



ANNEX D1

CALIBRATION CERTIFICATES FOR DUST
MONITORING EQUIPMENT

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1	Date of Calibration:	19-Aug-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	19-Oct-24
	Operator:	P.F.Yeung

CONDITIONS

	1005	Corrected Pressure (mm Hg)	753.8
Temperature (°C)	30.0	Temperature (K)	303

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	1.637	53	52.36	Slope= 30.005 Intercept= 3.831 Corr. Coeff.= 0.9975
13	4.5	4.5	9.0	1.443	48	47.42	
10	3.2	3.2	6.4	1.220	42	41.49	
7	2.2	2.2	4.4	1.014	34	33.59	
5	1.4	1.3	2.7	0.798	28	27.66	

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:

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

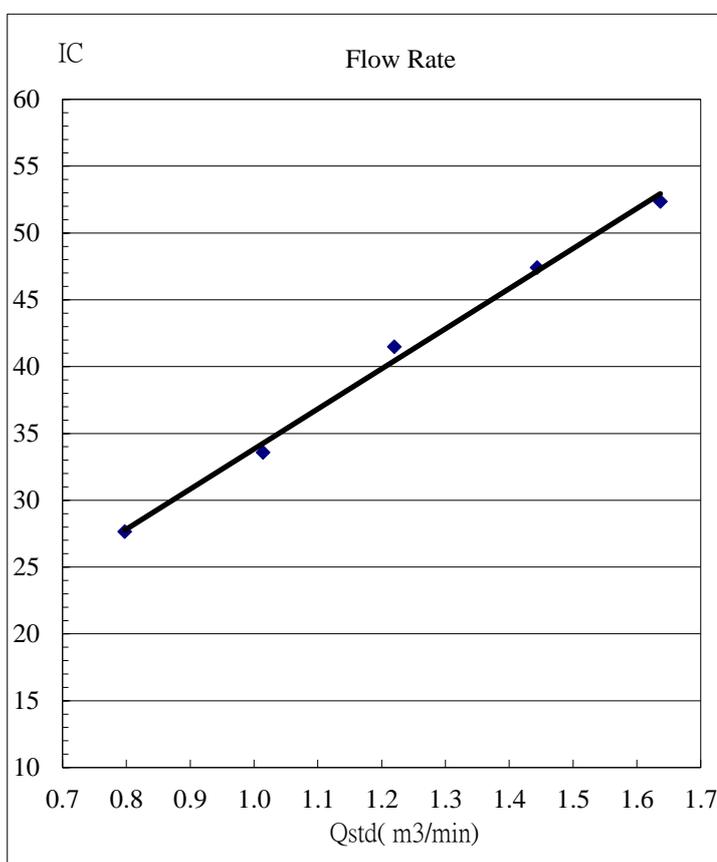
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM2	Date of Calibration:	19-Aug-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	19-Oct-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1005	Corrected Pressure (mm Hg)	753.8
Temperature (°C)	30.0	Temperature (K)	303

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	1.594	52	51.37	Slope= 31.281 Intercept= 2.566 Corr. Coeff.= 0.9923
13	4.1	4.1	8.2	1.379	47	46.43	
10	3.1	3.0	6.1	1.191	42	41.49	
7	2.3	2.2	4.5	1.025	34	33.59	
5	1.4	1.4	2.8	0.812	28	27.66	

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:

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

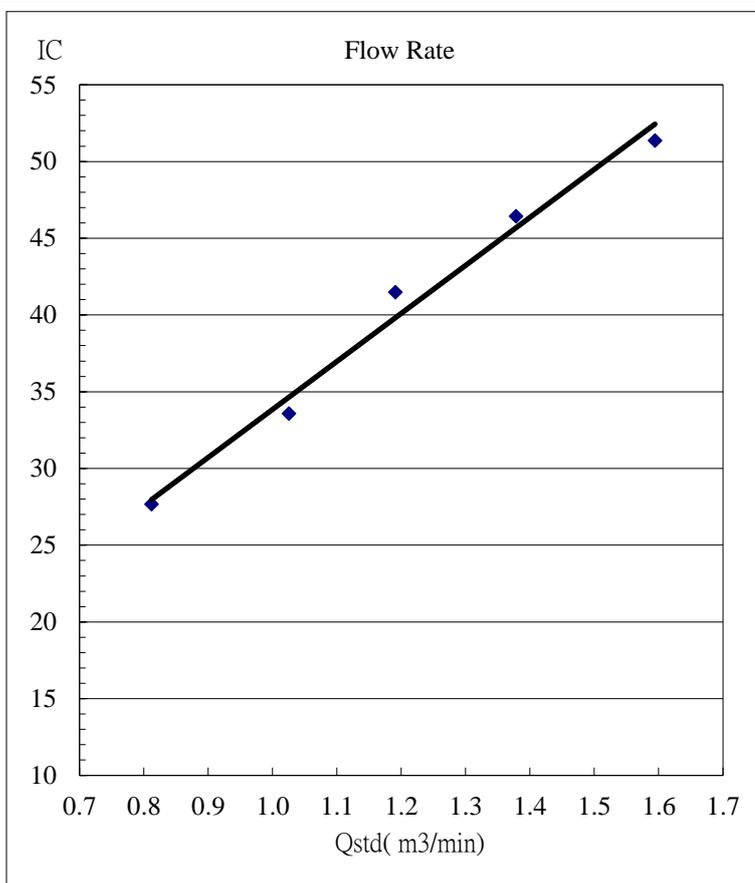
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

Sea Level Pressure (hpa)	1005	Corrected Pressure (mm Hg)	753.8
Temperature (°C)	30.0	Temperature (K)	303

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	5.2	5.2	10.4	1.551	57	56.31	Slope= 28.490 Intercept= 11.913 Corr. Coeff.= 0.9991
13	4.1	4.1	8.2	1.379	52	51.37	
10	3.1	3.1	6.2	1.201	46	45.44	
7	2.0	2.0	4.0	0.967	40	39.52	
5	1.2	1.2	2.4	0.753	34	33.59	

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:

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

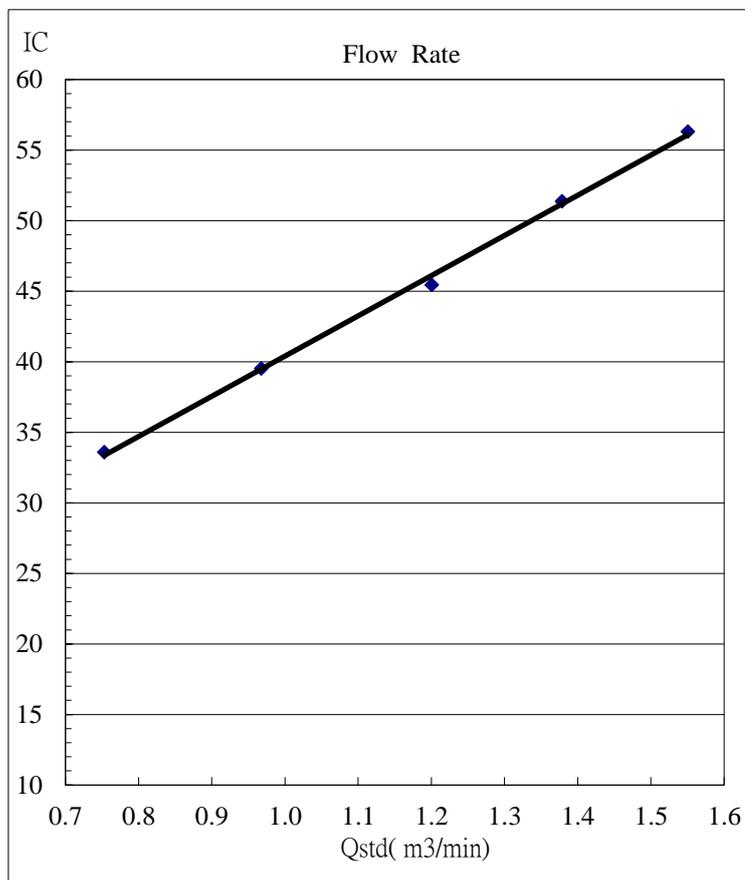
m = sampler slope

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

CONDITIONS

Sea Level Pressure (hpa)	1005	Corrected Pressure (mm Hg)	753.8
Temperature (°C)	30.0	Temperature (K)	303

