# **High-Volume TSP Sampler** 5-POINT CALIBRATION DATA SHEET



						File No. N	MA20003/18/025
Project No.	CKL 1 - Flat 12	1 Cha Kwo Ling	Village				
Date:		4-Mar-24 Ne.		: 4-N	1av-24	Operator:	SK
	A-0				5170		
Equipment 140	A-0	1-10	Wiodel Ivo.		7.5170	Schai No.	0723
			Ambient	Condition			
Temperatu	re, Ta (K)	292.7	Pressure, Pa	ı (mmHg)		759.3	
			rifice Transfer St				
Serial		3864	Slope, mc	0.05976	Intercep		-0.05018
Last Calibra		15-Jan-24			$c = [\Delta H \times (Pa/76)]$		
Next Calibrate	ation Date:	14-Jan-25		$Qstd = \{ [\Delta H] \}$	x (Pa/760) x (298	/Ta)]** -bc} / m	<u>c</u>
		•	Calibration of	f TSP Sampler			
G 111 - 1		Or	fice	151 Sumpler		HVS	
Calibration Point	ΔH (orifice), in. of water		50) x (298/Ta)] <sup>1/2</sup>	Qstd (CFM) X - axis	ΔW (HVS), in. of water	[ΔW x (Pa/760)	) x (298/Ta)] <sup>1/2</sup> <b>Y- axis</b>
1	13.7		3.73	63.31	9.4	3	3.09
2	10.3	,	3.24	55.00	7.3		2.72
3	8.6		2.96	50.33	5.5	2	2.37
4	6.3		2.53	43.20	3.6	1	1.91
5	3.7		1.94	33.30	2.0	1	1.43
Bv Linear Regr	ression of Y on Y	<b>X</b>					
Slope, mw =				Intercept, bw :	-0.503	35	
Correlation			.9968	_			
*If Correlation C	Coefficient < 0.99	90, check and rec	calibrate.				
				Calculation			
	ield Calibration (	-					
from the Regres	ssion Equation, th	ne "Y" value acco	ording to				
		mw x (	$\mathbf{Qstd} + \mathbf{bw} = [\mathbf{\Delta W}]$	x (Pa/760) x (2	298/Ta)] <sup>1/2</sup>		
			2				
Therefore, Se	et Point; $W = (m)$	nw x Qstd + bw)	<sup>2</sup> x ( 760 / Pa ) x (	Ta / 298) =	3.77		
Remarks:							_
				h	-λ		
Conducted by:	Wong Sh	ning Kwai	Signature	:	<u> </u>	Date:	4-Mar-24
				1 0	<u>,</u> X27		
Checked by:	Henry	Leung	Signature	: \-lem	, 0007	Date:	4-Mar-24

## 5-POINT CALIBRATION DATA SHEET



						File No.	MA20003/55/025
Project No.	CKL 2 - Flat 10	3 Cha Kwo Ling	Village			,	
Date:	4-M	ar-24	Next Due Date:	4-N	1ay-24	Operator:	SK
Equipment No.:	A-0	1-55	Model No.:	TE	5170	Serial No.	1956
	T. (T.)	202.7	Ambient C			750.2	
Temperatur	re, Ta (K)	292.7	Pressure, Pa	(mmHg)		759.3	
		Ori	ifice Transfer Star	ndard Informa	ntion		
Serial	No.	3864	Slope, mc	0.05976	Intercept	, bc	-0.05018
Last Calibra	ation Date:	15-Jan-24	1	mc x Qstd + bo	$c = [\Delta H \times (Pa/760)]$	) x (298/Ta)] <sup>1/</sup>	2
Next Calibra	ation Date:	14-Jan-25		$Qstd = \{ [\Delta H \ x] $	(Pa/760) x (298/7	Γa)] <sup>1/2</sup> -bc} / m	ıc
			~				
		^	Calibration of	TSP Sampler		**************************************	
Calibration	ΔH (orifice),		fice	Qstd (CFM)	ΔW (HVS), in.	HVS	60) x (298/Ta)] <sup>1/2</sup>
Point	in. of water	[ΔH x (Pa/76	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$		of water		00) x (298/1a)] Z <b>-axis</b>
1	13.7		3.73	63.31	9.8		3.16
2	11.4	,	3.41	57.82	7.8		2.82
3	9.5		3.11	52.86	6.1		2.49
4	5.7		2.41	41.13	3.1	1.78	
5	3.6		1.91	32.86	2.0		1.43
By Linear Regr		X					
Slope, mw =		_		Intercept, bw =	-0.530	5	
	coefficient* =		.9975	<u>-</u>			
*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 Regress	sion Equation, th	ne "Y" value acco	ording to				
				(D. /5(0) (20	no /m >11/2		
		mw x Q	$\mathbf{pstd} + \mathbf{bw} = [\Delta \mathbf{W} \ \mathbf{x}]$	(Pa/760) x (25	/8/1a)]		
Therefore, Se	et Point; W = ( m	nw x Qstd + bw )	<sup>2</sup> x ( 760 / Pa ) x ( 7	Γa / 298 ) =	3.75		
Remarks:							
Comunic.							
,							
Conducted 1	W 01		O!-	XI	h	Der	4 M 04
Conducted by:	Wong Sh	ning Kwai	Signature:			Date:	4-Mar-24
Cl. 1 11	**	Τ	a:	10	N. ~ ~	ъ.	434 04
Checked by:	Henry	Leung	Signature:	- tem	7 mon 7	Date:	4-Mar-24

