ANNEX D1 CALIBRATION CERTIFICATES FOR DUST MONITORING EQUIPMENT

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM1		Date of Calibration:	20-Feb-24
Name and Model :	TISCH HVS Model TE-5170	Next Calibration Date:	19-Apr-24
		Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1017	Corrected Pressure (mm Hg)	762.8
Temperature (^{o}C)	24.0	Temperature (K)	297

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O(L) (in)	H20(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.2	6.2	12.4	1.719	56	56.21	Slope= 30.370
13	4.9	4.9	9.8	1.530	51	51.19	Intercept= 4.548
10	3.6	3.6	7.2	1.313	45	45.17	Corr. Coeff.= 0.9989
7	2.4	2.4	4.8	1.075	37	37.14	
5	1.5	1.5	3.0	0.853	30	30.11	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

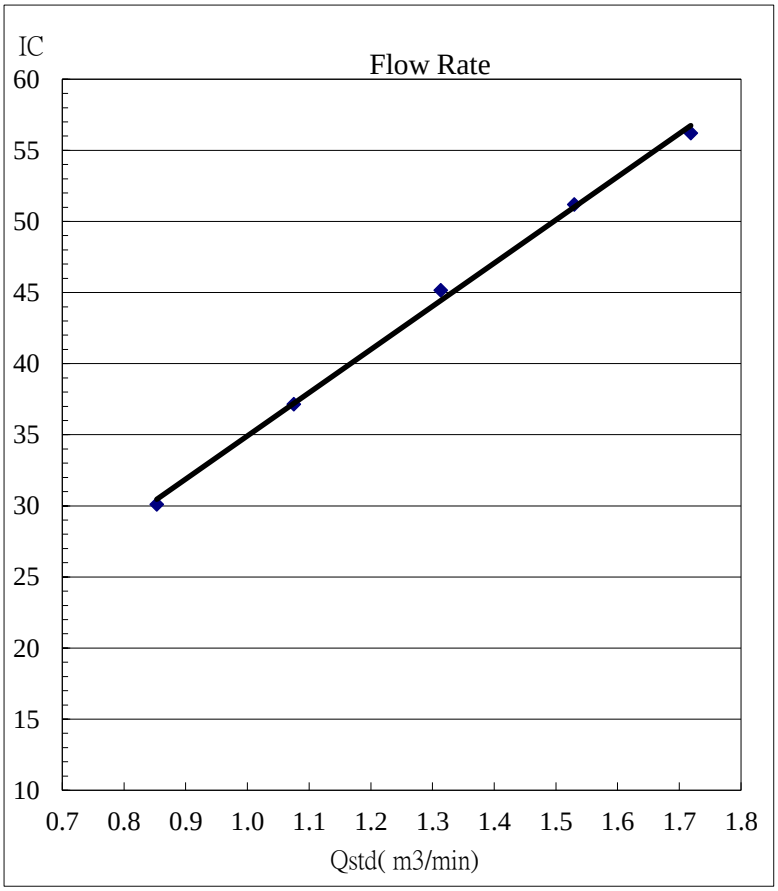
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM2		Date of Calibration:	20-Feb-24
Name and Model :	TISCH HVS Model TE-5170	Next Calibration Date:	19-Apr-24
		Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1017	Corrected Pressure (mm Hg)	762.8
Temperature (^{o}C)	24.0	Temperature (K)	297

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O(L) (in)	H20(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.5	6.5	13	1.759	52	52.20	Slope= 26.514
13	5.0	5.0	10	1.545	47	47.18	Intercept= 6.297
10	3.6	3.6	7.2	1.313	42	42.16	Corr. Coeff.= 0.9933
7	2.2	2.3	4.5	1.041	35	35.13	
5	1.4	1.5	2.9	0.839	27	27.10	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

