



ANNEX D1

CALIBRATION CERTIFICATES FOR DUST  
MONITORING EQUIPMENT

## 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:

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

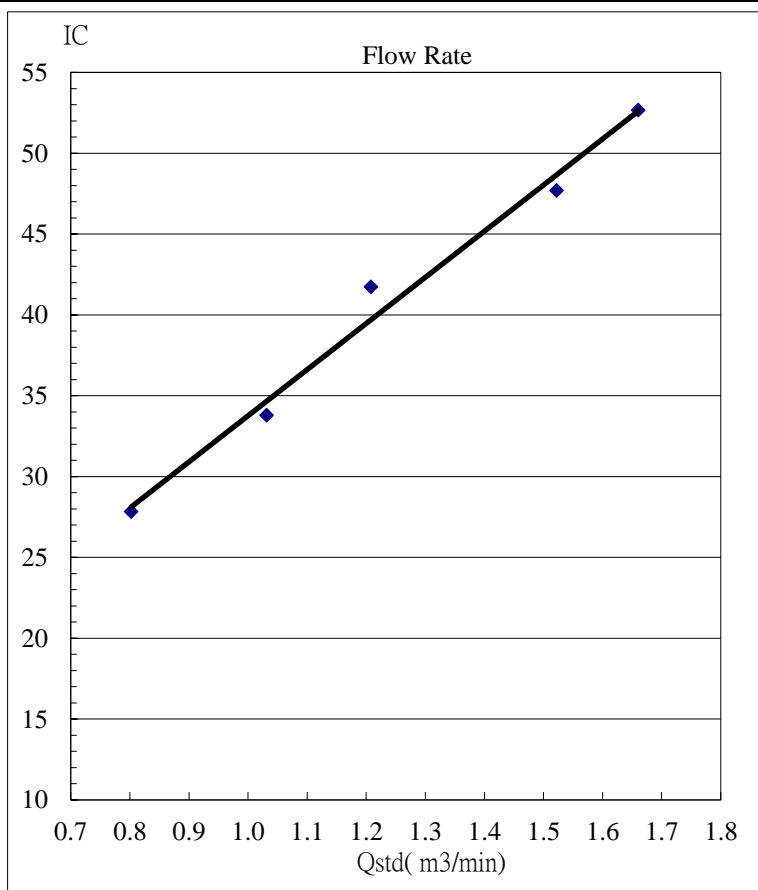
m = sampler slope

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:

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

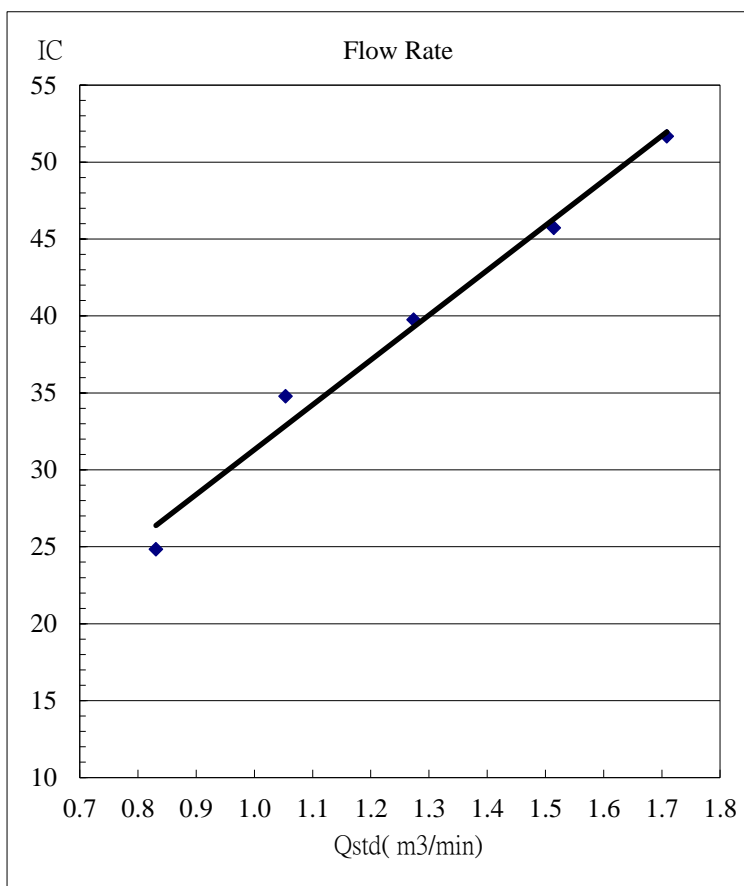
m = sampler slope

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
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	5.3	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:

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

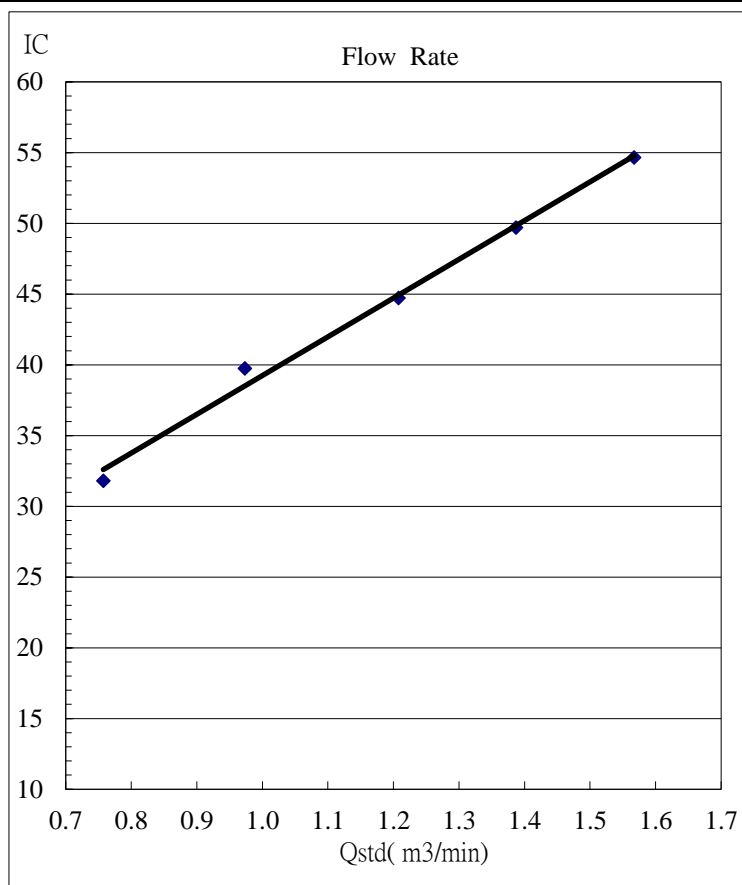
m = sampler slope

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:

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

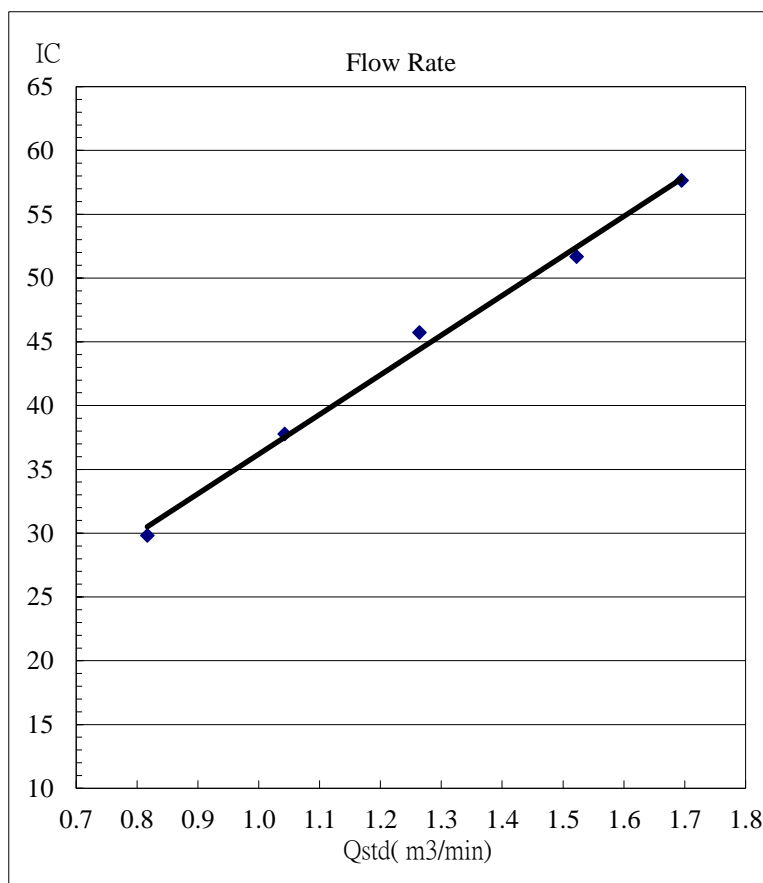
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1	Date of Calibration:	16-Dec-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	16-Feb-25
	Operator:	P.F.Yeung