#### 5-POINT CALIBRATION DATA SHEET



CINOTECHA

						File No. 1	MA20003/04/0023
Project No.	KER 1 - Future	Residential Deve	elopment at Kerry C	Godown			
Date:	10-M	Iar-24	Next Due Date:	10-1	May-24	Operator:	SK
Equipment No.:	A-0	1-04	Model No.:	TE	5170	Serial No.	10595
	I		Ambient C				
Temperatur	re, Ta (K)	289	Pressure, Pa	(mmHg)		765.8	
		Ori	fice Transfer Star	ndard Informa	ntion		
Serial	No.	3864	Slope, mc	0.05976	Intercept	t, bc	-0.05018
Last Calibra		15-Jan-24		nc x Qstd + bo	$c = [\Delta H \times (Pa/760)]$		/2
Next Calibra	ation Date:	14-Jan-25	(	$Qstd = \{ [\Delta H x] \}$	(Pa/760) x (298/7	Γa)] <sup>1/2</sup> -bc} / m	nc
			Calibration of T	TSP Sampler		*****	
Calibration	ΔH (orifice),		fice	Qstd (CFM)	AW/ (TWC) :	HVS	60) ** (200/TE-\)1/2
Point	in. of water	[ΔH x (Pa/76	[ΔH x (Pa/760) x (298/Ta)] <sup>1/2</sup>		$\Delta$ W (HVS), in. of water		60) x (298/Ta)] <sup>1/2</sup> Y-axis
1	13.4	,	3.73	63.28	9.2		3.09
2	10.7	,	3.33	56.63	7.3		2.75
3	8.6		2.99	50.86	5.5		2.39
4	5.5		2.39	40.84	3.6	1.93	
5	3.7		1.96	33.65	2.3		1.55
-	ession of Y on X	<b>K</b>	_				
<b>-</b> /	0.0519	_		ntercept, bw =	-0.204	4	
	coefficient* =		9991				
II Correlation C	oemcient < 0.99	90, check and rec	anorate.				
			Set Point Ca	lculation			
From the TSP Fi	eld Calibration C	Curve, take Qstd	= 43 CFM				
From the Regres	sion Equation, th	ne "Y" value acco	ording to				
			FAXX	(D- /7(0) (20	10/T- \11/2		
		mw x Q	$\mathbf{std} + \mathbf{bw} = [\Delta \mathbf{W} \ \mathbf{x}]$	(Pa//60) X (25	/ <b>o</b> /1a)]		
Therefore, Se	et Point; W = ( m	w x Qstd + bw)	<sup>2</sup> x ( 760 / Pa ) x ( 7	Ta / 298) =	3.96		
Remarks:							
Comunic.							
					•		
Conducted by:	Wone Cl	ing Vwei	C:anatura.	X	<b>γ</b>	Data	10-Mar-24
Conducted by:	wong Sn	ning Kwai	Signature:		<i>)</i>	Date:	10-Mar-24
Checked by	Henry	Leung	Signature:	\_P_	- Mar	Date:	10-Mar-24
Checked by.		Louis	Signature.	1 cem	~, · · ·		10 14101-27

