

## Certificate of Calibration - Wind Monitoring Station

Description: Yau Lai Estate, Bik Lai House  
 Manufacturer: Davis Instruments  
 Model No.: Davis7440  
 Serial No.: MC01010A44  
 Equipment No.: SA-03-04  
 Date of Calibration: 18-Feb-2024  
 Next Due Date: 18-Aug-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
1.5	1.7	-0.2
2.5	2.4	0.1
4.0	3.8	0.2

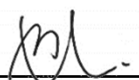
### 2. Performance check of Wind Direction

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

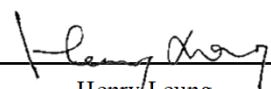
### Test Specification:

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

## Certificate of Calibration - Wind Monitoring Station

Description: Yau Lai Estate, Bik Lai House  
 Manufacturer: Davis Instruments  
 Model No.: Davis7440  
 Serial No.: MC01010A44  
 Equipment No.: SA-03-04  
 Date of Calibration: 17-Aug-2024  
 Next Due Date: 17-Feb-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
1.5	1.6	-0.1
2.5	2.3	0.2
4.0	4.0	0.0


### 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

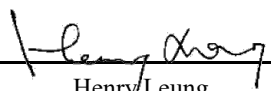
### Test Specification:

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

# 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

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET



File No. MA20003/18/027

Project No. CKL 1 - Flat 121 Cha Kwo Ling Village  
 Date: 4-Jul-24 Next Due Date: 4-Sep-24 Operator: SK  
 Equipment No.: A-01-18 Model No.: TE 5170 Serial No. 0723

Ambient Condition			
Temperature, Ta (K)	<u>303.2</u>	Pressure, Pa (mmHg)	<u>758.9</u>

Orifice Transfer Standard Information					
Serial No.	<u>3864</u>	Slope, mc	<u>0.05976</u>	Intercept, bc	<u>-0.05018</u>
Last Calibration Date:	<u>15-Jan-24</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	<u>14-Jan-25</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>13.6</u>	3.65	61.97	<u>9.4</u>	3.04
2	<u>10.2</u>	3.16	53.78	<u>7.3</u>	2.68
3	<u>8.5</u>	2.89	49.17	<u>5.5</u>	2.32
4	<u>6.2</u>	2.47	42.12	<u>3.6</u>	1.88
5	<u>3.6</u>	1.88	32.29	<u>2.0</u>	1.40

### By Linear Regression of Y on X

Slope, mw = 0.0569 Intercept, bw : -0.4586  
 Correlation coefficient\* = 0.9968

\*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 =  $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$  4.02

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

Conducted by: Wong Shing Kwai Signature:  Date: 4-Jul-24

Checked by: Henry Leung Signature:  Date: 4-Jul-24

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET



File No. MA20003/55/027

Project No. CKL 2 - Flat 103 Cha Kwo Ling Village  
 Date: 4-Jul-24 Next Due Date: 4-Sep-24 Operator: SK  
 Equipment No.: A-01-55 Model No.: TE 5170 Serial No. 1956

Ambient Condition			
Temperature, Ta (K)	<b>303.2</b>	Pressure, Pa (mmHg)	<b>758.9</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:	14-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>13.5</b>	3.64	61.75	<b>9.5</b>	3.05
2	<b>11.3</b>	3.33	56.57	<b>7.5</b>	2.71
3	<b>9.4</b>	3.04	51.67	<b>5.9</b>	2.41
4	<b>5.5</b>	2.32	39.72	<b>3.1</b>	1.74
5	<b>3.6</b>	1.88	32.29	<b>2.1</b>	1.44

**By Linear Regression of Y on X**

Slope, mw = 0.0551 Intercept, bw : -0.3959

Correlation coefficient\* = 0.9974

\*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;  $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$  3.97