### CONDITIONS

	1022.7	Corrected Pressure (mm Hg)	767.1
Temperature (°C)	17.0	Temperature (K)	290

### 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	1.660	54	55.01	Slope= 35.201 Intercept= -2.7305 Corr. Coeff.= 0.9953
13	4.4	4.4	8.8	1.474	48	48.90	
10	3.2	3.2	6.4	1.261	42	42.78	
7	2.1	2.1	4.2	1.026	34	34.63	
5	1.3	1.3	2.6	0.812	24	24.45	

#### 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:

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

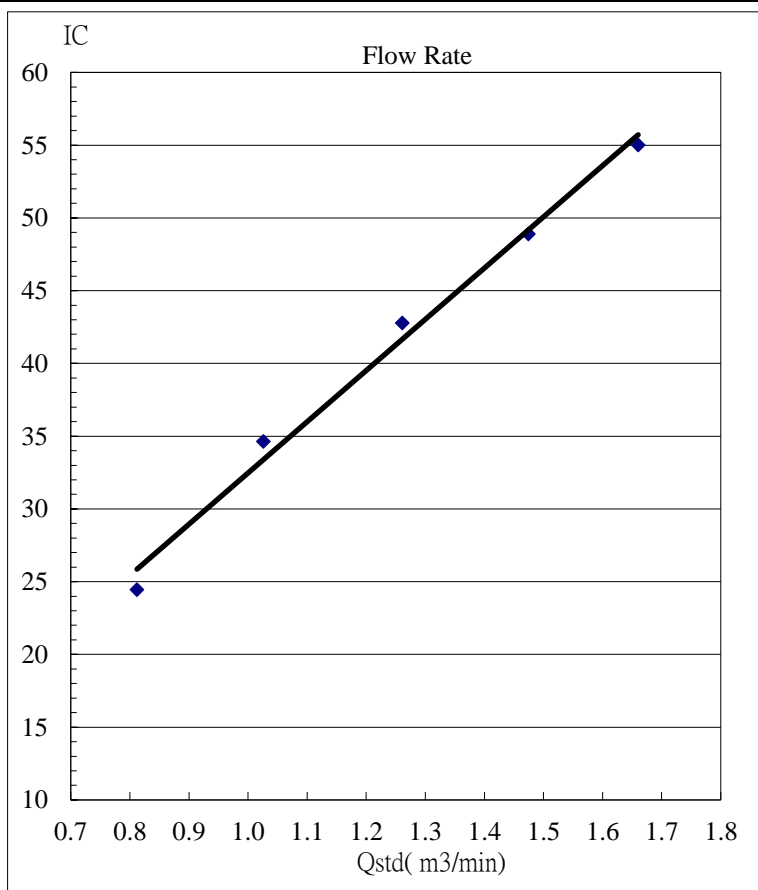
m = sampler slope

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:	16-Dec-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	16-Feb-25
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1022.7	Corrected Pressure (mm Hg)	767.1
Temperature (°C)	17.0	Temperature (K)	290

### 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	6.2	6.2	12.4	1.746	55	56.03	Slope= 30.970 Intercept= 2.602 Corr. Coeff.= 0.9989
13	4.8	4.8	9.6	1.539	50	50.93	
10	3.7	3.7	7.4	1.354	44	44.82	
7	2.3	2.3	4.6	1.073	35	35.65	
5	1.4	1.4	2.8	0.842	28	28.52	

