



ANNEX D1

CALIBRATION CERTIFICATES FOR DUST
MONITORING EQUIPMENT

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1	Date of Calibration:	22-Apr-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	22-Jun-24
	Operator:	P.F.Yeung

CONDITIONS

	1014	Corrected Pressure (mm Hg)	760.1
Temperature (°C)	25.0	Temperature (K)	298

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
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	1.600	52	52.03	Slope= 33.386 Intercept= -0.9831 Corr. Coeff.= 0.9974
13	4.4	4.4	8.8	1.446	47	47.03	
10	2.9	3.0	5.9	1.187	40	40.02	
7	2.2	2.2	4.4	1.027	33	33.02	
5	1.3	1.3	2.6	0.793	25	25.02	

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:

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

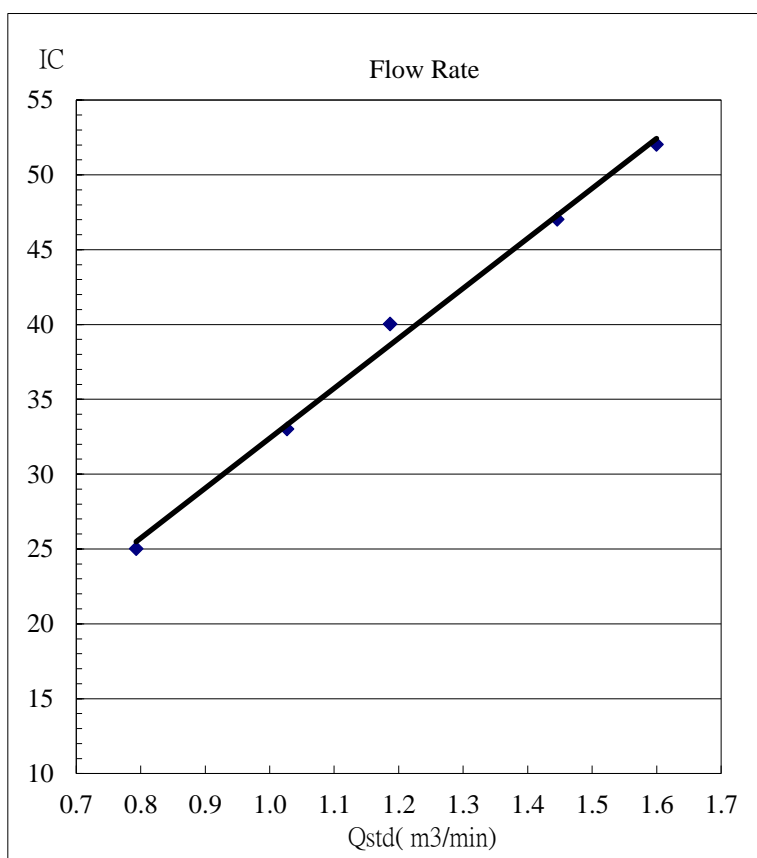
m = sampler slope

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:	22-Apr-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	22-Jun-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1014	Corrected Pressure (mm Hg)	760.1
Temperature (°C)	25.0	Temperature (K)	298

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.0	5.0	10.0	1.540	52	52.03	Slope= 30.764 Intercept= 3.559 Corr. Coeff.= 0.9953
13	4.3	4.3	8.6	1.429	47	47.03	
10	3.5	3.5	7.0	1.291	42	42.03	
7	2.1	2.1	4.2	1.004	35	35.02	
5	1.3	1.3	2.6	0.793	28	28.02	

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:

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

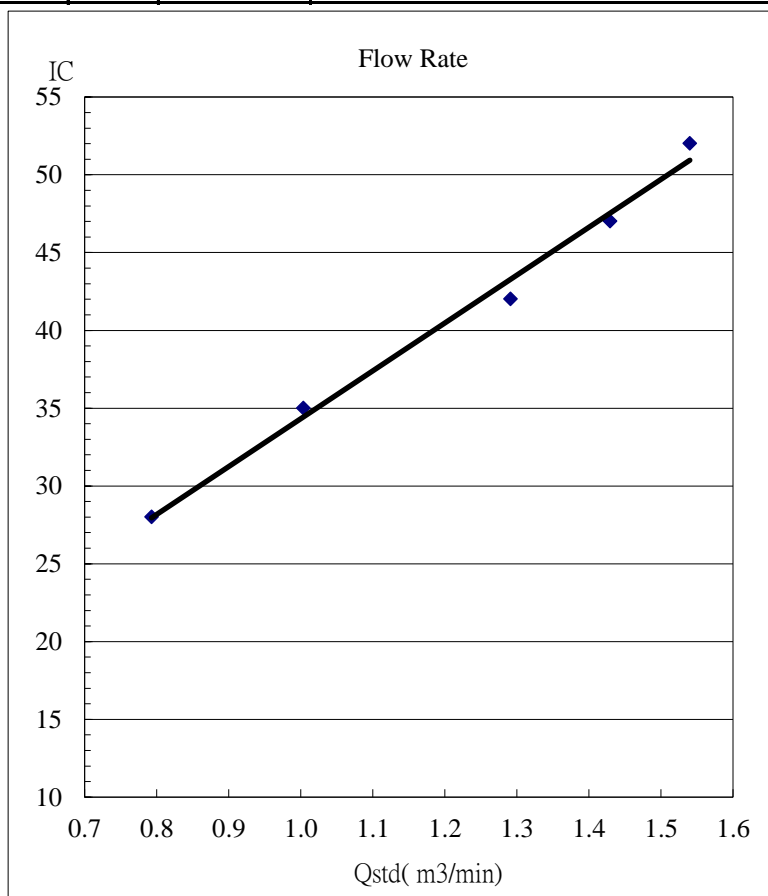
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM3	Date of Calibration:	22-Apr-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	23-Jun-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1014	Corrected Pressure (mm Hg)	760.1
Temperature (°C)	25.0	Temperature (K)	298

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
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	1.614	57	57.04	Slope= 26.552 Intercept= 14.177 Corr. Coeff.= 0.9952
13	4.2	4.2	8.4	1.413	52	52.03	
10	3.4	3.4	6.8	1.273	47	47.03	
7	2.1	2.1	4.2	1.004	42	42.03	
5	1.3	1.4	2.7	0.808	35	35.02	

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:

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

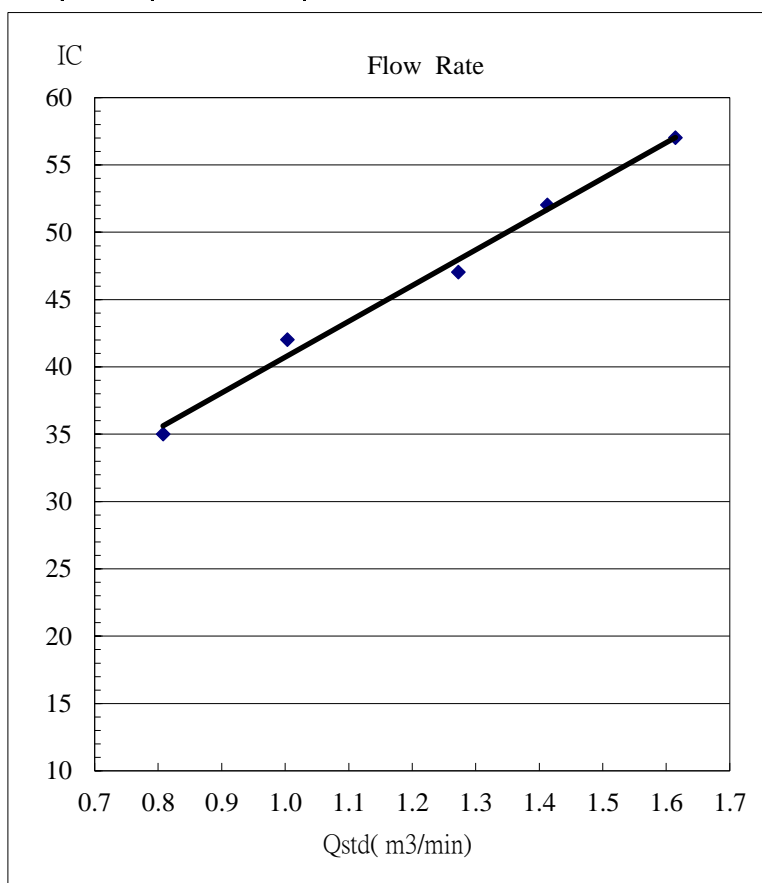
m = sampler slope

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:	22-Apr-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	23-Jun-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1014	Corrected Pressure (mm Hg)	760.1
Temperature (°C)	25.0	Temperature (K)	298

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.5	6.4	12.9	1.747	59	59.04	Slope= 32.028 Intercept= 2.6869 Corr. Coeff.= 0.9989
13	5.1	5.2	10.3	1.563	52	52.03	
10	3.8	3.9	7.7	1.353	46	46.03	
7	2.5	2.4	4.9	1.083	38	38.02	
5	1.6	1.5	3.1	0.864	30	30.02	

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:

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

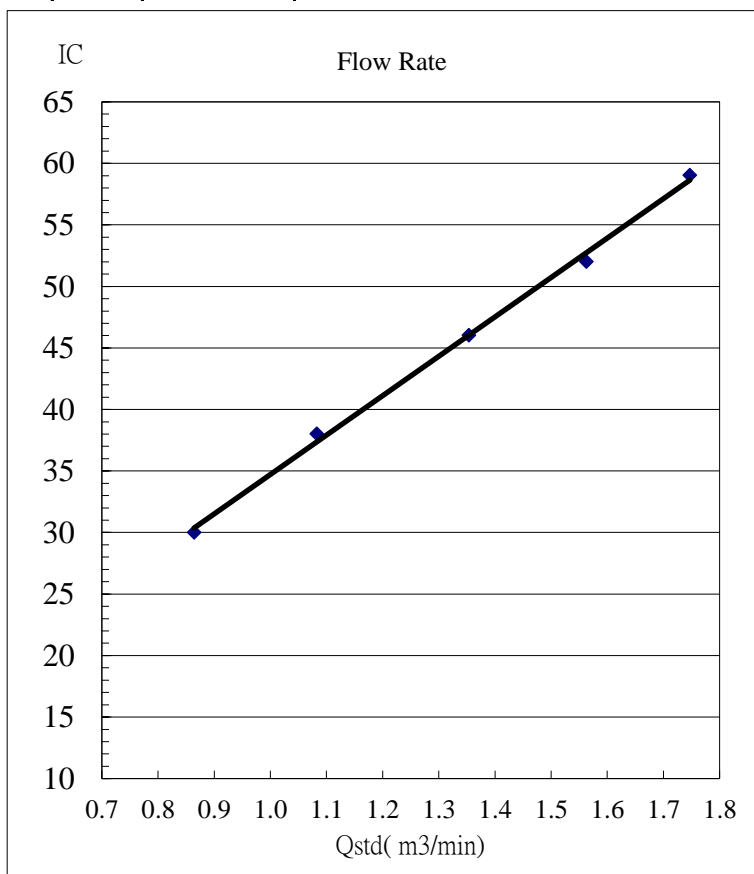
m = sampler slope

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:	19-Jun-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	19-Aug-24
	Operator:	P.F.Yeung

CONDITIONS

	1005	Corrected Pressure (mm Hg)	753.8
Temperature (°C)	32.0	Temperature (K)	305

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
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	5.8	11.6	1.631	53	52.19	Slope= 33.376 Intercept= -1.264 Corr. Coeff.= 0.9971
13	4.5	4.5	9.0	1.439	48	47.26	
10	3.4	3.3	6.7	1.244	42	41.36	
7	2.2	2.2	4.4	1.011	33	32.49	
5	1.4	1.3	2.7	0.795	25	24.62	

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:

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

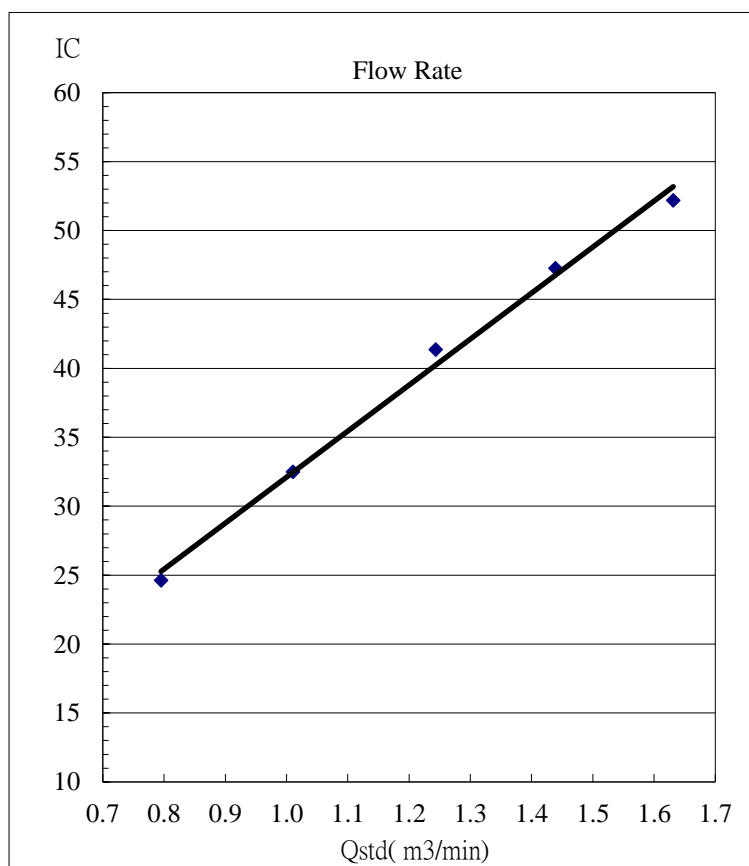
m = sampler slope

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:	19-Jun-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	19-Aug-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1005	Corrected Pressure (mm Hg)	753.8
Temperature (°C)	32.0	Temperature (K)	305

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.1	6.1	12.2	1.673	53	52.19	Slope= 28.030 Intercept= 6.135 Corr. Coeff.= 0.9951
13	4.5	4.5	9.0	1.439	48	47.26	
10	3.6	3.6	7.2	1.289	43	42.34	
7	2.2	2.2	4.4	1.011	36	35.45	
5	1.5	1.5	3.0	0.837	29	28.56	

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:

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

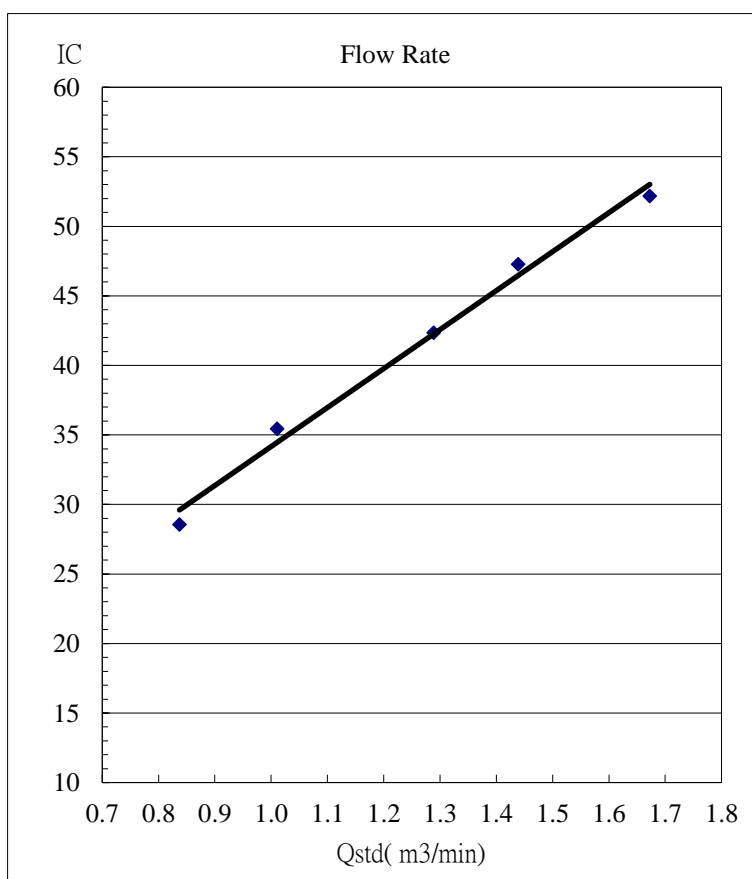
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM3	Date of Calibration:	19-Jun-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	19-Aug-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1005	Corrected Pressure (mm Hg)	753.8
Temperature (°C)	32.0	Temperature (K)	305

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
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	5.6	11.1	1.596	58	57.11	Slope= 27.386 Intercept= 13.224 Corr. Coeff.= 0.9981
13	4.3	4.4	8.7	1.415	52	51.20	
10	3.0	3.0	6.0	1.178	47	46.28	
7	1.9	2.0	3.9	0.952	40	39.39	
5	1.2	1.2	2.4	0.750	34	33.48	

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:

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

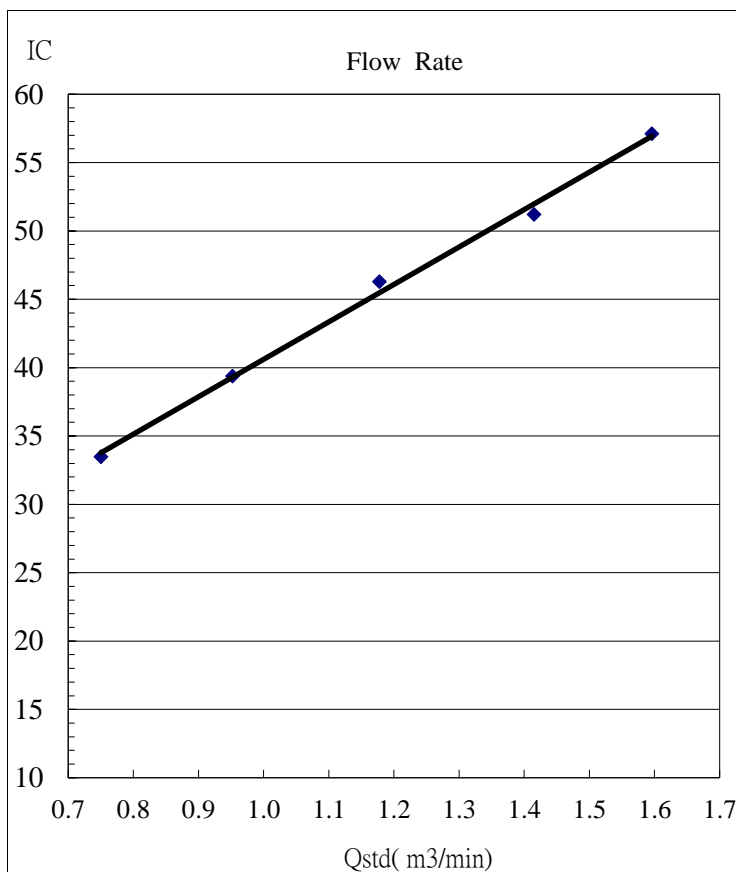
m = sampler slope

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:	19-Jun-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	19-Aug-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1005	Corrected Pressure (mm Hg)	753.8
Temperature (°C)	32.0	Temperature (K)	305

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
Model:	TE-5025A	Qstd Intercept	-0.03205
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.3	6.3	12.6	1.700	58	57.11	Slope= 33.491 Intercept= 0.132 Corr. Coeff.= 0.9989
13	5.0	5.0	10	1.516	52	51.20	
10	3.7	3.8	7.5	1.315	44	43.33	
7	2.5	2.4	4.9	1.066	37	36.43	
5	1.5	1.4	2.9	0.823	28	27.57	

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

