

**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-Aug-24
Validity of Calibration Record:	21-Oct-24

**Calibration**

Calibration Points:	Time Minutes	High Volume Sampler	Dust Monitor System
		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	227.0	76.0
2	60	127.0	45.0
3	60	83.0	30.0
Average	60	109.3	37.8

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

Slope:	2.98600350
Intercept:	-3.47163209
Correlation Coefficient:	0.99907787

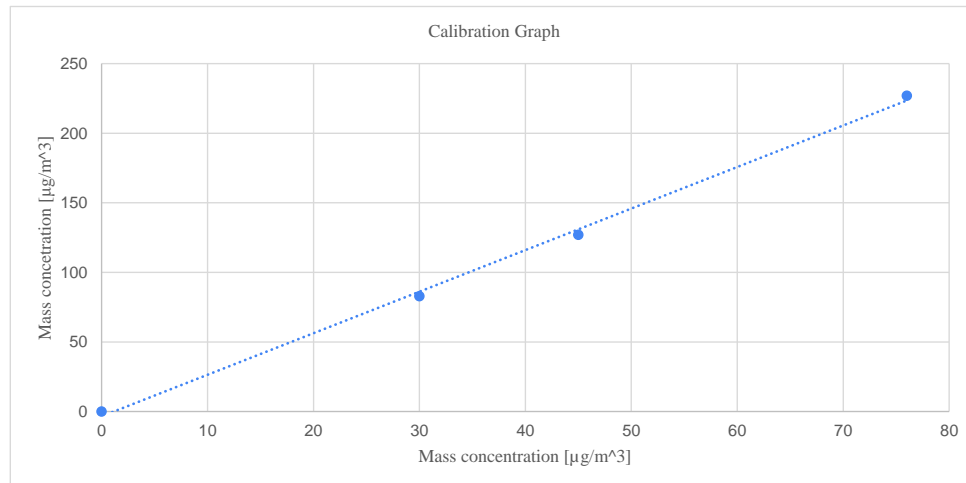
**If the correlation coefficient is green (ie larger than 0.90), then no recalibration is required**

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

Equation of line:


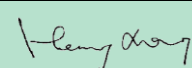
<b><math>y(\text{HVS})=3.6x(\text{OC-9200})</math></b>
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In-house method in according to the instruction manual:

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-Aug-24
Checked by:	Signature:	Date:
Project Manager (Henry Leung)		21-Aug-24

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET



File No. MA20024/74/0005

Location: M-A3 - S.K.H Tsoi Kung Po Secondary School  
 Date: 8-Aug-24 Next Due Date: 8-Oct-24 Operator: SK  
 Equipment No.: A-01-74 Model No.: TE-5170 Serial No. 2204

Ambient Condition			
Temperature, Ta (K)	<b>304.7</b>	Pressure, Pa (mmHg)	<b>755.1</b>

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

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>	3.88	65.78	<b>10.2</b>	3.15
2	<b>12.5</b>	3.49	59.16	<b>8.4</b>	2.86
3	<b>9.2</b>	2.99	50.87	<b>6.5</b>	2.51
4	<b>5.9</b>	2.39	40.91	<b>4.1</b>	2.00
5	<b>3.3</b>	1.79	30.80	<b>2.6</b>	1.59

### By Linear Regression of Y on X

Slope,  $m_w =$  0.0451 Intercept,  $b_w =$  0.1859  
 Correlation coefficient\* = 0.9992

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

### Set Point Calculation


From the TSP Field Calibration Curve, take  $Q_{std} = 43$  CFM

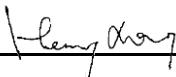
From the Regression Equation, the "Y" value according to

$$m_w \times Q_{std} + b_w = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point;  $W = (m_w \times Q_{std} + b_w)^2 \times (760 / Pa) \times (Ta / 298) =$  4.66

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

Conducted by: Wong Shing Kwai Signature:  Date: 8-Aug-24

Checked by: Henry Leung Signature:  Date: 8-Aug-24

# Certificate of Calibration

Calibration Certification Information			
Cal. Date: January 15, 2024	Rootsmeter S/N: 438320	Ta: 294	°K
Operator: Jim Tisch		Pa: 755.4	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: <b>3864</b>		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4380	3.3	2.00
2	3	4	1	1.0270	6.4	4.00
3	5	6	1	0.9180	8.0	5.00
4	7	8	1	0.8750	8.9	5.50
5	9	10	1	0.7230	12.9	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)
1.0031	0.6975	1.4195	0.9956	0.6924	0.8823
0.9989	0.9727	2.0075	0.9915	0.9655	1.2477
0.9968	1.0858	2.2444	0.9894	1.0778	1.3950
0.9956	1.1378	2.3539	0.9882	1.1294	1.4631
0.9903	1.3697	2.8390	0.9829	1.3595	1.7645
<b>QSTD</b>	m=	<b>2.11196</b>	<b>QA</b>	m=	<b>1.32248</b>
	b=	<b>-0.05043</b>		b=	<b>-0.03134</b>
	r=	<b>0.99998</b>		r=	<b>0.99998</b>

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

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-Jun-2024  
 Next Due Date: 21-Dec-2024

### 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
1.8	1.8	0.0
2.5	2.6	-0.1
3.5	3.6	-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  
Application No. : HP00537

Issue Date : 03 May 2024

### 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**

A handwritten signature in black ink, appearing to read 'Lee Wai Kit', is written over a horizontal line.

Lee Wai Kit  
Laboratory Manager

**High Precision Chemical Testing Ltd.**

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



Report No. : 00676  
Application No. : HP00537

Issue Date : 03 May 2024

**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.

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Report No. : 00568  
Application No. : HP00436

Issue Date : 14 Feb 2024

### 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-12-03

Manufacturer: : BSWA Technology

Other information :

Model No.	BSWA 308
Serial No.	570188
Microphone No.	570608

Date Received : 05 Feb 2024

Test Period : 07 Feb 2024 to 07 Feb 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*  
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Lee Wai Kit  
Laboratory Manager

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Report No. : 00568  
Application No. : HP00436

Issue Date : 14 Feb 2024

### 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	113.9	- 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 -



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Report No. : 00618  
Application No. : HP00473

Issue Date : 18 Mar 2024

### 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-12-06

Manufacturer: : BSWA Technology

Other information :

Model No.	BSWA 308
Serial No.	580156
Microphone No.	580804

Date Received : 06 Mar 2024

Test Period : 14 Mar 2024 to 14 Mar 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**

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Lee Wai Kit  
Laboratory Manager

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



Report No. : 00618

Issue Date : 18 Mar 2024

Application No. : HP00473

### 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  
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Report No. : 00736  
Application No. : HP00592

Issue Date : 28 Jun 2024

**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

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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 -