

# **CERTIFICATE OF CALIBRATION**

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler, hereinafter ("HVS")

Equipment Calibrated:		Standard Equipment:	
Type:	Dust Monitor System	Type:	High Volume Sampler
Model:	OC-9200	Model:	TE 5170
Equipment No.:	A-06-03	Equipment No.:	A-01-75
Serial No.:	OC20210316224101	Serial No.:	3499
Sensitivity.:	0.001mg/m3	Tisch Calibration Orifice No.:	3864

Date of Calibration:	21-Feb-25
Validity of Calibration Record:	24-Apr-25

## **Calibration**

Calibration Points:	Time	High Volume Sampler	Dust Monitor System
	Minutes	Mass concentration [ $\mu\text{g}/\text{m}^3$ ]	Mass concentration [ $\mu\text{g}/\text{m}^3$ ]
		y Axis	x Axis
0	60	0	0
1	60	228.0	76.0
2	60	132.0	45.0
3	60	80.0	29.0
Average	60	110.0	37.5

With the aid of the mathematical model of Simple Linear Regression, the following values are calculated as:

Slope:	3.01226384
Intercept:	-2.95989393
Correlation Coefficient:	0.99940609

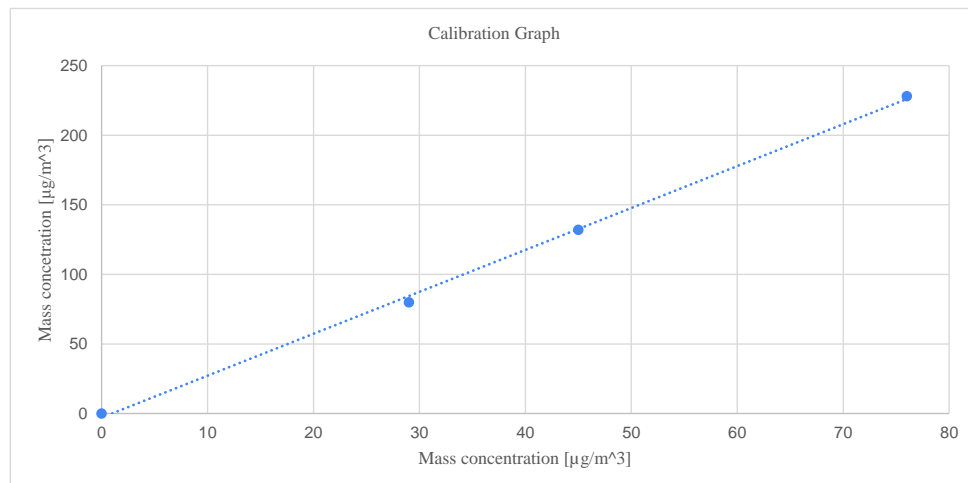
If the correlation coefficient is green (ie larger than 0.90), then no recalibration is required

Scale factor (K):	3.0
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(to one decimal point)

Equation of line:



$$y(\text{HVS})=3.6x(\text{OC-9200})$$



In-house method in according to the instruction manual:

The OC-9200 was compared with a calibrated HVS; the result has been used to calculate the scale factor and correlation coefficient between the two equipment.

The filter papers are weighted by HOKLAS laboratory (HPCT Litimed)

Recorded by:	Signature:	Date:
Technical Officer (Wong Shing Kwai)		21-Feb-25
Checked by:	Signature:	Date:
Project Manager (Henry Leung)		21-Feb-25

# CERTIFICATE OF CALIBRATION

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler, hereinafter ("HVS")

Equipment Calibrated:		Standard Equipment:	
Type:	Dust Monitor System	Type:	High Volume Sampler
Model:	OC-9200	Model:	TE 5170
Equipment No.:	A-06-03	Equipment No.:	A-01-75
Serial No.:	OC20210316224101	Serial No.:	3499
Sensitivity.:	0.001mg/m3	Tisch Calibration Orifice No.:	3864

