

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET

File No. MA20003/18/0006R

Project No. CKL 1 - Flat 121 Cha Kwo Ling Village
 Date: 6-Jan-21 Next Due Date: 6-Mar-21 Operator: SK
 Equipment No.: A-01-18 Model No.: TE 5170 Serial No. 0723

Ambient Condition			
Temperature, Ta (K)	<u>290.1</u>	Pressure, Pa (mmHg)	<u>764.9</u>

Orifice Transfer Standard Information					
Serial No.	<u>3746</u>	Slope, mc	<u>0.0592</u>	Intercept, bc	<u>-0.0274</u>
Last Calibration Date:	<u>17-Jan-20</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	<u>17-Jan-21</u>				

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>13.7</u>	3.76	64.04	<u>10.2</u>	3.25
2	<u>11.2</u>	3.40	57.94	<u>7.6</u>	2.80
3	<u>8.5</u>	2.96	50.54	<u>6.0</u>	2.49
4	<u>5.4</u>	2.36	40.37	<u>3.5</u>	1.90
5	<u>3.2</u>	1.82	31.19	<u>1.8</u>	1.36

By Linear Regression of Y on X

Slope, mw = 0.0560 Intercept, bw = -0.3720
 Correlation coefficient* = 0.9983

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation


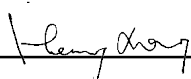
From the TSP Field Calibration Curve, take Qstd = 43 CFM

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 = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 4.01

Remarks: _____

Conducted by: SK Wong Signature:  Date: 6 January 2021
 Checked by: Henry Leung Signature:  Date: 6 January 2021

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET

File No. MA20003/55/0006

Project No. CKL 2 - Flat 103 Cha Kwo Ling Village
 Date: 6-Jan-21 Next Due Date: 6-Mar-21 Operator: SK
 Equipment No.: A-01-55 Model No.: TE 5170 Serial No. 1956

Ambient Condition			
Temperature, Ta (K)	<u>290.1</u>	Pressure, Pa (mmHg)	<u>764.9</u>

Orifice Transfer Standard Information					
Serial No.	<u>3746</u>	Slope, mc	<u>0.0592</u>	Intercept, bc	<u>-0.0274</u>
Last Calibration Date:	<u>17-Jan-20</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	<u>17-Jan-21</u>				

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>13.9</u>	3.79	64.50	<u>9.5</u>	3.13
2	<u>11.4</u>	3.43	58.45	<u>7.2</u>	2.73
3	<u>8.5</u>	2.96	50.54	<u>5.7</u>	2.43
4	<u>5.3</u>	2.34	40.00	<u>3.6</u>	1.93
5	<u>2.9</u>	1.73	29.71	<u>2.1</u>	1.47

By Linear Regression of Y on X

Slope, mw = 0.0466 Intercept, bw = 0.0736
 Correlation coefficient* = 0.9976

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

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

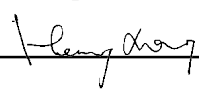
From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; W = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 4.17

Remarks: _____

Conducted by: SK Wong Signature:  Date: 6 January 2021

Checked by: Henry Leung Signature:  Date: 6 January 2021

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET

File No. MA20003/04/0003

Project No. KER 1 - Future Residential Development at Kerry Godown
 Date: 3-Dec-20 Next Due Date: 3-Feb-21 Operator: SK
 Equipment No.: A-01-04 Model No.: TE 5170 Serial No. 10595

Ambient Condition			
Temperature, Ta (K)	<u>290.4</u>	Pressure, Pa (mmHg)	<u>765.8</u>

Orifice Transfer Standard Information					
Serial No.	<u>3746</u>	Slope, mc	<u>0.0592</u>	Intercept, bc	<u>-0.0274</u>
Last Calibration Date:	<u>17-Jan-20</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	<u>17-Jan-21</u>				

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>13.3</u>	3.71	63.10	<u>6.5</u>	2.59
2	<u>10.8</u>	3.34	56.91	<u>5.2</u>	2.32
3	<u>8.3</u>	2.93	49.95	<u>4.0</u>	2.03
4	<u>4.5</u>	2.16	36.90	<u>2.6</u>	1.64
5	<u>2.5</u>	1.61	27.62	<u>1.8</u>	1.36

By Linear Regression of Y on X

Slope, mw = 0.0341 Intercept, bw = 0.3916
 Correlation coefficient* = 0.9963

*If Correlation Coefficient < 0.990, check and recalibrate.


