	A-weighting (dB)		
125	1.0	0.3	0.25	2.0
1 000	0.3	0.1	0.25	1.4
4 000	-1.0	-1.3	0.25	3.6

- Note :**
- 1) There was no adjustment.
  - 2) The calibration was performed at a sound pressure level of 94 dB.
  - 3) The measured values did not include the correction of microphone of UUT.
  - 4) The deviation was produced from the absolute difference between the measured values and the responding sound pressure levels in IEC 61672-1 (2002).

Calibrated by :

  
.....  
(Mr. Sanaey Grajang)

Approved by :

  
.....  
(Mr. Prawate Kluaypa)

**Director**

**Electrical and Electronic Standards Laboratory**

**Industrial Metrology and Testing Service Centre**

**Date of Calibration** : 3 Apr. 2024

**Date of Issue** : 4 Apr. 2024

**Ref** : 2011267032001134001

2 / 2

End of Certificate

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.** 21-67/0355

**MTC No. EEL. BP.** 68/0367

## CALIBRATION CERTIFICATE

**Submitted by** : STS Green Co.,Ltd.

**Address** : 3/23 Moo 5,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 :**

**Ambient Environment**

Description : Noise Dosimeter

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

Manufacturer : Quest

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

Model : NoisePro DL Dosimeter

Ambient Pressure :  $(101.325 \pm 1.5) \text{ kPa}$

Serial No. : NLK070071

Microphone : STS 302-18-0007

**Standards used :**

Multifunction Acoustic Calibrator Brüel&Kjær 4226 S/N 2810358 with Coupler UA0915 S/N 2810358.

**Calibration Procedure :**

This instrument was calibrated by using calibration procedure no CP-102-01, which was based on IEC 61672-3 Electroacoustics - Sound Level Meters - Part 3 : Periodic tests (2006). This calibration procedure was related to the acoustical signal test of frequency weightings using a multifunction acoustic calibrator.

This instrument has been calibrated against standards maintained at the 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.

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%.

**Date of Receipt** : 20 Mar. 2024

**Date of Calibration** : 3 Apr. 2024

1 / 2

*G. Samy*

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. 21-67/0355

MTC No. EEL. BP. 68/0367

Acoustic signal test of frequency weightings

Frequency (Hz)	Deviation from various frequency curve		Uncertainty (±dB)	Tolerance limits class 2 (±dB)
	C-weighting (dB)	A-weighting (dB)		
125	0.7	0.1	0.25	2.0
1 000	0.3	0.0	0.25	1.4
4 000	-0.7	-1.2	0.25	3.6

- Note :**
- 1) There was no adjustment.
  - 2) The calibration was performed at a sound pressure level of 94 dB.
  - 3) The measured values did not include the correction of microphone of UUT.
  - 4) The deviation was produced from the absolute difference between the measured values and the responding sound pressure levels in IEC 61672-1 (2002).

Calibrated by :

*G. Sanaey*

(Mr. Sanaey Grajang)

Approved by :

*Prawate Kluaypa*

(Mr. Prawate Kluaypa)

Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 3 Apr. 2024

Date of Issue : 4 Apr. 2024

Ref : 2011267032001134002

2 / 2

End of Certificate

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





# Certificate of Calibration

Certificate No.: WK2305-251-1

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. : 210500025  
Identity No. : STS 306-22-0009  
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 : 29-May-23  
Calibrated Date : 6-Jun-23  
Issued Date : 8-Jun-23  
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	23PH11	18-Jan-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.Chotiwat Thanakulphan

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. : WK2305-251-1

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	1000	1014	14	16
1500	1500	1517	17	24
2000	2000	2024	24	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\*\*\*\*