Date of Calibration:	21-Apr-25
Validity of Calibration Record:	21-Jun-25

## Calibration

Calibration Points:	Time	High Volume Sampler	Dust Monitor System
	Minutes	Mass concentration [ $\mu\text{g}/\text{m}^3$ ]	Mass concentration [ $\mu\text{g}/\text{m}^3$ ]
		y Axis	x Axis
0	60	0	0
1	60	224.0	75.0
2	60	130.0	45.0
3	60	85.0	30.0
Average	60	109.8	37.5

With the aid of the mathematical model of Simple Linear Regression, the following values are calculated as:

Slope:	2.98717949
Intercept:	-2.26923077
Correlation Coefficient:	0.99961193

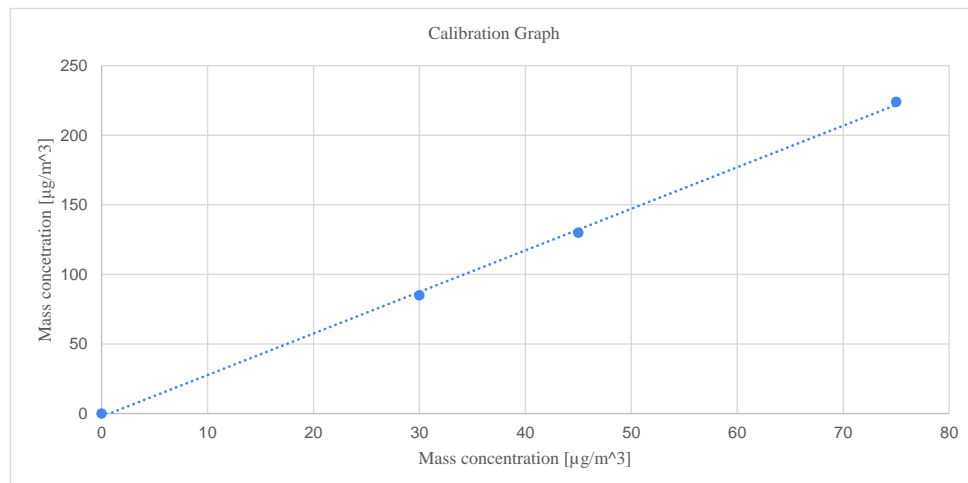
If the correlation coefficient is green (ie larger than 0.90), then no recalibration is required

<b>Scale factor (K):</b>	<b>3.0</b>
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(to one decimal point)

Equation of line:



$$y(\text{HVS})=3.6x(\text{OC-9200})$$



In-house method in according to the instruction manual:

The OC-9200 was compared with a calibrated HVS; the result has been used to calculate the scale factor and correlation coefficient between the two equipment.

**The filter papers are weighted by HOKLAS laboratory (HPCT Litimed)**

Recorded by:	Signature:	Date:
Technical Officer (Wong Shing Kwai)		21-Apr-25
Checked by:	Signature:	Date:
Project Manager (Henry Leung)		21-Apr-25

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET



File No. MA20024/74/0008

Location: M-A3 - S.K.H Tsoi Kung Po Secondary School

Date: 8-Feb-25 Next Due Date: 11-Apr-25 Operator: SK

Equipment No.: A-01-74 Model No.: TE-5170 Serial No. 2204

Ambient Condition			
Temperature, Ta (K)	<b>290.2</b>	Pressure, Pa (mmHg)	<b>768.5</b>

Orifice Transfer Standard Information					
Serial No.	3864	Slope, mc	0.05976	Intercept, bc	-0.05018
Last Calibration Date:	15-Jan-24	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	15-Jan-25	$Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	$\Delta H$ (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	$\Delta W$ (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<b>15.5</b>	4.01	67.97	<b>9.8</b>	3.19
2	<b>12.4</b>	3.59	60.88	<b>8.1</b>	2.90
3	<b>9.1</b>	3.07	52.28	<b>6.6</b>	2.62
4	<b>5.6</b>	2.41	41.19	<b>3.8</b>	1.99
5	<b>3.0</b>	1.76	30.37	<b>2.3</b>	1.55

