



ANNEX D1

CALIBRATION CERTIFICATES FOR DUST
MONITORING EQUIPMENT

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1				Date of Calibration:		9-Aug-25	
Name and Model : TISCH HVS Model TE-5170				Next Calibration Date:		9-Oct-25	
				Operator:		P.F.Yeung	

CONDITIONS							
				1015	Corrected Pressure (mm Hg)		757.9
Temperature (°C)				33.0	Temperature (K)		306.0

CALIBRATION ORIFICE							
Make:				TISCH	Qstd Slope		2.08315
Model:				TE-5025A	Qstd Intercept		-0.04938
Serial#:				2454			

CALIBRATION							
Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	4.9	4.9	9.8	1.505	51	50.26	Slope= 32.779 Intercept= 1.301 Corr. Coeff.= 0.9991
13	3.9	3.9	7.8	1.345	46	45.33	
10	2.8	2.8	5.6	1.143	40	39.42	
7	1.9	1.9	3.8	0.946	33	32.52	
5	1.1	1.1	2.2	0.725	25	24.64	

Calculations:

Qstd = $1/m[\text{Sqrt}(\text{H2O}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})) - b]$

IC = $I[\text{Sqrt}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})]$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$1/m((I) [\text{Sqrt}(298/\text{Tav})(\text{Pav}/760)] - b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Qstd (m3/min)	IC
0.725	24.64
0.946	32.52
1.143	39.42
1.345	45.33
1.505	50.26

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM2				Date of Calibration:		9-Aug-25	
Name and Model : TISCH HVS Model TE-5170				Next Calibration Date:		9-Oct-25	
				Operator:		P.F.Yeung	

CONDITIONS							
Sea Level Pressure (hpa)				1010		Corrected Pressure (mm Hg)	
Temperature (°C)				33.0		Temperature (K)	
				757.9			
				306.0			

CALIBRATION ORIFICE							
Make:				TISCH		Qstd Slope	
Model:				TE-5025A		Qstd Intercept	
Serial#:				2454		-0.04938	

CALIBRATION							
Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.8	5.8	11.6	1.635	53	52.23	Slope= 28.796 Intercept= 5.766 Corr. Coeff.= 0.9954
13	4.3	4.3	8.6	1.411	48	47.30	
10	3.4	3.4	6.8	1.257	42	41.39	
7	2.1	2.1	4.2	0.993	36	35.48	
5	1.3	1.3	2.6	0.787	28	27.59	

Calculations:

Qstd = $1/m[\text{Sqrt}(\text{H2O}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})) - b]$

IC = $I[\text{Sqrt}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})]$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$1/m((I)[\text{Sqrt}(298/\text{Tav})(\text{Pav}/760)] - b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM3	Date of Calibration:	9-Aug-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	9-Oct-25
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1010	Corrected Pressure (mm Hg)	757.9
Temperature (°C)	33.0	Temperature (K)	306.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.4	5.4	10.8	1.578	56	55.19	Slope= 28.490 Intercept= 9.840 Corr. Coeff.= 0.9908
13	4.5	4.5	9.0	1.443	51	50.26	
10	3.2	3.2	6.4	1.221	45	44.35	
7	2.1	2.1	4.2	0.993	40	39.42	
5	1.3	1.3	2.6	0.787	32	31.54	

Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

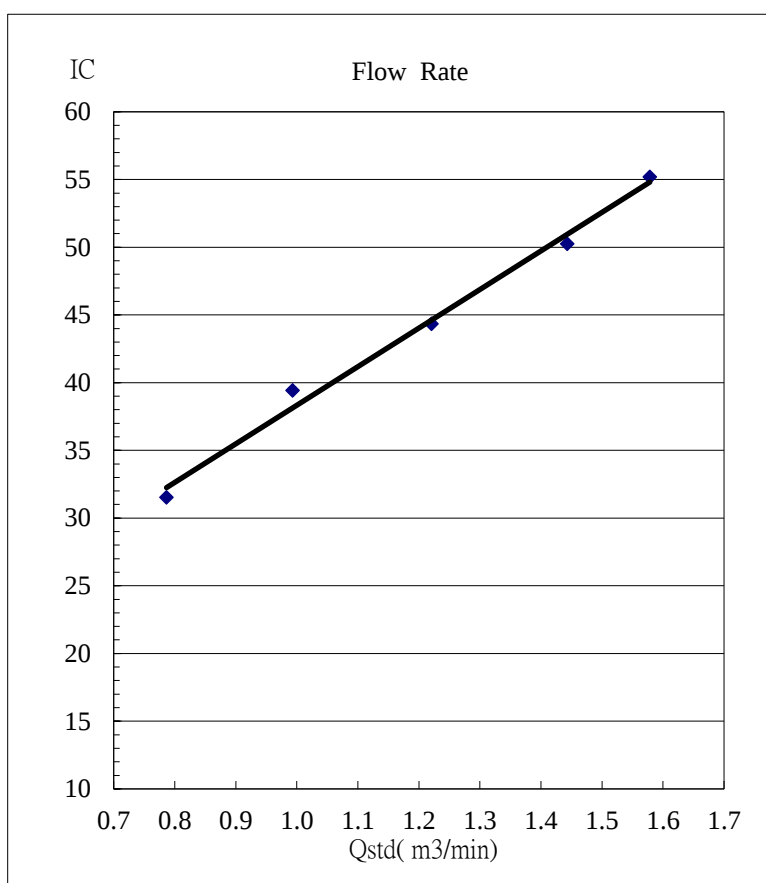
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM4	Date of Calibration:	9-Aug-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	9-Oct-25
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1010	Corrected Pressure (mm Hg)	757.9
Temperature (°C)	33.0	Temperature (K)	306.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.6	5.6	11.2	1.607	56	55.19	Slope= 29.982 Intercept= 7.137 Corr. Coeff.= 0.9992
13	4.4	4.4	8.8	1.427	51	50.26	
10	3.4	3.4	6.8	1.257	45	44.35	
7	2.1	2.1	4.2	0.993	38	37.45	
5	1.2	1.2	2.4	0.757	30	29.57	

Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

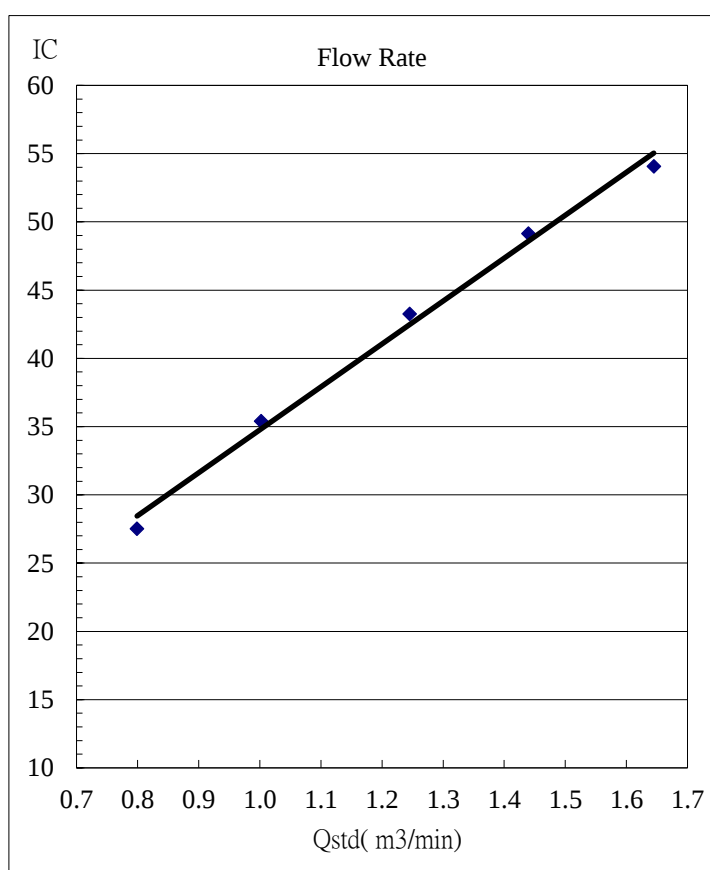
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1	Date of Calibration:	9-Oct-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	9-Dec-25
	Operator:	P.F.Yeung

CONDITIONS

	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	32.0	Temperature (K)	305.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.5	5.5	10.9	1.593	53	52.47	Slope= 30.289 Intercept= 5.351 Corr. Coeff.= 0.9951
13	4.0	4.0	8.0	1.368	48	47.52	
10	3.0	3.0	6.0	1.188	43	42.57	
7	2.0	2.0	4.0	0.974	35	34.65	
5	1.2	1.2	2.4	0.760	28	27.72	

Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

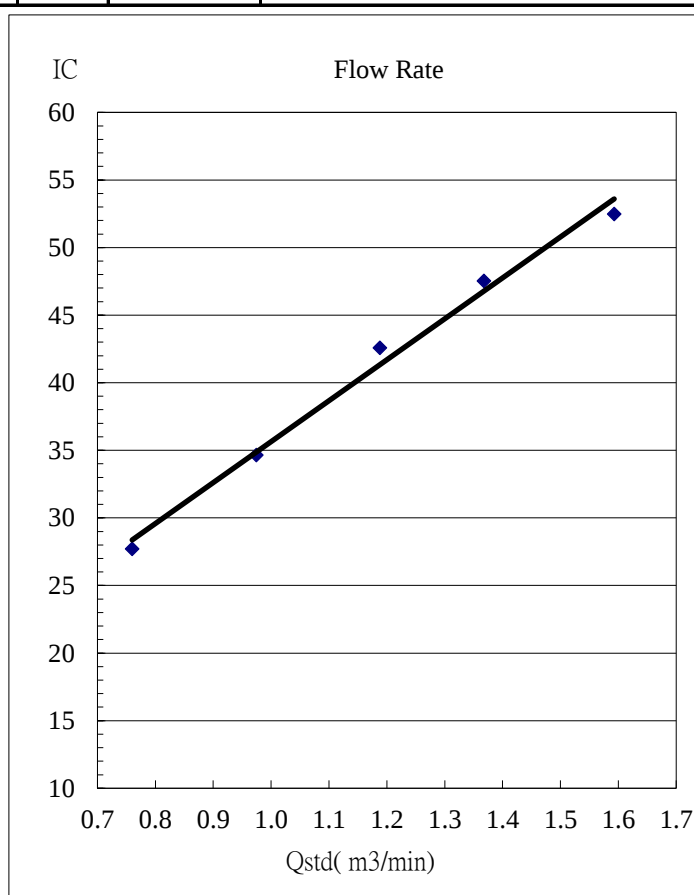
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM2				Date of Calibration:		9-Oct-25	
Name and Model : TISCH HVS Model TE-5170				Next Calibration Date:		9-Dec-25	
				Operator:		P.F.Yeung	