#### 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:

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

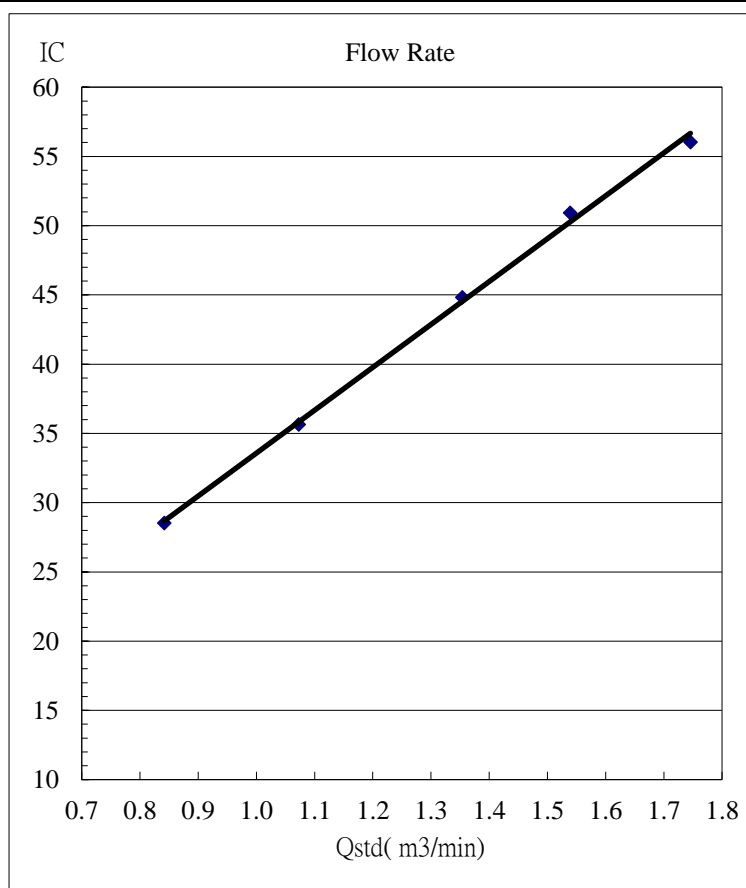
m = sampler slope

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:	16-Dec-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	16-Feb-25
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1022.7	Corrected Pressure (mm Hg)	767.1
Temperature (°C)	17.0	Temperature (K)	290

### 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	5.9	11.7	1.696	57	58.06	Slope= 27.680 Intercept= 11.209 Corr. Coeff.= 0.9953
13	4.6	4.6	9.2	1.507	52	52.97	
10	3.5	3.4	6.9	1.308	46	46.86	
7	2.2	2.2	4.4	1.049	41	41.77	
5	1.4	1.4	2.8	0.842	33	33.62	

#### 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:

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

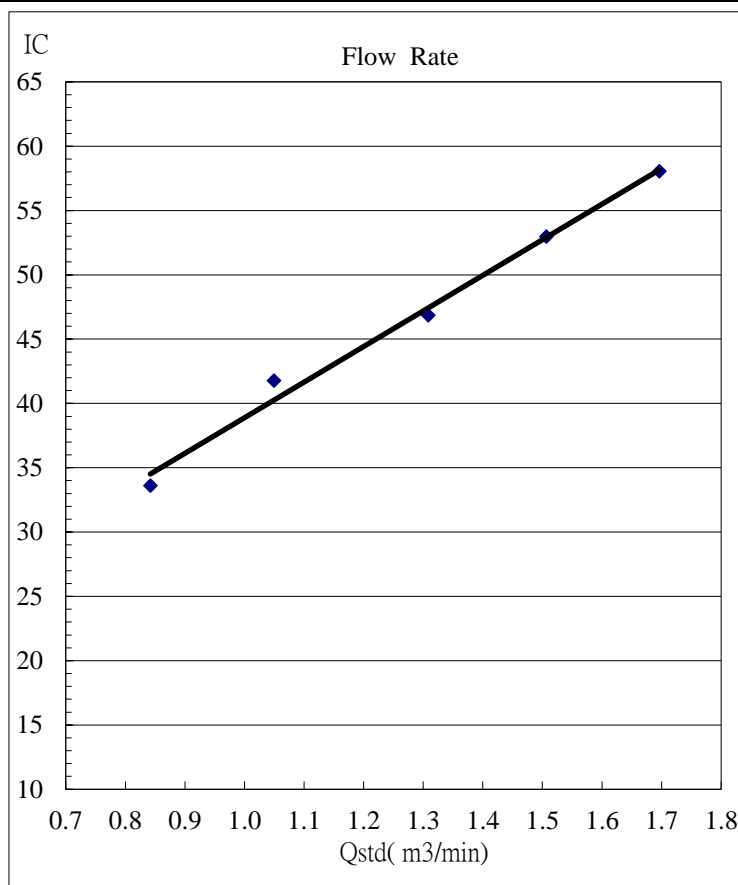
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM4	Date of Calibration:	16-Dec-24
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	16-Feb-25
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1022.7	Corrected Pressure (mm Hg)	767.1
Temperature (°C)	17.0	Temperature (K)	290

### 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	6.3	6.2	12.5	1.753	58	59.08	Slope= 32.169 Intercept= 2.782 Corr. Coeff.= 0.9982
13	5.0	4.9	9.9	1.562	52	52.97	
10	3.7	3.6	7.3	1.345	45	45.84	
7	2.2	2.2	4.4	1.049	37	37.69	
5	1.5	1.4	2.9	0.856	29	29.54	

#### 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