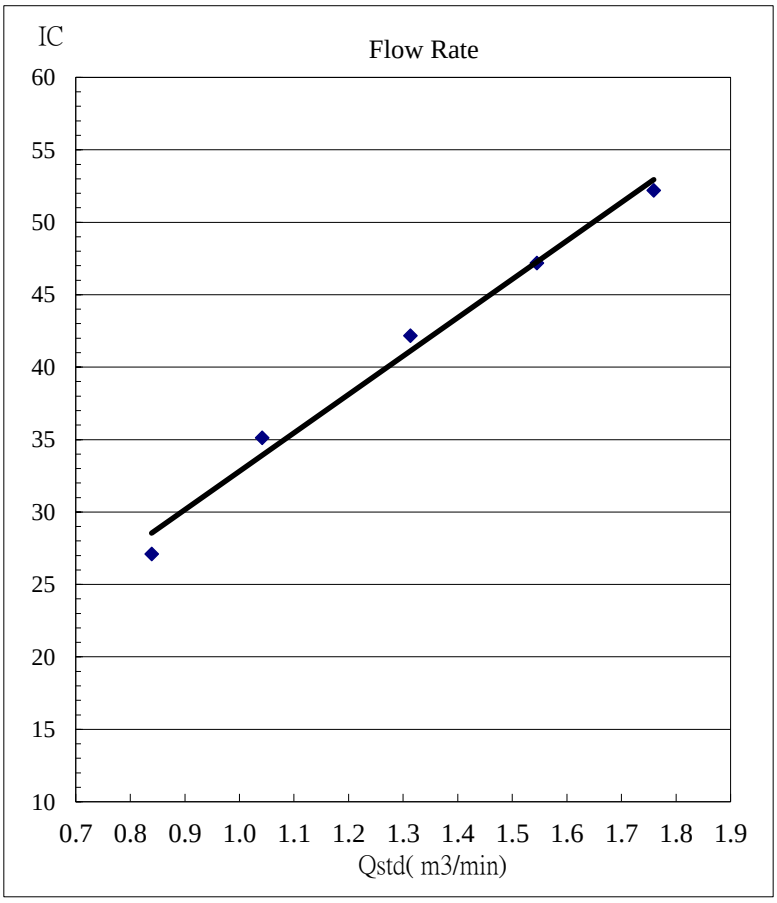
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM3		Date of Calibration:	20-Feb-24
Name and Model :	TISCH HVS Model TE-5170	Next Calibration Date:	19-Apr-24
		Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1017	Corrected Pressure (mm Hg)	762.8
Temperature (^{o}C)	24.0	Temperature (K)	297

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O(L) (in)	H20(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.6	5.7	11.3	1.641	57	57.22	Slope= 27.283
13	4.3	4.3	8.6	1.434	52	52.20	Intercept= 12.645
10	3.3	3.2	6.5	1.249	46	46.17	Corr. Coeff.= 0.9985
7	2.0	2.0	4.0	0.983	40	40.15	
5	1.2	1.2	2.4	0.765	33	33.12	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

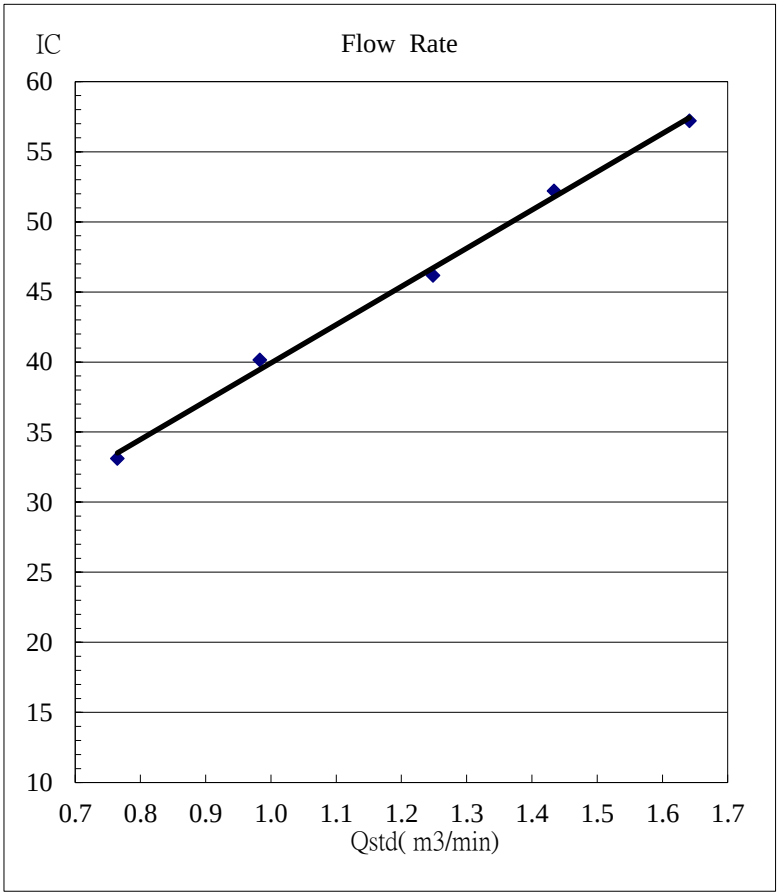
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM4		Date of Calibration:	20-Feb-24
Name and Model :	TISCH HVS Model TE-5170	Next Calibration Date:	19-Apr-24
		Operator:	P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1017	Corrected Pressure (mm Hg)	762.8
Temperature (^{o}C)	24.0	Temperature (K)	297