## 5-POINT CALIBRATION DATA SHEET



File No. MA20003/44/0022

Project No.	KTD1 - Centre	of Excellence in	Paediatrics (Childr	en's Hospital)		_	
Date:	10-M	Iar-24	Next Due Date:	10-May-24		Operator:	SK
Equipment No.:	A-0	1-44	Model No.:	TE	E-5170	Serial No.	1316
			Ambient C	ondition			
Temperatu	re Ta (K)	289	Pressure, Pa			765.8	
Temperatu	10, 14 (11)	20)	Trossure, ru	(15)		700.0	
		Or	ifice Transfer Sta	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 Calibra	ation Date:	14-Jan-25		$Qstd = \{ [\Delta H \ x ] \}$	(Pa/760) x (298/	Γa)] <sup>1/2</sup> -bc} / m	c
	<u> </u>		Calibration of	TSP Sampler		HYG	
Calibration	ΔH (orifice),		fice	Qstd (CFM)	ΔW (HVS), in.	HVS	50) x (298/Ta)] <sup>1/2</sup>
Point	in. of water	[ΔH x (Pa/76	$(50) \times (298/Ta)]^{1/2}$	X - axis	of water		50) x (298/1a)] '-axis
1	13.6		3.76	63.74	9.7		3.17
2	11.3		3.43	58.18	7.5		2.79
3	9.0		3.06	52.01	5.7		2.43
4	6.4		2.58	43.99	3.9		2.01
5	3.9		2.01	34.52	2.3		1.55
Slope , mw =	ression of Y on Y 0.0552 coefficient* =	<u> </u>	. <b>9980</b>	Intercept, bw :	-0.394	15	
		90, check and rec		-			
			Set Point Ca	alculation			
		Curve, take Qstd ne "Y" value acco mw x Q		: (Pa/760) x (29	98/Ta)] <sup>1/2</sup>		
Therefore, Se	et Point; W = ( m	nw x Qstd + bw)	<sup>2</sup> x ( 760 / Pa ) x ( 7	Γa / 298 ) =	3.77		
Remarks:							
Conducted by:	Wong Sh	ning Kwai	Signature:	<u> </u>	<u> </u>	Date:	10-Mar-24
Checked by:	Henry	I eung	Signature:	1-0	- X227	Date:	10-Mar-24

## 5-POINT CALIBRATION DATA SHEET



File No. MA20003/41/0023

Project No.	KTD 2D - Next	to the SOR Offic	ce of Trunk Road T	2 in Kai Tak A	rea		
Date:	10-Mar-24		Next Due Date:	10-1	10-May-24		SK
Equipment No.:	A-0	1-41	Model No.:	TE	E 5170	Serial No.	5280
			Ambient C	ondition			
Temperatui	re, Ta (K)	289	Pressure, Pa	(mmHg)		765.8	
-							
		Or	ifice Transfer Star	ndard Informa	ation		
Serial	No.	3864	Slope, mc	0.05976	Intercept	t, bc	-0.05018
Last Calibra	ation Date:	15-Jan-24	r	nc x Qstd + bo	$c = [\Delta H \times (Pa/760)]$	) x (298/Ta)] <sup>1/</sup>	2
Next Calibra	ation Date:	14-Jan-25	•	$Qstd = \{ [\Delta H \ x ] \}$	(Pa/760) x (298/7	Γa)] <sup>1/2</sup> -bc} / m	c
	-						
			Calibration of T	TSP Sampler			
Calibration		Or	fice			HVS	
Point	$\Delta H$ (orifice), in. of water	[ΔH x (Pa/76	50) x (298/Ta)] <sup>1/2</sup>	Qstd (CFM) X - axis	ΔW (HVS), in. of water		50) x (298/Ta)] <sup>1/2</sup> 7-axis
1	14.0		3.81	64.66	9.6		3.16
2	11.5		3.46	58.68	8.6		2.99
3	9.5		3.14	53.41	6.4		2.58
4	7.0		2.70	45.97	4.5		2.16
5	4.0		2.04	34.95	2.2	1.51	
By Linear Regr Slope , mw = Correlation o *If Correlation C	0.0573 coefficient* =	0	.9955 calibrate.	intercept, bw	-0.474		
E 4 EGD E	11.6.17		Set Point Ca	lculation			
From the TSP Fig From the Regress		_					
		mw x Q	$\mathbf{Qstd} + \mathbf{bw} = [\mathbf{\Delta W} \ \mathbf{x}]$	(Pa/760) x (29	<b>98/Ta</b> )] <sup>1/2</sup>		
Therefore, Se	et Point; W = ( m	w x Qstd + bw)	<sup>2</sup> x ( 760 / Pa ) x ( 7	Γa / 298 ) =	3.81	_	
Remarks:							
Conducted by:	Wong Sh	ing Kwai	Signature:	K	<u> </u>	Date:	10-Mar-24
Checked by:	Henry	Leung	Signature:	\-lan	J Kong	Date:	10-Mar-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			
<b>QSTD</b>	b= -0.05043		QA	b=	-0.03134			
	r=	0.99998	4 1	r=	0.99998			

Calculations					
Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	Va=	ΔVol((Pa-ΔP)/Pa)		
Qstd=	std= Vstd/∆Time		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: calibrate	ΔH: calibrator manometer reading (in H2O)					
ΔP: rootsme	ter 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

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-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