Set Point Calculation

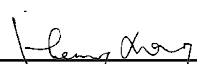
From the TSP Field Calibration Curve, take Qstd = 43 CFM
 From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; W = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 3.33

Remarks: _____

Conducted by: SK Wong Signature:  Date: 03 December 2020

Checked by: Henry Leung Signature:  Date: 03 December 2020

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET

File No. MA20003/44/0004

Project No. KTD1 - Centre of Excellence in Paediatrics (Children's Hospital)
 Date: 3-Dec-20 Next Due Date: 3-Feb-21 Operator: SK
 Equipment No.: A-01-44 Model No.: TE-5170 Serial No. 1316

Ambient Condition			
Temperature, Ta (K)	<u>290.4</u>	Pressure, Pa (mmHg)	<u>765.8</u>

Orifice Transfer Standard Information					
Serial No.	<u>3746</u>	Slope, mc	<u>0.0592</u>	Intercept, bc	<u>-0.02740</u>
Last Calibration Date:	<u>17-Jan-20</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	<u>17-Jan-21</u>				

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>12.9</u>	3.65	62.16	<u>8.7</u>	3.00
2	<u>10.4</u>	3.28	55.86	<u>6.6</u>	2.61
3	<u>7.9</u>	2.86	48.74	<u>4.9</u>	2.25
4	<u>5.9</u>	2.47	42.18	<u>3.4</u>	1.87
5	<u>3.1</u>	1.79	30.71	<u>1.8</u>	1.36

By Linear Regression of Y on X

Slope, mw = 0.0520 Intercept, bw = -0.2699
 Correlation coefficient* = 0.9982

*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 = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 3.73

Remarks: _____

Conducted by: SK Wong Signature:  Date: 03 December 2020

Checked by: Henry Leung Signature:  Date: 03 December 2020

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET

File No. MA20003/41/0003

Project No. KTD 2c - G/IC Zone next to Kwun Tong Bypass (Next to the Kowloon Bay Sewage Interception Station)
 Date: 3-Dec-20 Next Due Date: 3-Feb-21 Operator: SK
 Equipment No.: A-01-41 Model No.: TE 5170 Serial No. 5280

Ambient Condition			
Temperature, Ta (K)	<u>290.4</u>	Pressure, Pa (mmHg)	<u>765.8</u>

Orifice Transfer Standard Information					
Serial No.	<u>3746</u>	Slope, mc	<u>0.0592</u>	Intercept, bc	<u>-0.0274</u>
Last Calibration Date:	<u>17-Jan-20</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	<u>17-Jan-21</u>				

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>13.5</u>	<u>3.74</u>	<u>63.57</u>	<u>6.5</u>	<u>2.59</u>
2	<u>11.1</u>	<u>3.39</u>	<u>57.69</u>	<u>5.2</u>	<u>2.32</u>
3	<u>8.1</u>	<u>2.89</u>	<u>49.35</u>	<u>4.1</u>	<u>2.06</u>
4	<u>4.6</u>	<u>2.18</u>	<u>37.30</u>	<u>2.5</u>	<u>1.61</u>
5	<u>2.6</u>	<u>1.64</u>	<u>28.16</u>	<u>1.8</u>	<u>1.36</u>

By Linear Regression of Y on X

Slope, mw = 0.0346 Intercept, bw = 0.3558

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

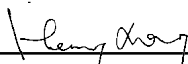
From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; W = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 3.28

Remarks: _____

Conducted by: SK Wong Signature:  Date: 03 December 2020

Checked by: Henry Leung Signature:  Date: 03 December 2020

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET

File No. MA20003/04/0004

Project No. KER 1 - Future Residential Development at Kerry Godown
 Date: 2-Feb-21 Next Due Date: 2-Apr-21 Operator: SK
 Equipment No.: A-01-04 Model No.: TE 5170 Serial No. 10595

Ambient Condition			
Temperature, Ta (K)	<u>293.9</u>	Pressure, Pa (mmHg)	<u>764.6</u>

Orifice Transfer Standard Information					
Serial No.	<u>3864</u>	Slope, mc	<u>0.05846</u>	Intercept, bc	<u>-0.00313</u>
Last Calibration Date:	<u>11-Jan-21</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	<u>11-Jan-22</u>				

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>13.2</u>	<u>3.67</u>	<u>62.82</u>	<u>7.2</u>	<u>2.71</u>
2	<u>10.8</u>	<u>3.32</u>	<u>56.83</u>	<u>5.6</u>	<u>2.39</u>
3	<u>8.2</u>	<u>2.89</u>	<u>49.53</u>	<u>4.4</u>	<u>2.12</u>
4	<u>4.8</u>	<u>2.21</u>	<u>37.90</u>	<u>2.8</u>	<u>1.69</u>
5	<u>2.8</u>	<u>1.69</u>	<u>28.96</u>	<u>1.8</u>	<u>1.36</u>