### By Linear Regression of Y on X


Slope, mw = 0.0445 Intercept, bw : 0.1979

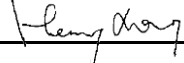
Correlation coefficient\* = 0.9967

\*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation	
From the TSP Field Calibration Curve, take Qstd = 43 CFM	
From the Regression Equation, the "Y" value according to	
$mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$	
Therefore, Set Point; $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ <u>4.30</u>	

Remarks: \_\_\_\_\_

Conducted by: Wong Shing Kwai Signature:  Date: 8-Feb-25

Checked by: Henry Leung Signature:  Date: 8-Feb-25

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET



File No. MA20024/74/0009

Location. M-A3 - S.K.H Tsoi Kung Po Secondary School

Date: 8-Apr-25 Next Due Date: 8-Jun-25 Operator: SK

Equipment No.: A-01-74 Model No.: TE-5170 Serial No. 2204

Ambient Condition			
Temperature, Ta (K)	<u>296.2</u>	Pressure, Pa (mmHg)	<u>762.2</u>

Orifice Transfer Standard Information					
Serial No.	<u>3864</u>	Slope, mc	<u>0.05914</u>	Intercept, bc	<u>-0.02377</u>
Last Calibration Date:	<u>7-Jan-25</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	<u>7-Jan-26</u>	$Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	$\Delta H$ (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	$\Delta W$ (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>15.6</u>	<u>3.97</u>	<u>67.49</u>	<u>9.6</u>	<u>3.11</u>
2	<u>12.5</u>	<u>3.55</u>	<u>60.45</u>	<u>8.0</u>	<u>2.84</u>
3	<u>9.2</u>	<u>3.05</u>	<u>51.92</u>	<u>6.4</u>	<u>2.54</u>
4	<u>5.7</u>	<u>2.40</u>	<u>40.95</u>	<u>3.9</u>	<u>1.98</u>
5	<u>3.0</u>	<u>1.74</u>	<u>29.82</u>	<u>2.3</u>	<u>1.52</u>

### By Linear Regression of Y on X

Slope, mw = 0.0427 Intercept, bw : 0.2581


Correlation coefficient\* = 0.9983

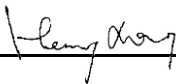
\*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation	
From the TSP Field Calibration Curve, take Qstd = 43 CFM	
From the Regression Equation, the "Y" value according to	
$mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$	
Therefore, Set Point; W = ( mw x Qstd + bw ) <sup>2</sup> x ( 760 / Pa ) x ( Ta / 298 ) = <u>4.35</u>	

Remarks: \_\_\_\_\_

\_\_\_\_\_

Conducted by: Wong Shing Kwai Signature:  Date: 8-Apr-25

Checked by: Henry Leung Signature:  Date: 8-Apr-25



# Certificate of Calibration

**Calibration Certification Information**

<b>Cal. Date:</b> January 7, 2025	<b>Rootsmeter S/N:</b> 438320	<b>Ta:</b> 293 °K
<b>Operator:</b> Jim Tisch		<b>Pa:</b> 759.0 mm Hg
<b>Calibration Model #:</b> TE-5025A	<b>Calibrator S/N:</b> 3864	

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4590	3.2	2.00
2	3	4	1	1.0360	6.4	4.00
3	5	6	1	0.9160	8.0	5.00
4	7	8	1	0.8800	8.8	5.50
5	9	10	1	0.7270	12.7	8.00