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	6.4	12.7	1.712	56	55.32	Slope= 31.910 Intercept= 1.594 Corr. Coeff.= 0.9980
13	4.8	4.9	9.7	1.498	51	50.38	
10	3.6	3.7	7.3	1.302	44	43.47	
7	2.4	2.5	4.9	1.069	36	35.57	
5	1.4	1.5	2.9	0.826	28	27.66	

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:

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

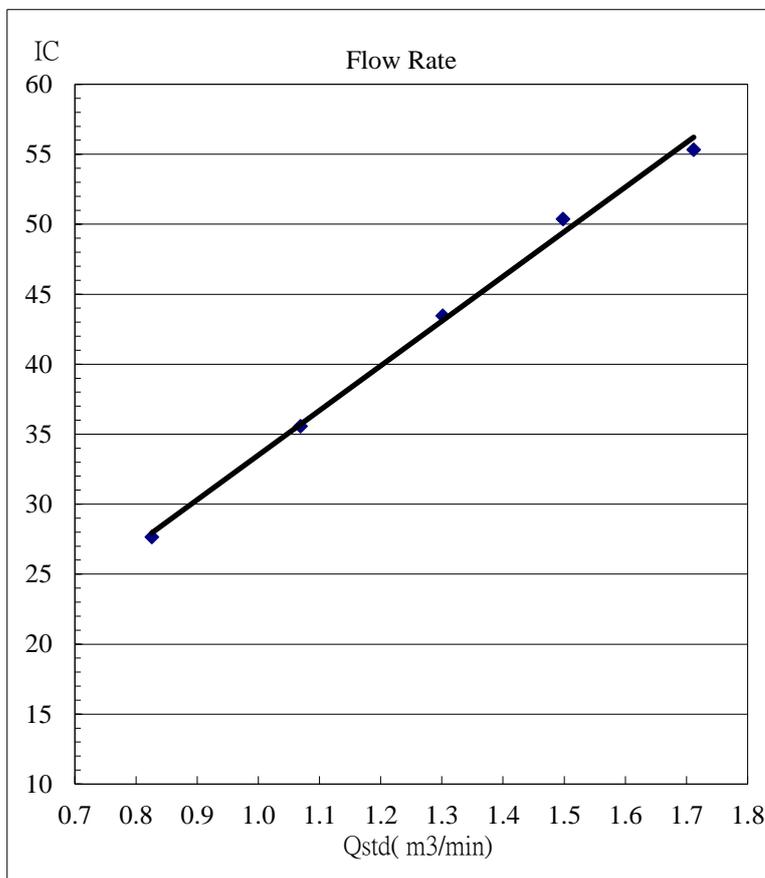
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1	Date of Calibration:	17-Oct-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	17-Dec-24
	Operator:	P.F.Yeung

CONDITIONS

	1013.9	Corrected Pressure (mm Hg)	760.5
Temperature (°C)	29.0	Temperature (K)	302

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	5.9	5.9	11.8	1.661	53	52.68	Slope= 28.537 Intercept= 5.226 Corr. Coeff.= 0.9927
13	4.5	4.4	9.9	1.522	48	47.71	
10	3.1	3.1	6.2	1.208	42	41.74	
7	2.3	2.2	4.5	1.031	34	33.79	
5	1.4	1.3	2.7	0.802	28	27.83	

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:

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

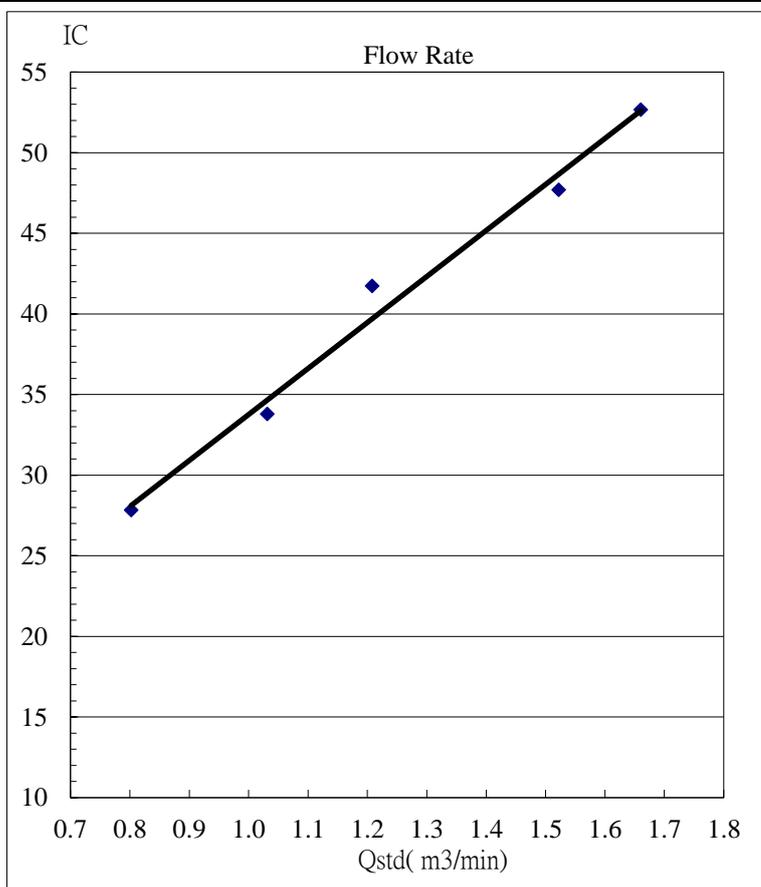
m = sampler slope

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:	17-Oct-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	17-Dec-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1013.9	Corrected Pressure (mm Hg)	760.5
Temperature (°C)	29.0	Temperature (K)	302

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	6.2	6.3	12.5	1.709	52	51.68	Slope= 29.137 Intercept= 2.173 Corr. Coeff.= 0.9921
13	4.9	4.9	9.8	1.515	46	45.72	
10	3.5	3.4	6.9	1.273	40	39.76	
7	2.4	2.3	4.7	1.054	35	34.79	
5	1.5	1.4	2.9	0.831	25	24.85	

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:

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

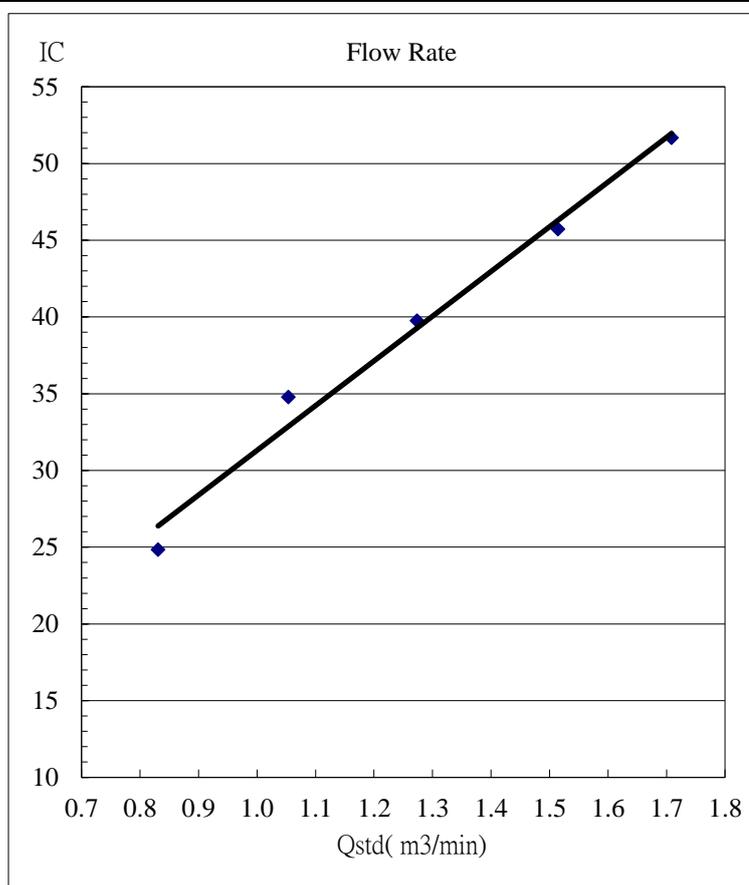
m = sampler slope

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:	17-Oct-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	17-Dec-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1013.9	Corrected Pressure (mm Hg)	760.5
Temperature (°C)	29.0	Temperature (K)	302

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07544
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CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.3	5.2	10.5	1.567	55	54.67	Slope= 27.383 Intercept= 11.859 Corr. Coeff.= 0.9964
13	4.1	4.1	8.2	1.387	50	49.70	
10	3.1	3.1	6.2	1.208	45	44.73	
7	2.0	2.0	4.0	0.973	40	39.76	
5	1.2	1.2	2.4	0.757	32	31.81	

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:

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

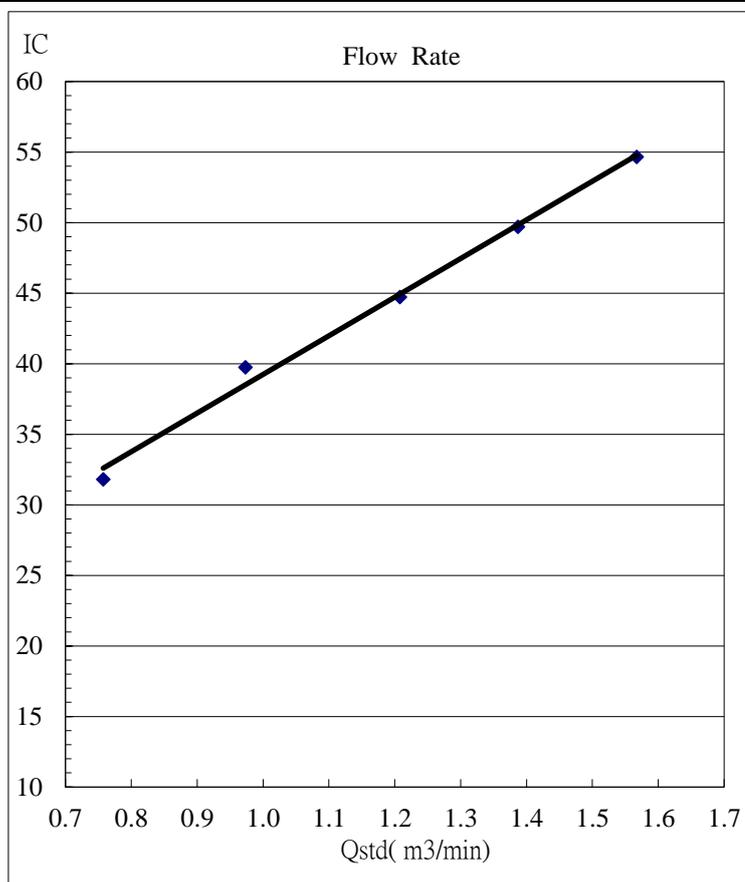
m = sampler slope

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:	17-Oct-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	17-Dec-24
	Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1013.9	Corrected Pressure (mm Hg)	760.5
Temperature (°C)	29.0	Temperature (K)	302

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	6.2	6.1	12.3	1.695	58	57.65	Slope= 31.069 Intercept= 5.127 Corr. Coeff.= 0.9971
13	4.9	5.0	9.9	1.522	52	51.68	
10	3.4	3.4	6.8	1.264	46	45.72	
7	2.3	2.3	4.6	1.043	38	37.77	
5	1.4	1.4	2.8	0.817	30	29.82	

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