CONDITIONS							
Sea Level Pressure (hpa)				1016	Corrected Pressure (mm Hg)		762.1
Temperature (°C)				32.0	Temperature (K)		305.0

CALIBRATION ORIFICE							
Make:				TISCH	Qstd Slope		2.08315
Model:				TE-5025A	Qstd Intercept		-0.04938
Serial#:				2454			

CALIBRATION							
Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.5	5.5	11.0	1.600	53	52.47	Slope= 30.371 Intercept= 4.031 Corr. Coeff.= 0.9997
13	4.4	4.4	8.8	1.434	48	47.52	
10	3.4	3.4	6.8	1.263	43	42.57	
7	2.1	2.1	4.2	0.998	35	34.65	
5	1.3	1.3	2.6	0.790	28	27.72	

Calculations:

Qstd = $1/m[\text{Sqrt}(\text{H2O}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta}))-b]$

IC = $I[\text{Sqrt}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})]$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$1/m((I)[\text{Sqrt}(298/\text{Tav})(\text{Pav}/760)]-b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Qstd (m3/min)	IC
0.8	28
1.0	35
1.25	43
1.45	48
1.6	53

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM3	Date of Calibration:	9-Oct-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	9-Dec-25
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	32.0	Temperature (K)	305.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.5	5.5	11.0	1.600	57	56.43	Slope= 26.806 Intercept= 13.239 Corr. Coeff.= 0.9976
13	4.2	4.2	8.4	1.401	51	50.49	
10	3.2	3.2	6.4	1.226	46	45.54	
7	2.1	2.0	4.1	0.986	41	40.59	
5	1.3	1.2	2.5	0.775	34	33.66	

Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

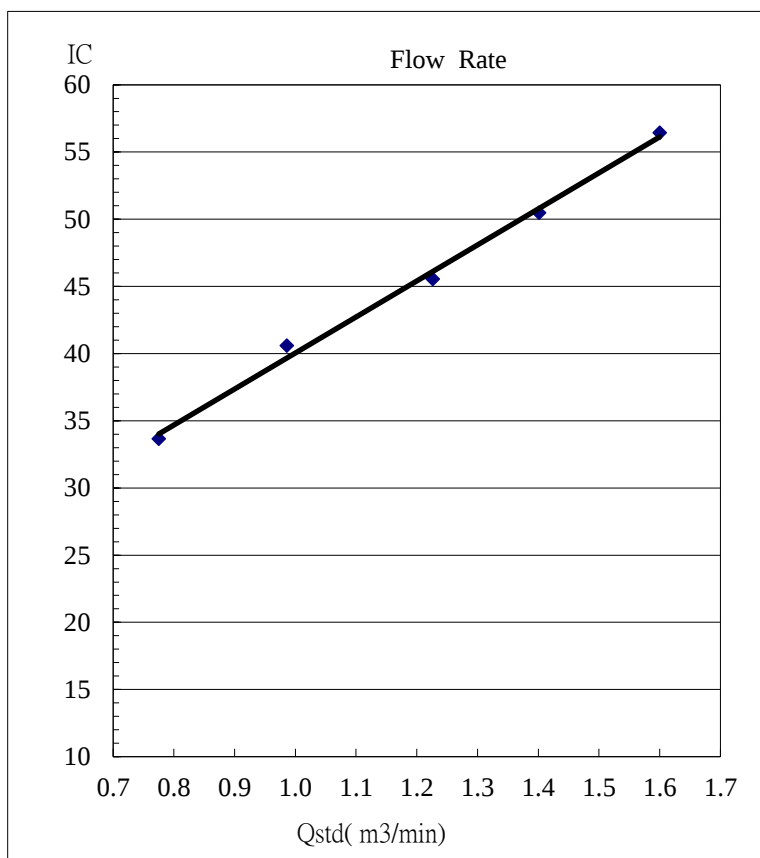
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM4	Date of Calibration:	9-Oct-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	9-Dec-25
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	32.0	Temperature (K)	305.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.8	5.7	11.5	1.635	56	55.44	Slope= 30.206 Intercept= 6.483 Corr. Coeff.= 0.9981
13	4.4	4.3	8.7	1.426	51	50.49	
10	3.5	3.5	7.0	1.281	45	44.55	
7	2.2	2.2	4.4	1.021	38	37.62	
5	1.3	1.2	2.5	0.775	30	29.70	

Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