**Data Tabulation**

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis)
1.0114	0.6932	1.4252	0.9958	0.6825	0.8787
1.0071	0.9721	2.0156	0.9916	0.9571	1.2427
1.0050	1.0971	2.2535	0.9895	1.0802	1.3893
1.0039	1.1408	2.3635	0.9884	1.1232	1.4572
0.9987	1.3737	2.8505	0.9833	1.3525	1.7574
<b>QSTD</b>	<b>m=</b>	<b>2.08969</b>	<b>QA</b>	<b>m=</b>	<b>1.30853</b>
	<b>b=</b>	<b>-0.02374</b>		<b>b=</b>	<b>-0.01464</b>
	<b>r=</b>	<b>0.99985</b>		<b>r=</b>	<b>0.99985</b>

**Calculations**

<b>Vstd=</b> $\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	<b>Va=</b> $\Delta Vol((Pa-\Delta P)/Pa)$
<b>Qstd=</b> $Vstd/\Delta Time$	<b>Qa=</b> $Va/\Delta Time$
<b>For subsequent flow rate calculations:</b>	
<b>Qstd=</b> $1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$	<b>Qa=</b> $1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$

**Standard Conditions**

Tstd: 298.15 °K  
Pstd: 760 mm Hg

**Key**

ΔH: calibrator manometer reading (in H2O)  
ΔP: rootsmeter manometer reading (mm Hg)  
Ta: actual absolute temperature (°K)  
Pa: actual barometric pressure (mm Hg)  
b: intercept  
m: slope

**RECALIBRATION**

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

**Certificate of Calibration - Wind Monitoring Station**

Description: M-A3 - S.K.H Tsoi Kung Po Secondary School  
Model No.: C-OC-9200-wind  
Serial No.: OC20210316224101  
Equipment No.: A-06-03  
Date of Calibration 20-Dec-2024  
Next Due Date 20-Jun-2025

**1. Performance check of Wind Speed**

Wind Speed, m/s		Difference D (m/s)
Wind Speed Reading (V1)	Anemometer Value (V2)	$D = V1 - V2$
0.0	0.0	0.0
2.0	2.0	0.0
3.0	3.1	-0.1
4.0	4.1	-0.1

**2. Performance check of Wind Direction**

Wind Direction (°)		Difference D (°)
Wind Direction Reading (W1)	Marine Compass Value (W2)	$D = W1 - W2$
0	0	0.0
90	90	0.0
180	180	0.0
270	270	0.0

**Test Specification:**

- 1. Performance Wind Speed Test - The wind meter was on-site calibrated against the anemometer**
- 2. Performance Wind Direction Test - The wind meter was on-site calibrated against the marine compass at four direction**

Calibrated by:



Wong Shing Kwai

Approved by:



Henry Leung

## **High Precision Chemical Testing Ltd.**

Rm 1904, Technology Park

18 On Lai Street, Shatin

NT, Hong Kong

Tel: +852 3841 4388 Website: <https://www.hpct.com.hk>



Report No. : 00676

Issue Date : 03 May 2024

Application No. : HP00537

### **Certificate of Calibration**

Applicant : Cinotech Consultants Limited  
RM 1710, Technology Park,  
18 On Lai Street,  
Shatin, N.T., Hong Kong

Sample Description : Submitted equipment stated to be Integrating Sound Level Meter.

Equipment No.: : SN-01-01

Manufacturer: : SVANTEK

Other information :

Model No.	SVAN 979
Serial No.	27189
Microphone No.	25202

Date Received : 02 May 2024

Test Period : 02 May 2024 to 02 May 2024

Test Requested : Performance checking for Sound Level Meter

Test Method : The Sound Level Calibrator has been calibrated in accordance with the documented procedures and using standard and instrument which are recommended by the manufacturer, or equivalent.

Test conditions : Room Temperature: 22-25 degree Celsius  
Relative Humidity: 35-70%

Test Result : Refer to the test result(s) on page 2.

Remark : 1. Information of the sample description provided by the Applicant.  
2. The result(s) relate only to the items tested or calibrated.

