

Certificate of Calibration - Wind Monitoring Station

Description: Yau Lai Estate, Bik Lai House

Manufacturer: <u>Davis Instruments</u>

Model No.: Davis7440

Serial No.: <u>MC01010A44</u>

Equipment No.: SA-03-04

Date of Calibration <u>17-Aug-2024</u>

Next Due Date <u>17-Feb-2025</u>

1. Performance check of Wind Speed

Wind Sp	peed, m/s	Difference D (m/s)		
Wind Speed Reading (V1)	Anemometer Value (V2)	D = V1 - V2		
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 Di	rection (°)	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



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1. Performance check of Wind Speed

Wind Sp	peed, m/s	Difference D (m/s)
Wind Speed Reading (V1)	Anemometer Value (V2)	D = V1 - V2
0.0	0.0	0.0
1.5	1.4	0.1
2.5	2.4	0.1
4.0	3.8	0.2

2. Performance check of Wind Direction

Wind Di	rection (°)	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
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RECALIBRATION DUE DATE:

January 7, 2026

Certificate of Calibration

Calibration Certification Information

Cal. Date: January 7, 2025 Rootsmeter S/N: 438320 Ta: 293 °K

Operator: Jim Tisch Pa: 759.0 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	1.4590	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	Qstd	$\sqrt{\Delta H \left(\frac{Pa}{Pstd}\right) \left(\frac{Tstd}{Ta}\right)}$		Qa	$\sqrt{\Delta H(Ta/Pa)}$				
(m3)	(x-axis)	(y-axis)	Va	(x-axis)	(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				
	m=	2.08969		m=	1.30853				
QSTD	b=	-0.02374	QA	b=	-0.01464				
	r=	0.99985	,	r=	0.99985				

	Calculations						
	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	Va=	ΔVol((Pa-ΔP)/Pa)				
Qstd= Vstd/ΔTime Qa= Va/ΔTime			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=	$1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$				

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	777					

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

FAX: (513)467-9009

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET



						File No. N	MA20003/18/030
Project No.	CKL 1 - Flat 12	1 Cha Kwo Ling	Village				
Date:		I-Jan-25 Next Due Date: 6-Mar-25		Лar-25	Operator:	SK	
			1	\ <u></u>		· · · · · · · · · · · · · · · · · · ·	
Equipment 110	ent No.: A-01-18 Model No.: TE 5170		7.5170	Deriai No.	0723		
			Ambient	Condition			
Temperatur	re, Ta (K)	292.7	Pressure, Pa	ı (mmHg)		765.4	
	T		rifice Transfer Sta	T T			
Serial		3864	Slope, mc	0.05976	Intercept		-0.05018
Last Calibra		15-Jan-24			$c = [\Delta H \times (Pa/76)] \times (Pa/760) \times (298)$		
Next Calibra	ation Date:	14-Jan-25		$Qsta = \{ [\Delta H \}$	X (Pa/760) X (298)	/1a)] -bc}/m	<u>ic</u>
		•	Calibration of	f TSP Sampler			
Callbard's a		Or	fice			HVS	
Calibration Point	ΔH (orifice), in. of water		50) x (298/Ta)] ^{1/2}	Qstd (CFM) X - axis	ΔW (HVS), in. of water	· ·) x (298/Ta)] ^{1/2} Y-
1	13.4		3.71	62.87	9.0		3.04
2	10.3	,	3.25	55.22	7.2	,	2.72
3	8.2		2.90	49.36	5.3		2.33
4	6.2	:	2.52	43.03	3.6		1.92
5	3.1		1.78	30.67	1.6	1.28	
Bv Linear Regr	ession of Y on Y	ζ.					
Slope, mw =				Intercept, bw :	-0.445	58	
Correlation		0.	.9978	- /			
*If Correlation C	Coefficient < 0.99	0, check and rec	calibrate.	_			
				Calculation			
	eld Calibration (-					
From the Regres	sion Equation, th	ne "Y" value acco	ording to				
		mw x ($\mathbf{Qstd} + \mathbf{bw} = [\mathbf{\Delta W}]$	x (Pa/760) x (2	298/Ta)] ^{1/2}		
Therefore, Se	et Point; W = (m	w x Qstd + bw)	² x (760 / Pa) x (Ta / 298) =	3.76		
Remarks:							
				(n.	<u> </u>		
Conducted by:	Wong Sh	ing Kwai	Signature	:	<u>/\-</u>	Date:	4-Jan-25
				1 -			
Checked by:	Henry	Leung	Signature	: \-lem			

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET



File No. MA20003/55/030 Project No. CKL 2 - Flat 103 Cha Kwo Ling Village 4-Jan-25 Next Due Date: 6-Mar-25 Operator: SK Date: Equipment No.: A-01-55 Model No.: TE 5170 Serial No. 1956 **Ambient Condition** 292.7 Temperature, Ta (K) Pressure, Pa (mmHg) 765.4 **Orifice Transfer Standard Information** 0.05976 Intercept, bc 3864 Slope, mc Serial No. -0.05018 $mc \times Ostd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ Last Calibration Date: 15-Jan-24 Qstd = $\{ [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} -bc \} / mc$ 14-Jan-25 Next Calibration Date: **Calibration of TSP Sampler** Orfice Calibration $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ ΔH (orifice), Ostd (CFM) ΔW (HVS), in. $[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ Point in. of water X - axis of water Y-axis 3.07 1 13.6 3.73 63.33 9.2 11.2 2.74 2 3.39 57.55 7.3 3.04 51.67 5.7 2.42 4 5.3 2.33 39.85 2.6 1.63 3.6 32.99 1.8 5 1.92 1.36 By Linear Regression of Y on X Slope , mw = 0.0581 Intercept, bw : -0.6068 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 x Qstd + bw = $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Therefore, Set Point; W = $(\text{mw x Qstd} + \text{bw})^2 \text{ x} (760 / \text{Pa}) \text{ x} (\text{Ta}/298) =$ 3.49 Remarks: Conducted by: Wong Shing Kwai Checked by: Henry Leung

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET



File No. MA20003/04/0028

Project No.	KER 1 - Future	Residential Deve		_			
Date:	11-Jan-25		Next Due Date:	13-	Mar-25	Operator:	SK
Equipment No.:	A-0	1-04	Model No.:	TE 5170		Serial No.	10595
			Ambient C	ondition			
Temperatur	re, Ta (K)	289.6	Pressure, Pa			771.8	
•	· · · · · · · · · · · · · · · · · · ·			·			
		Or	ifice Transfer Star	ndard Informa	ation		
Serial	No.	3864	Slope, mc	0.05976	Intercept	t, bc	-0.05018
Last Calibra	ntion Date:	15-Jan-24	1	mc x Qstd + bo	$c = [\Delta H \times (Pa/760]]$) x (298/Ta)] ^{1/2}	2
Next Calibra	ation Date:	14-Jan-25	($Qstd = \{ [\Delta H \ x] \}$	(Pa/760) x (298/7	Γa)] ^{1/2} -bc} / m	c
			Calibration of T	ΓSP Sampler			
Calibration		Or	fice			HVS	
Point	ΔH (orifice), in. of water	[ΔH x (Pa/76	50) x (298/Ta)] ^{1/2}	Qstd (CFM) X - axis	ΔW (HVS), in. of water		50) x (298/Ta)] ^{1/} -axis
1	13.1		3.70	62.75	8.6	:	3.00
2	10.9		3.37	57.31	7.0		2.70
3	8.6		3.00	51.00	5.3		2.35
4	5.3		2.35	40.22	3.1		1.80
5	3.8		1.99	34.19	2.4		1.58
Slope , mw =	0.0502	_		Intercept, bw :	-0.179	00	
If Correlation C	coefficient = Coefficient < 0.99		.9981 calibrate.				
			G + D • + G				
Enouge 4h o TCD E	ald Calibratian C	Samue tales Oated	Set Point Ca	alculation			
From the TSP Fig							
From the Regress	sion Equation, th	e i value acco	ording to				
		mw x Q	$\mathbf{pstd} + \mathbf{bw} = [\mathbf{\Delta W} \ \mathbf{x}]$	(Pa/760) x (29	$[98/Ta]^{1/2}$		
Therefore, Se	et Point; $W = (m)$	$w \times Qstd + bw$)	2 x (760 / Pa) x (7	$\Gamma a / 298) =$	3.76		
Remarks:							
•							
G 1 . 11	11 1 ~:	. 17 .	G.	X	λ	ъ.	11 7 25
Conducted by:	Wong Sh	ıng Kwaı	Signature:			Date:	11-Jan-25
Checked by	Henry	Leung	Signature:	10	Ohan 17	Date:	11-Jan-25

