

Certificate of Calibration - Wind Monitoring Station

Description: Yau Lai Estate, Bik Lai House

Manufacturer: <u>Davis Instruments</u>

Model No.: <u>Davis7440</u>

Serial No.: MC01010A44

Equipment No.: <u>SA-03-04</u>

Date of Calibration <u>18-Feb-2024</u>

Next Due Date <u>18-Aug-2024</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		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 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



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		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



RECALIBRATION DUE DATE:

January 15, 2025

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: **3864**

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	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)			
1.0031	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			
	m=	2.11196		m=	1.32248			
QSTD	b=	-0.05043	QA	b=	-0.03134			
	r=	0.99998	4 1	r=	0.99998			

	Calculatio	ns		
Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	Va=	ΔVol((Pa-ΔP)/Pa)	
Qstd=	Vstd/∆Time	Qa= Va/∆Time		
	For subsequent flow ra	te calculatio	ns:	
Qstd=	$1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$	Qa=	$1/m\left(\left(\sqrt{\Delta H(Ta/Pa)}\right)-b\right)$	

	Standard Conditions				
Tstd:	298.15 °K				
Pstd:	760 mm Hg				
	Key				
ΔH: calibrate	or manometer reading (in H2O)				
ΔP: rootsme	ΔP: rootsmeter manometer reading (mm Hg)				
Ta: actual ab	Ta: actual absolute temperature (°K)				
Pa: actual ba	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

Tisch Environmental, Inc. 145 South Miami Avenue Village of Cleves, OH 45002

www.tisch-env.com

TOLL FREE: (877)263-7610 FAX: (513)467-9009

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET



						File No. N	MA20003/18/027
Project No.	CKL 1 - Flat 12	1 Cha Kwo Ling	Village				
Date:		4-Jul-24 Next Due Date: 4-Sep-24		Sep-24	Operator:	SK	
	A-0		•	del No.: TE 5170			
Equipment 110	11-0	1-10			73170		0723
			Ambient	Condition			
Temperatu	re, Ta (K)	303.2	Pressure, Pa	(mmHg)		758.9	
			rifice Transfer Sta	1			
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		$Qsta = \{[\Delta H]\}$	(Pa//60) X (298)	/1a)] -bc}/m	<u>le</u>
		·	Calibration of	TSP Sampler			
C-111		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- axis
1	13.6	(3.65	61.97	9.4		3.04
2	10.2	(3.16	53.78	7.3		2.68
3	8.5	2	2.89	49.17	5.5		2.32
4	6.2	2	2.47	42.12	3.6		1.88
5	3.6		1.88	32.29	2.0		1.40
By Linear Regr	ession of Y on X	ζ.					
Slope, mw =	0.0569	_		Intercept, bw :	-0.458	36	
Correlation	coefficient* =	0.	.9968	_			
*If Correlation C	Coefficient < 0.99	00, check and rec	calibrate.				
			Set Point (Calculation			
From the TSP Fi	ield Calibration C	Curve, take Qstd					
From the Regres	ssion Equation, th	ne "Y" value acco	ording to				
			$Qstd + bw = [\Delta W]$	(D- /7(0) (2	100 /TF - \11/2		
		mw x C	$\mathbf{Qstd} + \mathbf{bw} = \mathbf{L}\mathbf{\Delta W}$	x (Pa//60) x (2	(98/1a)]		
Therefore, Se	et Point; W = (m	w x Qstd + bw)	2 x (760 / Pa) x (Ta / 298) =	4.02		
Remarks:							
							_
Conducted by:	Wong Sh	ing Kwai	Signature:	Xr	JC JC	Data	4-Jul-24
conducted by.	wong an	mg ixwai	. Signature:		, •	Date.	→ -Ju1-∠+
Checked by:	Henry	Leung	Signature:	\-lem	, Don	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 4-Jul-24 Next Due Date: 4-Sep-24 Date: Operator: SK Equipment No.: A-01-55 Model No.: TE 5170 Serial No. 1956 **Ambient Condition** 303.2 Temperature, Ta (K) Pressure, Pa (mmHg) 758.9 **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 1 13.5 3.64 61.75 9.5 3.05 2.71 2 11.3 3.33 56.57 7.5 3.04 51.67 2.41 4 5.5 2.32 39.72 3.1 1.74 32.29 2.1 1.44 5 3.6 1.88 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 x Qstd + bw = $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Therefore, Set Point; $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) = 3.97$ Remarks: Conducted by: Wong Shing Kwai Checked by: Henry Leung

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET



File No. MA20003/04/0025

Project No.	KER 1 - Future	Residential Deve	elopment at Kerry (Godown		_	
Date:	10-Jul-24		10-Jul-24 Next Due Date:		Sep-24	Operator:	SK
Equipment No.:	A-0	01-04		Model No.: TE 5170		Serial No.	10595
			Ambient C	ondition			
Temperatu	re, Ta (K)	303.6	Pressure, Pa			756.5	
-							
		Or	ifice Transfer Star	ndard Informa	ation		
Serial	l No.	3864	Slope, mc	0.05976	Intercept		-0.05018
Last Calibra	ation Date:	15-Jan-24			$c = [\Delta H \times (Pa/760]]$		
Next Calibr	ation Date:	14-Jan-25	($\mathbf{Qstd} = \{ [\Delta \mathbf{H} \ \mathbf{x}] \}$	(Pa/760) x (298/7	Γa)] ^{1/2} -bc} / m	c
			G 19 41 65	EGD G I			
		0-	Calibration of	ISP Sampler		IIVC	
Calibration	ΔH (orifice),		fice	Qstd (CFM)	ΔW (HVS), in.	HVS	50) x (298/Ta)] ^{1/2}
Point	in. of water	[ΔH x (Pa/76	$(50) \times (298/Ta)]^{1/2}$	X - axis	of water		oo) x (298/1a)] '-axis
1	13.4		3.62	61.39	9.0		2.97
2	10.6		3.22	54.69	7.1		2.63
3	8.6		2.90	49.35	5.3		2.28
4	5.5		2.32	39.63	3.4		1.82
5	3.7		1.90	32.66	2.1		1.43
By Linear Regr Slope , mw = Correlation		<u> </u>	. 9989	Intercept, bw :	-0.306	66	
*If Correlation C	Coefficient < 0.99	90, check and rec	calibrate.	•			
			Set Point Ca	alculation			
		Curve, take Qstd	= 43 CFM				
om me regies			-				
		mw x Q	$\mathbf{Qstd} + \mathbf{bw} = [\Delta \mathbf{W} \ \mathbf{x}]$	(Pa/760) x (29	98/Ta)] ^{1/2}		
Therefore, Se	et Point; W = (m	nw x Qstd + bw)	² x (760 / Pa) x (7	Га / 298) =	4.03		
Remarks:							
Conducted by:	Wong Sl	ning Kwai	Signature:	K	<u> </u>	Date:	10-Jul-24
				1 0			
Checked by:	Henry	Leung	Signature:	\-Pa.	~ Kon	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 (Childre	en's Hospital)			
Date:	10-J	Jul-24	Next Due Date:	10-Sep-24 TE-5170		Operator:	SK
Equipment No.:	A-()1-44	-			- -	1316
			Ambient C	ondition			
Temperatu	re, Ta (K)	303.6	Pressure, Pa			756.5	
*	, , , ,		,	<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>			
		Or	ifice Transfer Star	ndard Informa	ntion		
Serial	l No.	3864	Slope, mc	0.05976	Intercept		-0.05018
Last Calibra	ation Date:	15-Jan-24			$c = [\Delta H \times (Pa/760]]$		
Next Calibr	ation Date:	14-Jan-25		$Qstd = \{ [\Delta H \ x] \}$	(Pa/760) x (298/7	Γa)] ^{1/2} -bc} / n	nc
			Calibration of T	FCD Camplan			
		Or	fice	i or Sampler		HVS	
Calibration Point	ΔH (orifice), in. of water		50) x (298/Ta)] ^{1/2}	Qstd (CFM) X - axis	ΔW (HVS), in. of water	[ΔW x (Pa/7	760) x (298/Ta)] ^{1/2} Y-axis
1	13.8		3.67	62.28	9.7		3.08
2	11.2		3.31	56.19	7.5		2.71
3	9.1		2.98	50.74	5.7		2.36
4	6.4		2.50	42.68	3.9		1.95
5	3.8		1.93	33.08	2.2		1.47
Slope , mw = Correlation	coefficient* =	_	.9986	intercept, bw	-0.381	.9	
			G + P + + G				
From the Regres	ssion Equation, t			(Pa/760) x (29	98/Ta)] ^{1/2} 4.02		
Remarks: Conducted by:	Wong Si	hing Kwai	Signature:	\hat{\gamma}	<u></u>	Date:	10-Jul-24
Checked by:	Henry	Leung	Signature:	\-lem	<u>y</u> (X2)	Date:	10-Jul-24

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET



File No. MA20003/41/0025 KTD 2D - Next to the SOR Office of Trunk Road T2 in Kai Tak Area Project No. 10-Jul-24 Next Due Date: 10-Sep-24 Operator: SK Date: Equipment No.: _____ A-01-41 Model No.: TE 5170 Serial No. 5280 **Ambient Condition** Temperature, Ta (K) 303.6 Pressure, Pa (mmHg) 756.5 **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 62.73 1 14.0 3.70 9.6 3.06 8.4 2.86 2 11.5 3.35 56.93 9.5 3.05 51.82 6.4 2.50 2.62 4 7.0 44.60 4.5 2.10 2.2 1.47 5 3.8 1.93 33.08 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 x Qstd + bw = $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Therefore, Set Point; $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 4.18 Remarks: Conducted by: Wong Shing Kwai

Checked by: Henry Leung