***For and on behalf of  
HIGH PRECISION CHEMICAL TESTING LIMITED***

Lee Wai Kit  
Laboratory Manager

## **High Precision Chemical Testing Ltd.**

Rm 1904, Technology Park

18 On Lai Street, Shatin

NT, Hong Kong

Tel: +852 3841 4388 Website: <https://www.hpct.com.hk>



Report No. : 00676

Issue Date : 03 May 2024

Application No. : HP00537

### **Certificate of Calibration**

Measuring  
equipment

Description	Sound Calibrator
Manufacturer	Brüel & Kjær
Model No.	TYPE 4231
Serial No.	2326353
Equipment No.	N-02-01

Test Result :

Reference value, dB	Indication value, dB	Deviation, dB	Allowed deviation, dB
94.0	94.0	± 0.0	± 1.5
114.0	114.1	+ 0.1	± 1.5

- Note** : 1. "Instrument Readings" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.  
2. The indication value was obtained from the average of ten replicated measurement.

- End of report -



**High Precision Chemical Testing Ltd.**

Rm 1904, Technology Park

18 On Lai Street, Shatin

NT, Hong Kong

Tel: +852 3841 4388 Website: <https://www.hpct.com.hk>

Report No. : 00735

Issue Date : 28 Jun 2024

Application No. : HP00589

**Certificate of Calibration**

Applicant : Cinotech Consultants Limited  
RM 1710, Technology Park,  
18 On Lai Street,  
Shatin, N.T., Hong Kong

Sample Description : Submitted equipment stated to be Integrating Sound Level Meter.

Equipment No.: : N-12-04

Manufacturer: : BSWA Technology

Other information :

Model No.	BSWA 308
Serial No.	580238
Microphone No.	570605

Date Received : 25 Jun 2024

Test Period : 26 Jun 2024 to 26 Jun 2024

Test Requested : Performance checking for Sound Level Meter

Test Method : The Sound Level Calibrator has been calibrated in accordance with the documented procedures and using standard and instrument which are recommended by the manufacturer, or equivalent.

Test conditions : Room Temperature: 22-25 degree Celsius  
Relative Humidity: 35-70%

Test Result : Refer to the test result(s) on page 2.

Remark : 1. Information of the sample description provided by the Applicant.  
2. The result(s) relate only to the items tested or calibrated.

***For and on behalf of***  
**HIGH PRECISION CHEMICAL TESTING LIMITED**

Lee Wai Kit  
Laboratory Manager

**High Precision Chemical Testing Ltd.**

Rm 1904, Technology Park

18 On Lai Street, Shatin

NT, Hong Kong

Tel: +852 3841 4388 Website: <https://www.hpct.com.hk>

Report No. : 00735

Issue Date : 28 Jun 2024

Application No. : HP00589

**Certificate of Calibration**Measuring  
equipment

Description	Sound Calibrator
Manufacturer	Brüel & Kjær
Model No.	TYPE 4231
Serial No.	2326353
Equipment No.	N-02-01

Test Result :

Reference value, dB	Indication value, dB	Deviation, dB	Allowed deviation, dB
94.0	94.0	$\pm 0.0$	$\pm 1.5$
114.0	113.8	- 0.2	$\pm 1.5$

- Note** : 1. "Instrument Readings" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.
2. The indication value was obtained from the average of ten replicated measurement.

- End of report -

## **High Precision Chemical Testing Ltd.**

Rm 1904, Technology Park

18 On Lai Street, Shatin

NT, Hong Kong

Tel: +852 3841 4388 Website: <https://www.hpct.com.hk>



Report No. : 00941

Issue Date : 20 Dec 2024

Application No. : HP00807

### **Certificate of Calibration**

Applicant : Cinotech Consultants Limited  
RM 1710, Technology Park,  
18 On Lai Street,  
Shatin, N.T., Hong Kong

Sample Description : Submitted equipment stated to be Integrating Sound Level Meter.

Equipment No.: : N-12-09

Manufacturer: : BSWA Technology

Other information :

Model No.	BSWA 308
Serial No.	620248
Microphone No.	620743

Date Received : 20 Dec 2024

Test Period : 20 Dec 2024 to 20 Dec 2024

Test Requested : Performance checking for Sound Level Meter

Test Method : The Sound Level Calibrator has been calibrated in accordance with the documented procedures and using standard and instrument which are recommended by the manufacturer, or equivalent.