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O(L) (in)	H20(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.0	6.0	12.0	1.691	57	57.22	Slope= 32.433
13	4.7	4.8	9.5	1.506	51	51.19	Intercept= 1.905
10	3.7	3.7	7.4	1.331	44	44.17	Corr. Coeff.= 0.9966
7	2.4	2.5	4.9	1.086	36	36.14	
5	1.5	1.4	2.9	0.839	30	30.11	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

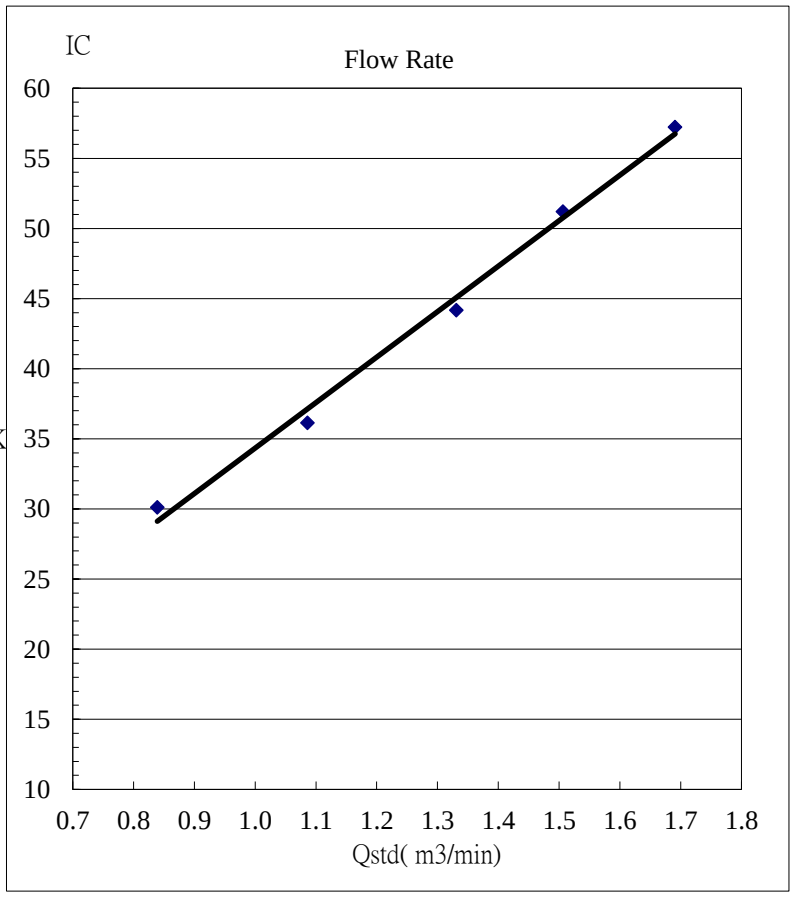
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CACULATION 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 (^{o}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)	H20(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
13	4.4	4.4	8.8	1.446	47	47.03	Intercept= -0.9831
10	2.9	3.0	5.9	1.187	40	40.02	Corr. Coeff.= 0.9974
7	2.2	2.2	4.4	1.027	33	33.02	
5	1.3	1.3	2.6	0.793	25	25.02	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

