High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET



						File No. N	MA20003/18/024
Project No.	CKL 1 - Flat 121	Cha Kwo Ling	Village				
Date:	4-Jai	n-24	Next Due Date:	4-N	1ar-24	Operator:	SK
Equipment No.:	A-01	-18	Model No.:	TE	5170	Serial No.	0723
			Ambient				
Temperatur	re, Ta (K)	290	Pressure, Pa	(mmHg)		765.7	
		Or	rifice Transfer Sta	andard Inform	ation		
Serial	No.	3864	Slope, mc	0.05928	Intercept	t, bc	-0.03491
Last Calibra	tion Date:	16-Jan-23		mc x Qstd + b	$c = [\Delta H \times (Pa/76)]$	0) x (298/Ta)] ^{1/2}	2
Next Calibra	ation Date:	16-Jan-24		$\mathbf{Qstd} = \{ [\Delta \mathbf{H} \ \mathbf{x}] \}$	x (Pa/760) x (298/	/Ta)] ^{1/2} -bc} / m	c
I			Calibration of	TSP Sampler		******	
Calibration	ΔH (orifice),		fice	Qstd (CFM)	AW (HVS) in	HVS	x (298/Ta)] ^{1/2} Y-
Point	in. of water	[ΔH x (Pa/76	0) x (298/Ta)] ^{1/2}	X - axis	of water		axis
1	13.6	3	3.75	63.89	9.6	3	3.15
2	10.2	3	3.25	55.41	7.6	,	2.81
3	8.5	2	2.97	50.63	5.6	2	2.41
4	6.3	2	2.55	43.67	3.6		1.93
5	3.4		1.88	32.24	2.0		1.44
Dr. I inaan Dagu	ession of Y on X						
Slope , mw =		•		Intercent hw:	-0.431	3	
Correlation of		- 0.	9930	intercept, 5 m	0.101		
	Coefficient < 0.99			_			
		,					
			Set Point (Calculation			
	eld Calibration C	_					
From the Regress	sion Equation, th	e "Y" value acco	ording to				
		mw x ($\mathbf{Qstd} + \mathbf{bw} = [\Delta \mathbf{W}]$	x (Pa/760) x (2	$(98/Ta)1^{1/2}$		
					,		
Therefore, Se	et Point; W = (m	$w \times Qstd + bw$	2 x (760 / Pa) x ($^{\prime}$	Ta / 298) =	3.86		
Remarks:							
•				10			
Conducted by:	Wong Sh	ing Kwai	Signature:		<u> </u>	Date:	4-Jan-24
•						·	
Checked by:	Henry	Leung	Signature:	-lem	, Don	Date:	4-Jan-24

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET



File No. MA20003/55/024 Project No. CKL 2 - Flat 103 Cha Kwo Ling Village 4-Jan-24 Next Due Date: 4-Mar-24 Operator: SK Date: Equipment No.: A-01-55 Model No.: TE 5170 Serial No. 1956 **Ambient Condition** 290 Temperature, Ta (K) Pressure, Pa (mmHg) 765.7 **Orifice Transfer Standard Information** 0.05928 Intercept, bc 3864 Slope, mc -0.03491 Serial No. $mc \times Ostd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ Last Calibration Date: 16-Jan-23 Qstd = $\{ [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} -bc \} / mc$ 16-Jan-24 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 13.6 3.75 63.89 9.9 3.20 11.3 7.9 2 3.42 58.29 2.86 53.21 3.12 6.2 2.53 4 5.6 2.41 41.21 3.0 1.76 3.5 2.0 1.44 5 1.90 32.70 By Linear Regression of Y on X Slope , mw = 0.0580 Intercept, bw : -0.5302 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 x Qstd + bw = $[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ Therefore, Set Point; $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ 3.72 Remarks: Conducted by: Wong Shing Kwai Checked by: Henry Leung