Test conditions : Room Temperature: 22-25 degree Celsius  
Relative Humidity: 35-70%

Test Result : Refer to the test result(s) on page 2.

Remark : 1. Information of the sample description provided by the Applicant.  
2. The result(s) relate only to the items tested or calibrated.

***For and on behalf of***  
**HIGH PRECISION CHEMICAL TESTING LIMITED**

Lee Wai Kit  
Laboratory Manager

## **High Precision Chemical Testing Ltd.**

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18 On Lai Street, Shatin

NT, Hong Kong

Tel: +852 3841 4388 Website: <https://www.hpct.com.hk>



Report No. : 00941

Issue Date : 20 Dec 2024

Application No. : HP00807

### **Certificate of Calibration**

Measuring  
equipment

Description	Sound Calibrator
Manufacturer	Brüel & Kjær
Model No.	TYPE 4231
Serial No.	2326353
Equipment No.	N-02-01

Test Result :

Reference value, dB	Indication value, dB	Deviation, dB	Allowed deviation, dB
94.0	94.0	± 0.0	± 1.5
114.0	114.1	+ 0.1	± 1.5

**Note** : 1. "Instrument Readings" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.  
2. The indication value was obtained from the average of ten replicated measurement.

- End of report -

## **High Precision Chemical Testing Ltd.**

Rm 1904, Technology Park

18 On Lai Street, Shatin

NT, Hong Kong

Tel: +852 3841 4388 Website: <https://www.hpct.com.hk>



Report No. : 00736

Issue Date : 28 Jun 2024

Application No. : HP00592

### **Certificate of Calibration**

Applicant : Cinotech Consultants Limited  
RM 1710, Technology Park,  
18 On Lai Street,  
Shatin, N.T., Hong Kong

Sample Description : Submitted equipment stated to be Sound Level Calibrator.

Equipment No.: : N-16-01

Manufacturer: : Hangzhou Aihua Instruments Co., Ltd.

Other information	Model No.	AWA6021A
	Serial No.	1023253

Date Received : 27 Jun 2024

Test Period : 28 Jun 2024 to 28 Jun 2024

Test Requested : Performance checking for Sound Level Calibrator

Test Method : The Sound Level Meter and Calibrator has been calibrated in accordance with the documented procedures and using standard and instrument which are recommended by the manufacturer, or equivalent.

Test conditions : Room Temperature: 22-25 degree Celsius  
Relative Humidity: 35-70%

Test Result : Refer to the test result(s) on page 2.

Remark : 1. Information of the sample description provided by the Applicant.  
2. The result(s) relate only to the items tested or calibrated.

***For and on behalf of  
HIGH PRECISION CHEMICAL TESTING LIMITED***

Lee Wai Kit  
Laboratory Manager

## **High Precision Chemical Testing Ltd.**

Rm 1904, Technology Park

18 On Lai Street, Shatin

NT, Hong Kong

Tel: +852 3841 4388 Website: <https://www.hpct.com.hk>



Report No. : 00736

Issue Date : 28 Jun 2024

Application No. : HP00592

### **Certificate of Calibration**

Measuring  
equipment

Description	Sound Calibrator
Manufacturer	Brüel & Kjær
Model No.	TYPE 4231
Serial No.	2326353
Equipment No.	N-02-01

Description	Sound Meter
Manufacturer	BSWA Technology
Model No.	BSWA 308
Serial No.	570183
Microphone No.	570605
Equipment No.	N-12-01

Test Result :

Reference value, dB	Indication value, dB	Deviation, dB	Allowed deviation, dB
94.0	94.1	+ 0.1	± 0.3
114.0	114.1	+ 0.1	± 0.5

**Note** : 1. "Instrument Readings" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.  
2. The indication value was obtained from the average of ten replicated measurement.

- End of report -