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

Conducted by: Wong Shing Kwai Signature:  Date: 4-Jul-24

Checked by: Henry Leung Signature:  Date: 4-Jul-24

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET



File No. MA20003/04/0025

Project No. KER 1 - Future Residential Development at Kerry Godown  
 Date: 10-Jul-24 Next Due Date: 10-Sep-24 Operator: SK  
 Equipment No.: A-01-04 Model No.: TE 5170 Serial No. 10595

Ambient Condition			
Temperature, Ta (K)	<b>303.6</b>	Pressure, Pa (mmHg)	<b>756.5</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:	14-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>13.4</b>	3.62	61.39	<b>9.0</b>	2.97
2	<b>10.6</b>	3.22	54.69	<b>7.1</b>	2.63
3	<b>8.6</b>	2.90	49.35	<b>5.3</b>	2.28
4	<b>5.5</b>	2.32	39.63	<b>3.4</b>	1.82
5	<b>3.7</b>	1.90	32.66	<b>2.1</b>	1.43

By Linear Regression of Y on X

Slope, mw = 0.0533 Intercept, bw : -0.3066

Correlation coefficient\* = 0.9989

\*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 =  $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$  4.03

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

Conducted by: Wong Shing Kwai Signature:  Date: 10-Jul-24

Checked by: Henry Leung Signature:  Date: 10-Jul-24

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET



File No. MA20003/44/0024

Project No. KTD1 - Centre of Excellence in Paediatrics (Children's Hospital)  
 Date: 10-Jul-24 Next Due Date: 10-Sep-24 Operator: SK  
 Equipment No.: A-01-44 Model No.: TE-5170 Serial No. 1316

Ambient Condition			
Temperature, Ta (K)	<b>303.6</b>	Pressure, Pa (mmHg)	<b>756.5</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:	14-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>13.8</b>	3.67	62.28	<b>9.7</b>	3.08
2	<b>11.2</b>	3.31	56.19	<b>7.5</b>	2.71
3	<b>9.1</b>	2.98	50.74	<b>5.7</b>	2.36
4	<b>6.4</b>	2.50	42.68	<b>3.9</b>	1.95
5	<b>3.8</b>	1.93	33.08	<b>2.2</b>	1.47

By Linear Regression of Y on X

Slope, mw = 0.0550 Intercept, bw : -0.3819

Correlation coefficient\* = 0.9986

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

### Set Point Calculation


From the TSP Field Calibration Curve, take Qstd = 43 CFM

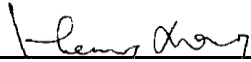
From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; W =  $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$  4.02

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

Conducted by: Wong Shing Kwai Signature:  Date: 10-Jul-24

Checked by: Henry Leung Signature:  Date: 10-Jul-24

# High-Volume TSP Sampler

## 5-POINT CALIBRATION DATA SHEET



File No. MA20003/41/0025

Project No. KTD 2D - Next to the SOR Office of Trunk Road T2 in Kai Tak Area  
 Date: 10-Jul-24 Next Due Date: 10-Sep-24 Operator: SK  
 Equipment No.: A-01-41 Model No.: TE 5170 Serial No. 5280

Ambient Condition			
Temperature, Ta (K)	<b>303.6</b>	Pressure, Pa (mmHg)	<b>756.5</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:	14-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>14.0</b>	3.70	62.73	<b>9.6</b>	3.06
2	<b>11.5</b>	3.35	56.93	<b>8.4</b>	2.86
3	<b>9.5</b>	3.05	51.82	<b>6.4</b>	2.50
4	<b>7.0</b>	2.62	44.60	<b>4.5</b>	2.10
5	<b>3.8</b>	1.93	33.08	<b>2.2</b>	1.47

**By Linear Regression of Y on X**

Slope, mw = 0.0554 Intercept, bw : -0.3617  
 Correlation coefficient\* = 0.9975

\*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>4.18</u>	

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

Conducted by: Wong Shing Kwai Signature:  Date: 10-Jul-24  
 Checked by: Henry Leung Signature:  Date: 10-Jul-24