By Linear Regression of Y on X

Slope, mw = 0.0391 Intercept, bw = 0.2067
 Correlation coefficient* = 0.9980

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

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

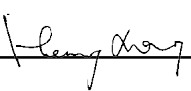
From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; W = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 3.49

Remarks: _____

Conducted by: SK Wong Signature:  Date: 2 February 2021

Checked by: Henry Leung Signature:  Date: 2 February 2021

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET

File No. MA20003/44/0005

Project No. KTD1 - Centre of Excellence in Paediatrics (Children's Hospital)
 Date: 2-Feb-21 Next Due Date: 2-Apr-21 Operator: SK
 Equipment No.: A-01-44 Model No.: TE-5170 Serial No. 1316

Ambient Condition			
Temperature, Ta (K)	<u>293.9</u>	Pressure, Pa (mmHg)	<u>764.6</u>

Orifice Transfer Standard Information					
Serial No.	<u>3864</u>	Slope, mc	<u>0.05846</u>	Intercept, bc	<u>-0.00313</u>
Last Calibration Date:	<u>11-Jan-21</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	<u>11-Jan-22</u>				

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>13.1</u>	3.66	62.58	<u>8.9</u>	3.01
2	<u>10.5</u>	3.27	56.04	<u>6.8</u>	2.63
3	<u>7.9</u>	2.84	48.61	<u>5.2</u>	2.30
4	<u>5.9</u>	2.45	42.02	<u>3.4</u>	1.86
5	<u>3.0</u>	1.75	29.98	<u>1.8</u>	1.36

By Linear Regression of Y on X

Slope, mw = 0.0512 Intercept, bw = -0.2169
 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

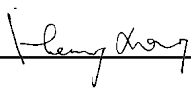
From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; W = $(mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 3.86

Remarks: _____

Conducted by: SK Wong Signature:  Date: 2 February 2021

Checked by: Henry Leung Signature:  Date: 2 February 2021

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET

File No. MA20003/41/0004

Project No. KTD 2c - G/IC Zone next to Kwun Tong Bypass (Next to the Kowloon Bay Sewage Interception Station)
 Date: 2-Feb-21 Next Due Date: 2-Apr-21 Operator: SK
 Equipment No.: A-01-41 Model No.: TE 5170 Serial No. 5280

Ambient Condition			
Temperature, Ta (K)	<u>293.9</u>	Pressure, Pa (mmHg)	<u>764.6</u>

Orifice Transfer Standard Information					
Serial No.	<u>3864</u>	Slope, mc	<u>0.05846</u>	Intercept, bc	<u>-0.00313</u>
Last Calibration Date:	<u>11-Jan-21</u>	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ $Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	<u>11-Jan-22</u>				

Calibration of TSP Sampler					
Calibration Point	Orifice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) X - axis	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Y-axis
1	<u>13.4</u>	3.70	63.30	<u>6.8</u>	2.63
2	<u>10.8</u>	3.32	56.83	<u>5.4</u>	2.35
3	<u>7.8</u>	2.82	48.30	<u>4.2</u>	2.07
4	<u>5.4</u>	2.35	40.20	<u>3.2</u>	1.81
5	<u>2.6</u>	1.63	27.91	<u>1.8</u>	1.36


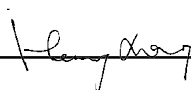
By Linear Regression of Y on X

Slope, mw = 0.0354 Intercept, bw = 0.3684
 Correlation coefficient* = 0.9990

*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) ² x (760 / Pa) x (Ta / 298) =	<u>3.50</u>

Remarks: _____

Conducted by: SK Wong Signature:  Date: 2 February 2021
 Checked by: Henry Leung Signature:  Date: 2 February 2021

Certificate of Calibration

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler


Description: Digital Dust Indicator Date of Calibration 5-Feb-21
 Manufacturer: Sibata Scientific Technology LTD. Validity of Calibration Record 5-Apr-21
 Model No.: LD-5R
 Serial No.: 972778
 Equipment No.: SA-01-07 Sensitivity 0.001 mg/m3
 High Volume Sampler No.: A-01-01A Before Sensitivity Adjustment 735 CPM
 Tisch Calibration Orifice No.: 3607 After Sensitivity Adjustment 735 CPM