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET



File No. MA20003/44/0027

Project No.	KTD1 - Centre	of Excellence in	Paediatrics (Childr	en's Hospital)			
Date:	11-J	an-25	Next Due Date:	te: 13-Mar-25 o.: TE-5170		Operator:	SK
Equipment No.:	A-0	01-44	Model No.:			Serial No.	1316
			Ambient C	ondition			
Temperature, Ta (K)		289.6	Pressure, Pa	(mmHg)		771.8	
			ifice Transfer Star			Т	
Serial	i	3864	Slope, mc	0.05976	Intercept		-0.05018
Last Calibration Date: 15-Jan-24 $\mathbf{mc} \times \mathbf{Qstd} + \mathbf{bc} = [\Delta \mathbf{H} \times (\mathbf{Pa/760}) \times (\mathbf{298/Ta})]$ Next Calibration Date: 14-Jan-25 $\mathbf{Qstd} = \{[\Delta \mathbf{H} \times (\mathbf{Pa/760}) \times (\mathbf{298/Ta})]^{1/2} - \mathbf{bc}\}$							
Next Calibr	ation Date:	14-Jan-25		Qsta = {[ΔH x	(Pa/700) X (298/	1a)j -bc}/n	<u> </u>
		•	Calibration of 7	TSP Sampler			
Calibration		Or	fice	<u> </u>		HVS	
Point	ΔH (orifice), in. of water	[ΔH x (Pa/76	(0) x (298/Ta)] ^{1/2}	Qstd (CFM) X - axis	ΔW (HVS), in. of water		760) x (298/Ta)] ^{1/2} Y-axis
1	13.7		3.78	64.15	9.6		3.17
2	11.3		3.44	58.34	7.4		2.78
3	9.0		3.07	52.16	5.6		2.42
4	6.2		2.55	43.43	3.5		1.91
5	3.5		1.91	32.84	2.0		1.45
	0.0551 coefficient* =	_	.9971	Intercept, bw	-0.419)2	
		Curve, take Qstd ne "Y" value acco mw x Q			98/Ta)] ^{1/2}		
Therefore, So	et Point; W = (m	nw x Qstd + bw)	² x (760 / Pa) x (7	Γa / 298) =	3.64		
Remarks:							
Conducted by:	Wong Sl	ning Kwai	Signature:	X	<u></u>	Date:	11-Jan-25
Checked by:	Henry	Leung	Signature:	\-lem	<u>,</u> X27	Date:	11-Jan-25

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET



File No. MA20003/41/0027 KTD 2D - Next to the SOR Office of Trunk Road T2 in Kai Tak Area Project No. 11-Jan-25 Next Due Date: 13-Mar-25 Operator: SK Date: Equipment No.: A-01-41 Model No.: TE 5170 Serial No. 5280 **Ambient Condition** Temperature, Ta (K) 289.6 Pressure, Pa (mmHg) 771.8 **Orifice Transfer Standard Information** 0.05976 Intercept, bc 3864 Slope, mc Serial No. -0.05018 $mc \times Ostd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ Last Calibration Date: 15-Jan-24 Qstd = $\{ [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} -bc \} / mc$ 14-Jan-25 Next Calibration Date: **Calibration of TSP Sampler** Orfice Calibration $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ ΔH (orifice), Ostd (CFM) ΔW (HVS), in. Point $[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ in. of water X - axis of water Y-axis 1 13.9 3.81 64.61 9.5 3.15 11.7 8.2 2.93 2 3.50 59.35 3.20 54.39 6.2 2.55 4 7.2 2.74 46.74 4.3 2.12 2.1 5 4.3 2.12 36.31 1.48 By Linear Regression of Y on X Slope , mw = 0.0600 Intercept, bw : -0.6898 Correlation coefficient* = 0.9985 *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 x Qstd + bw = $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Therefore, Set Point; $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 3.41 Remarks: Conducted by: Wong Shing Kwai

Checked by: Henry Leung