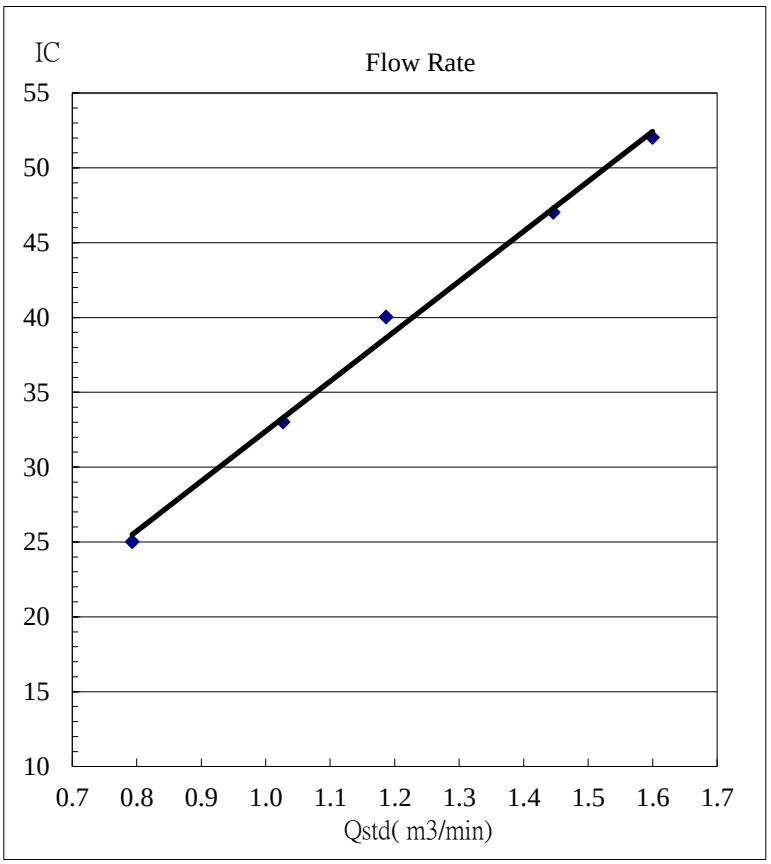
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CACULATION 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 (^{o}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)	H20(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
13	4.3	4.3	8.6	1.429	47	47.03	Intercept= 3.559
10	3.5	3.5	7.0	1.291	42	42.03	Corr. Coeff.= 0.9953
7	2.1	2.1	4.2	1.004	35	35.02	
5	1.3	1.3	2.6	0.793	28	28.02	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