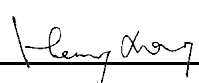
Calibration of 1 hr TSP		
Calibration Point	Laser Dust Monitor	HVS
	Mass Concentration ($\mu\text{g}/\text{m}^3$) X-axis	Mass concentration ($\mu\text{g}/\text{m}^3$) Y-axis
1	51.0	107.0
2	45.0	101.0
3	40.0	95.0
Average	45.3	101.0
By Linear Regression of Y on X Slope , mw = <u>1.0879</u> Intercept, bw = <u>51.6813</u> Correlation coefficient* = <u>0.9986</u>		
Set Correlation Factor		
Particulate Concentration by High Volume Sampler ($\mu\text{g}/\text{m}^3$)		101.0
Particulate Concentration by Dust Meter ($\mu\text{g}/\text{m}^3$)		45.3
Measureing time, (min)		60.0
Set Correlation Factor , SCF SCF = [K=High Volume Sampler / Dust Meter, ($\mu\text{g}/\text{m}^3$)] <u>2.2</u>		

In-house method in according to the instruction manual:

The Dust Monitor was compared with a calibrated High Volume Sampler and The result was used to generate the Correlation Factor (CF) between the Dust Monitor and High Volume Sampler.

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

Calibrated by: 
 Wong Shing Kwai

Approved by: 
 Henry Leung



Certificate of Calibration

Calibration Certification Information			
Cal. Date: January 17, 2020	Rootsmeter S/N: 438320	Ta: 295 °K	
Operator: Jim Tisch		Pa: 744.2 mm Hg	
Calibration Model #: TE-5025A	Calibrator S/N: 3746		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4340	3.2	2.00
2	3	4	1	1.0180	6.4	4.00
3	5	6	1	0.9080	7.9	5.00
4	7	8	1	0.8700	8.7	5.50
5	9	10	1	0.7150	12.6	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)
0.9849	0.6868	1.4066	0.9957	0.6944	0.8904
0.9807	0.9633	1.9892	0.9914	0.9739	1.2592
0.9787	1.0779	2.2240	0.9894	1.0896	1.4078
0.9776	1.1237	2.3325	0.9883	1.1360	1.4765
0.9724	1.3601	2.8131	0.9831	1.3749	1.7808
QSTD	m=	2.09221	QA	m=	1.31010
	b=	-0.02779		b=	-0.01759
	r=	0.99994		r=	0.99994

Calculations	
Vstd= $\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	Va= $\Delta Vol((Pa-\Delta P)/Pa)$
Qstd= $Vstd/\Delta Time$	Qa= $Va/\Delta Time$
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



RECALIBRATION DUE DATE:
January 11, 2022

Certificate of Calibration

Calibration Certification Information			
Cal. Date: January 11, 2021	Rootsmeter S/N: 438320	Ta: 297	°K
Operator: Jim Tisch		Pa: 750.1	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 3864		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4470	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9140	8.0	5.00
4	7	8	1	0.8670	8.8	5.50
5	9	10	1	0.7140	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)
0.9860	0.6814	1.4073	0.9957	0.6881	0.8899
0.9818	0.9616	1.9902	0.9915	0.9711	1.2585
0.9797	1.0719	2.2251	0.9893	1.0824	1.4071
0.9786	1.1288	2.3337	0.9883	1.1399	1.4757
0.9732	1.3630	2.8146	0.9828	1.3765	1.7798
QSTD	m=	2.06566	QA	m=	1.29348
	b=	0.00315		b=	0.00199
	r=	0.99996		r=	0.99996

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= $Vstd / \Delta Time$	Qa= $Va / \Delta Time$
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: Yau Lai Estate, Bik Lai House
 Manufacturer: Davis Instruments
 Model No.: Davis7440
 Serial No.: MC01010A44
 Equipment No.: SA-03-04
 Date of Calibration: 21-Aug-2020
 Next Due Date: 21-Feb-2021

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	1.5	0.0
2.2	2.3	-0.1
3.5	3.4	0.1


2. Performance check of Wind Direction

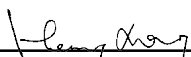
Wind Direction (°)		Difference D (°)
Wind Direction Reading (W1)	Marine Compass Value (W2)	$D = W1 - W2$
0	0	0.0
90	90	0.0
180	180	0.0
270	270	0.0

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

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: 20-Feb-2021
 Next Due Date: 20-Aug-2021

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	2.5	0.0
3.5	3.4	0.1


2. Performance check of Wind Direction

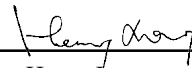
Wind Direction (°)		Difference D (°)
Wind Direction Reading (W1)	Marine Compass Value (W2)	$D = W1 - W2$
0	0	0.0
90	90	0.0
180	180	0.0
270	270	0.0

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