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET



File No. MA20003/04/0022

Project No.	KER 1 - Future	Residential Deve	elopment at Kerry (Godown			
Date:	ate: 10-Jan-24 quipment No.: A-01-04		Next Due Date:	10-Mar-24		Operator:	SK
Equipment No.:			Model No.:	TE	E 5170	Serial No.	10595
			Ambient C	ondition			
Temperatu	re, Ta (K)	293.3	Pressure, Pa			764	
•	•			·			
		Or	ifice Transfer Star	ndard Informa	ition		
Serial	l No.	3864	Slope, mc	0.05928	Intercept		-0.03491
Last Calibra	ation Date:	16-Jan-23			$c = [\Delta H \times (Pa/760]]$		
Next Calibr	ation Date:	16-Jan-24		$Qstd = \{ [\Delta H \ x] \}$	(Pa/760) x (298/7	Γa)] ^{1/2} -bc} / m	c
			Calibration of	FCD Commiss			
	l	0-	Calibration of	1 SP Sampler		HVC	
Calibration	ΔH (orifice),		fice	Qstd (CFM)	ΔW (HVS), in.	HVS	50) x (298/Ta)] ^{1/2}
Point	in. of water	[ΔH x (Pa/76	(60) x (298/Ta)] ^{1/2}	X - axis	of water		-axis
1	13.1		3.66	62.29	9.3		3.08
2	10.4		3.26	55.57	7.2		2.71
3	8.4		2.93	50.00	5.6		2.39
4	5.3		2.33	39.84	3.5	1.89	
5	3.5		1.89	32.48	2.1		1.46
Slope , mw = Correlation	coefficient* =	<u> </u>	.9997	Intercept, bw	-0.272	24	
			Set Point Ca	alculation			
		Curve, take Qstd					
From the Regres	sion Equation, th	ne "Y" value acco	ording to				
		mw x Q	$\mathbf{pstd} + \mathbf{bw} = [\mathbf{\Delta W} \ \mathbf{x}]$	(Pa/760) x (29	$[0.8]^{1/2}$		
Therefore, Se	et Point; W = (m	nw x Qstd + bw)	2 x (760 / Pa) x (2	$\Gamma a / 298) =$	4.06		
Remarks:							
				h	<u> </u>		
Conducted by:	Wong Sh	ning Kwai	Signature:		<u> </u>	Date:	10-Jan-24
				1 ~	•		
Checked by:	Henry	Leung	Signature:	\Pa.	2 Xon	Date:	10-Jan-24

High-Volume TSP Sampler

5-POINT CALIBRATION DATA SHEET



File No. MA20003/44/0021

Project No.	KTD1 - Centre	of Excellence in	Paediatrics (Childr	en's Hospital)			
Date:	te: 10-Jan-24 uipment No.: A-01-44		Next Due Date:	ext Due Date: 10-Mar-24		Operator:	SK
Equipment No.:			Model No.:	TE	E-5170	Serial No.	1316
			Ambient C	ondition			
Temperatu	re, Ta (K)	293.3	Pressure, Pa			764	
		Or	ifice Transfer Star	ndard Informa	tion		
Serial	l No.	3864	Slope, mc	0.05928	Intercept		-0.03491
Last Calibra	ation Date:	16-Jan-23			$c = [\Delta H \times (Pa/760)]$		
Next Calibra	ation Date:	16-Jan-24	($Qstd = \{ [\Delta H \ x]$	(Pa/760) x (298/7	Γa)] ^{1/2} -bc} / m	c
			Calibration of C	FCD Commiss			
	<u> </u>	Or	Calibration of T	18P Sampler		HVS	
Calibration Point	ΔH (orifice),		(0) x (298/Ta)] ^{1/2}	Qstd (CFM)	ΔW (HVS), in.		50) x (298/Ta)] ^{1/2}
	in. of water	[ДП Х (Ра//б	10) X (290/1a)]	X - axis	of water		-axis
1	13.3		3.69	62.76	9.5		3.11
2	11.0		3.35	57.13	7.3		2.73
3	8.8		3.00	51.16	5.5		2.37
4	6.2		2.52	43.04	3.7	1.94	
5	3.7		1.94	33.38	2.3		1.53
By Linear Regr Slope , mw =	0.0536	<u> </u>	1	Intercept, bw :	-0.316	53	
Correlation	coefficient* =	0	.9956				
*If Correlation C	Coefficient < 0.99	90, check and rec	alibrate.				
			Set Point Ca	alculation			
From the TSP Fi	eld Calibration (Curve, take Qstd		-			
From the Regres	sion Equation, th	ne "Y" value acco	ording to				
					1/2		
		mw x Q	$\mathbf{pstd} + \mathbf{bw} = [\Delta \mathbf{W} \ \mathbf{x}]$	(Pa/760) x (29	08/Ta)] ^{1/2}		
Therefore, Se	et Point; W = (m	w x Qstd + bw)	² x (760 / Pa) x (7	Γa / 298) =	3.88		
Remarks:							
G 1	***	. 17	<u> </u>	X	<u>λ</u>	-	10.7. 24
Conducted by:	Wong Sh	ning Kwai	Signature:			Date:	10-Jan-24
Checked by:	Henry	Leung	Signature:	1-8	- Mar	Date:	10-Jan-24

High-Volume TSP Sampler 5-POINT CALIBRATION DATA SHEET



File No. MA20003/41/0022

Project No.	KTD 2D - Next	to the SOR Offic	ce of Trunk Road T	2 in Kai Tak A	irea		
Date:	10-Jan-24		Next Due Date:	10-1	Mar-24	Operator:	SK
Equipment No.:	A-0	01-41	Model No.:	TE	E 5170	Serial No.	5280
			Ambient C	ondition			
Temperatur	re, Ta (K)	299.9	Pressure, Pa			762.1	
			ifice Transfer Star			<u> </u>	
Serial		3864	Slope, mc	0.05928	Intercept		-0.03491
Last Calibra		16-Jan-23			$c = [\Delta H \times (Pa/760)]$		
Next Calibra	ation Date:	16-Jan-24		$Qstd = \{ [\Delta H \ x] \}$	(Pa/760) x (298/7	[a)]bc} / mc	
			Calibration of T	TSP Sampler			
		Or	fice	i or bampier		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/760	0) x (298/Ta)] ^{1/2} axis
1	13.8		3.71	63.14	9.4	3	.06
2	11.3		3.36	57.19	8.4	2	.89
3	9.3		3.04	51.94	6.2	2	.49
4	6.9		2.62	44.82	4.1	2	.02
5	3.9		1.97	33.84	2.2	1	.48
By Linear Regr Slope , mw = Correlation		_	.9941	Intercept, bw	-0.454	3	
*If Correlation C	Coefficient < 0.9	90, check and rec	calibrate.				
			Set Point Ca	alculation			
From the TSP Fi	eld Calibration (Curve, take Qstd	= 43 CFM				
From the Regress	sion Equation, tl	ne "Y" value acco	ording to				
		mw x Q	$\mathbf{Qstd} + \mathbf{bw} = [\mathbf{\Delta W} \ \mathbf{x}]$	(Pa/760) x (29	98/Ta)] ^{1/2}		
Therefore, Se	et Point; W = (n	nw x Qstd + bw)	² x (760 / Pa) x (7	Γa / 298) =	3.94		
Remarks:							
Conducted by:	nducted by: Wong Shing Kwai Signature: Date: 10-Jan-24						
Checked by:	Henry	Leung	Signature:	\-len	J May	Date:	10-Jan-24



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 .	r=	0.99998	

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

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	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



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-Aug-2023</u>

Next Due Date <u>18-Feb-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	1.5	0.0
2.5	2.4	0.1
4.0	3.9	0.1

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.: <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