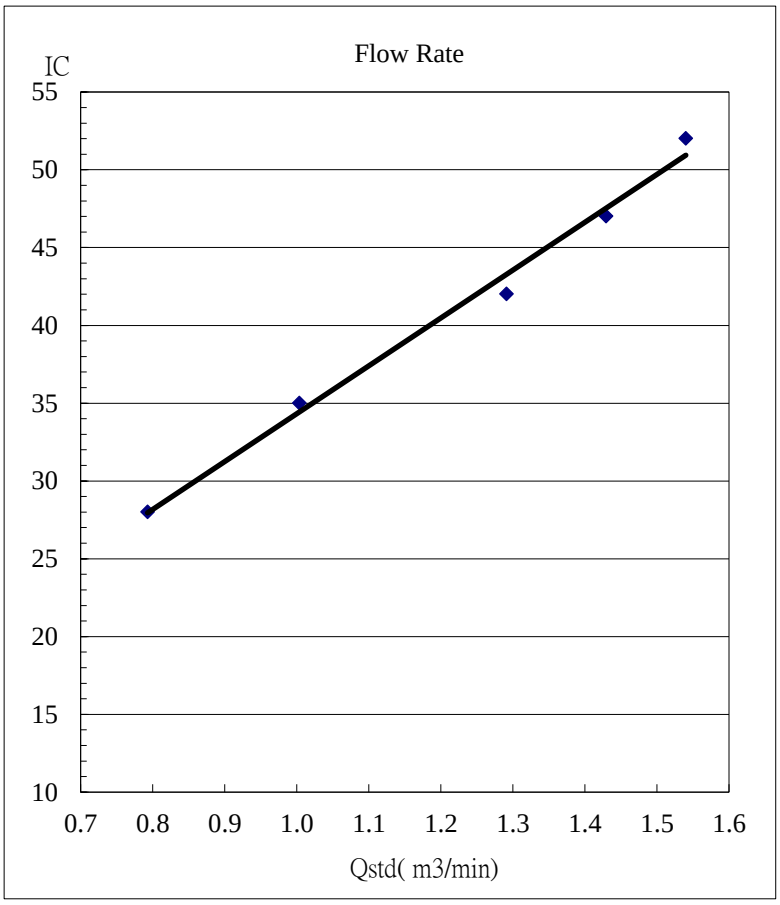
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CACULATION 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 (^{o}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)	H20(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
13	4.2	4.2	8.4	1.413	52	52.03	Intercept= 14.177
10	3.4	3.4	6.8	1.273	47	47.03	Corr. Coeff.= 0.9952
7	2.1	2.1	4.2	1.004	42	42.03	
5	1.3	1.4	2.7	0.808	35	35.02	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

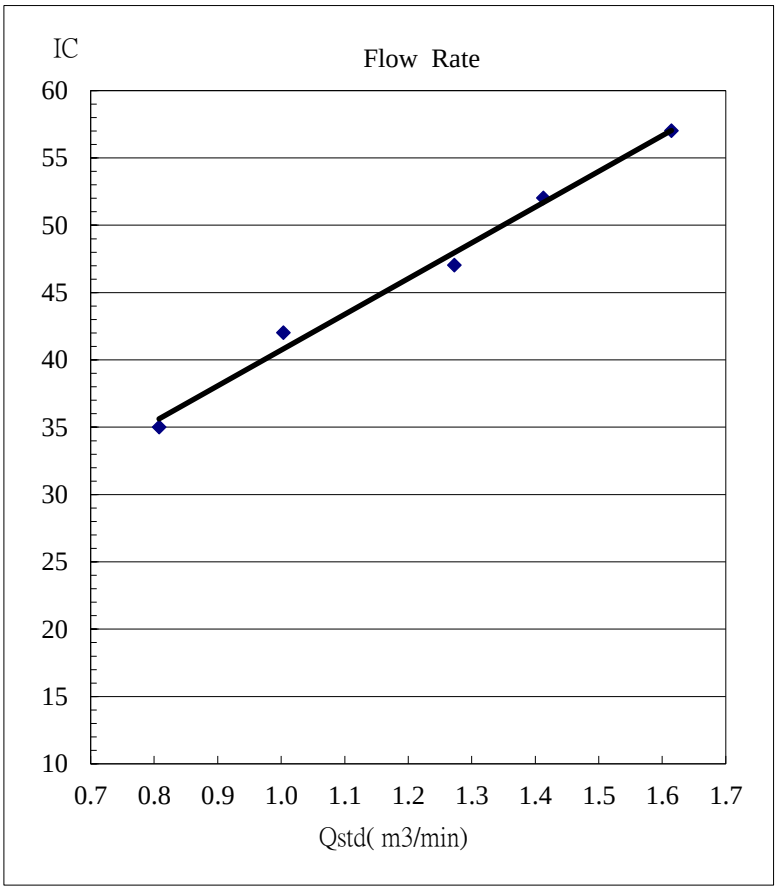
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CACULATION 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 (^{o}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)	H20(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
13	5.1	5.2	10.3	1.563	52	52.03	Intercept= 2.6869
10	3.8	3.9	7.7	1.353	46	46.03	Corr. Coeff.= 0.9989
7	2.5	2.4	4.9	1.083	38	38.02	
5	1.6	1.5	3.1	0.864	30	30.02	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure