ANNEX D1 CALIBRATION CERTIFICATES FOR DUST MONITORING EQUIPMENT

TSP SAMPLER CALIBRATION CACULATION 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 (^{o}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)	H20(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
13	4.5	4.5	9.0	1.439	48	47.26	Intercept= -1.264
10	3.4	3.3	6.7	1.244	42	41.36	Corr. Coeff.= 0.9971
7	2.2	2.2	4.4	1.011	33	32.49	
5	1.4	1.3	2.7	0.795	25	24.62	

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)

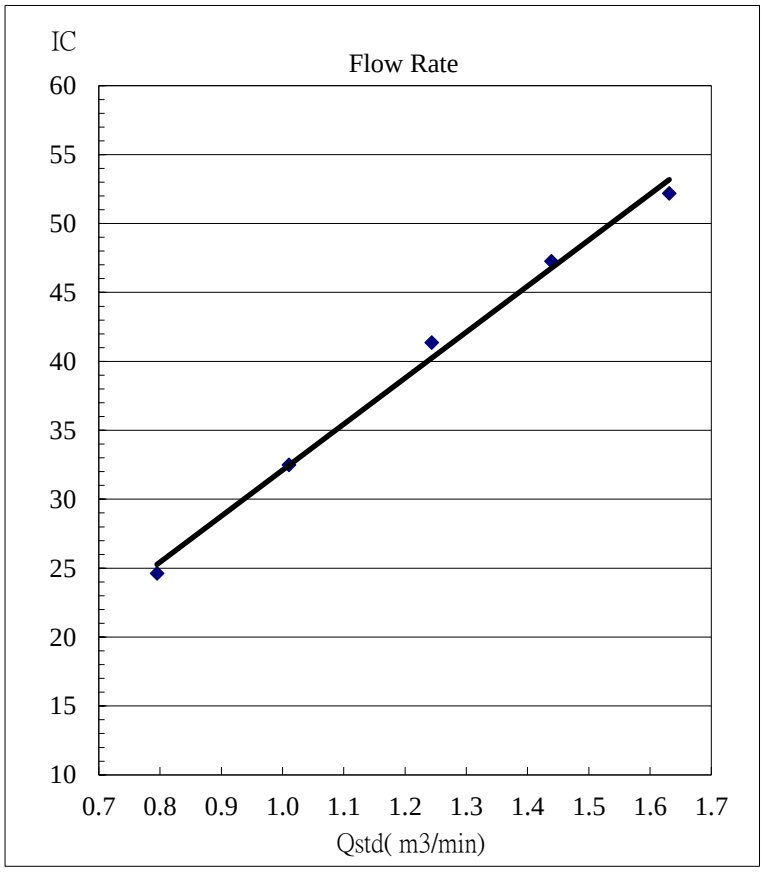
m = sampler slope

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:	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 (^{o}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)	H20(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
13	4.5	4.5	9.0	1.439	48	47.26	Intercept= 6.135
10	3.6	3.6	7.2	1.289	43	42.34	Corr. Coeff.= 0.9951
7	2.2	2.2	4.4	1.011	36	35.45	
5	1.5	1.5	3.0	0.837	29	28.56	

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)

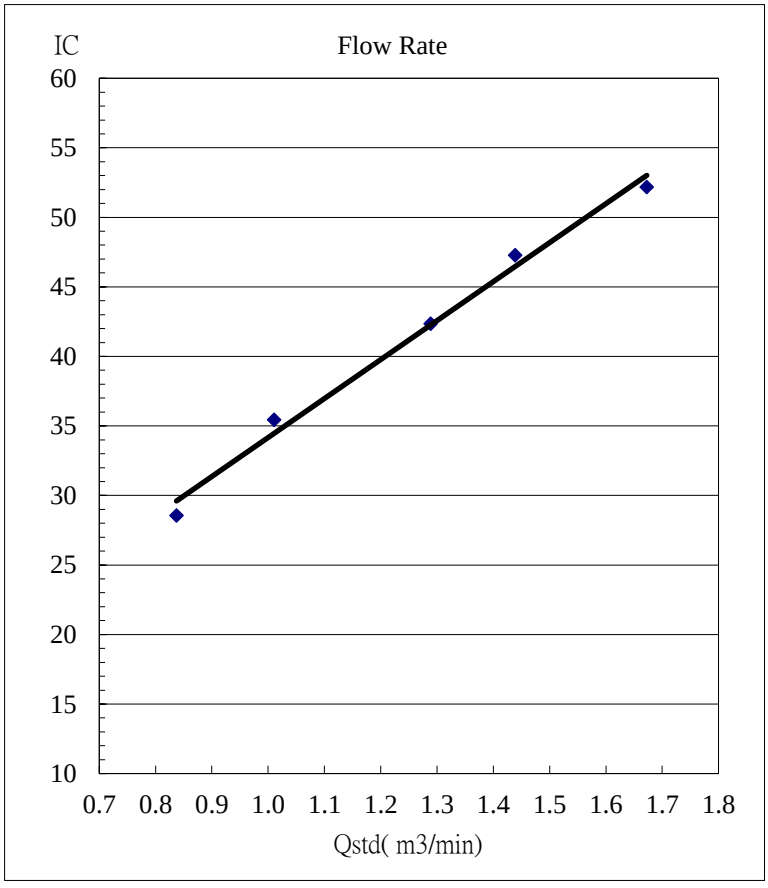
m = sampler slope

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:	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 (^{o}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)	H20(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
13	4.3	4.4	8.7	1.415	52	51.20	Intercept= 13.224
10	3.0	3.0	6.0	1.178	47	46.28	Corr. Coeff.= 0.9981
7	1.9	2.0	3.9	0.952	40	39.39	
5	1.2	1.2	2.4	0.750	34	33.48	

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)

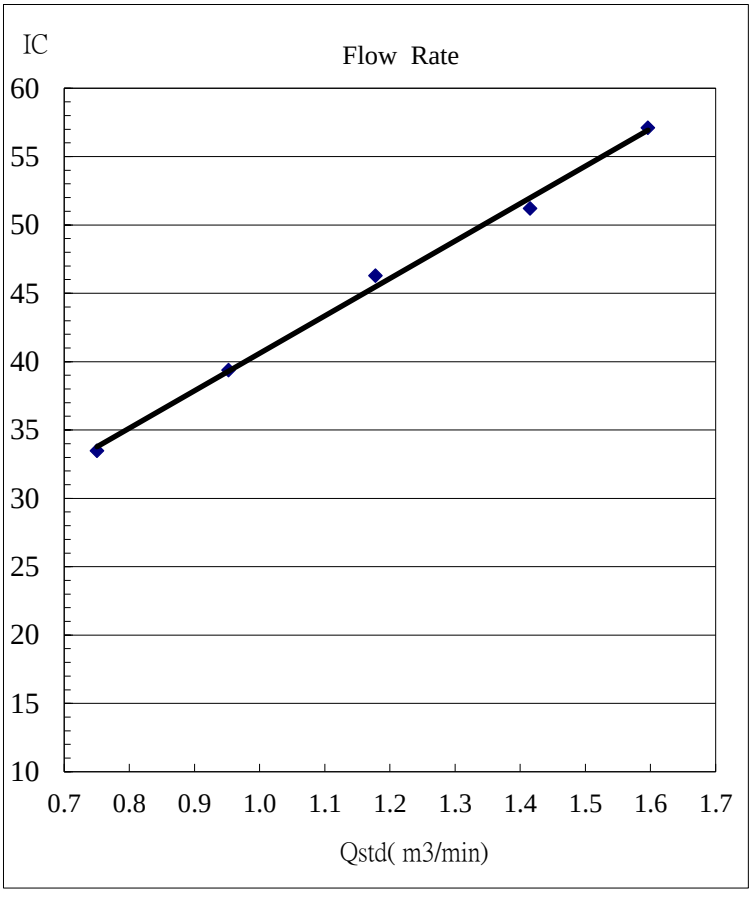
m = sampler slope

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:	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 (^{o}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)	H20(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
13	5.0	5.0	10	1.516	52	51.20	Intercept= 0.132
10	3.7	3.8	7.5	1.315	44	43.33	Corr. Coeff.= 0.9989
7	2.5	2.4	4.9	1.066	37	36.43	
5	1.5	1.4	2.9	0.823	28	27.57	

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)

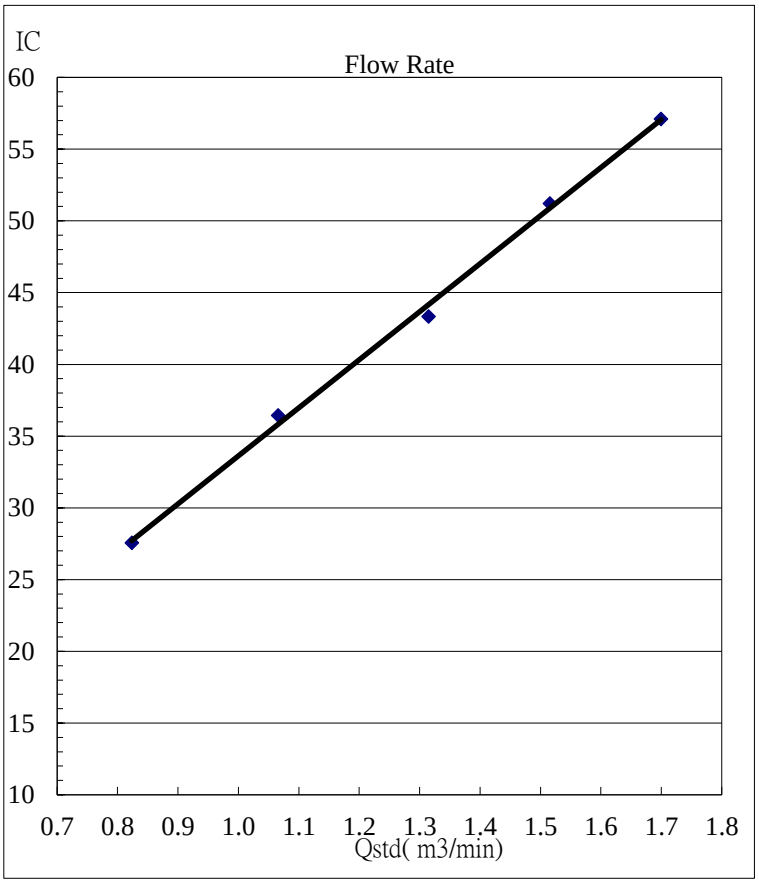
m = sampler slope

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:	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 (^{o}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)	H20(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
13	4.5	4.5	9.0	1.443	48	47.42	Intercept= 3.831
10	3.2	3.2	6.4	1.220	42	41.49	Corr. Coeff.= 0.9975
7	2.2	2.2	4.4	1.014	34	33.59	
5	1.4	1.3	2.7	0.798	28	27.66	

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)

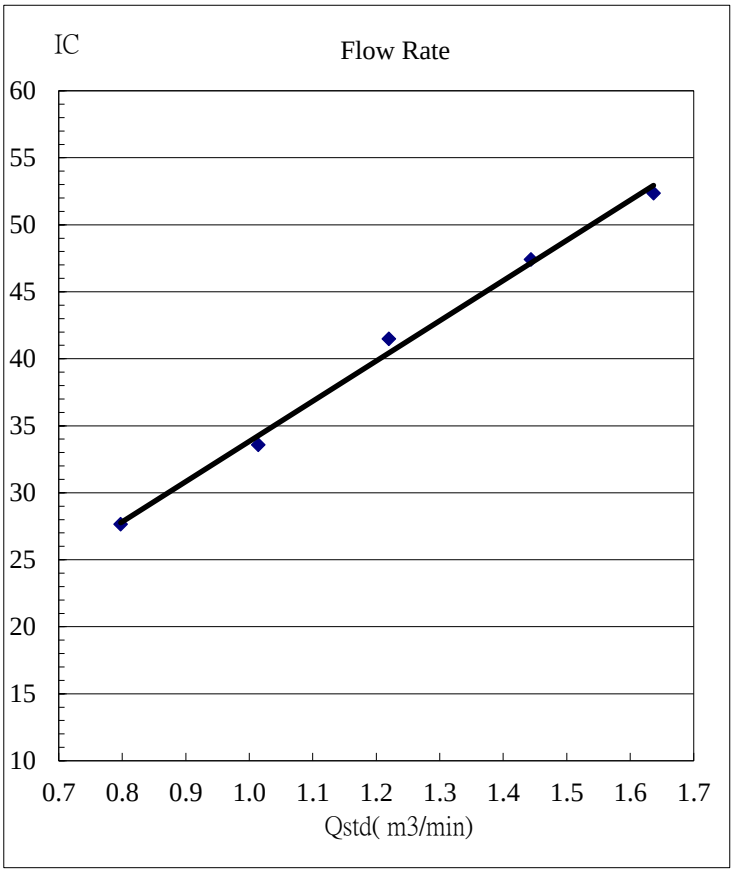
m = sampler slope

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:	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 (^{o}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)	H20(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
13	4.1	4.1	8.2	1.379	47	46.43	Intercept= 2.566
10	3.1	3.0	6.1	1.191	42	41.49	Corr. Coeff.= 0.9923
7	2.3	2.2	4.5	1.025	34	33.59	
5	1.4	1.4	2.8	0.812	28	27.66	

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)

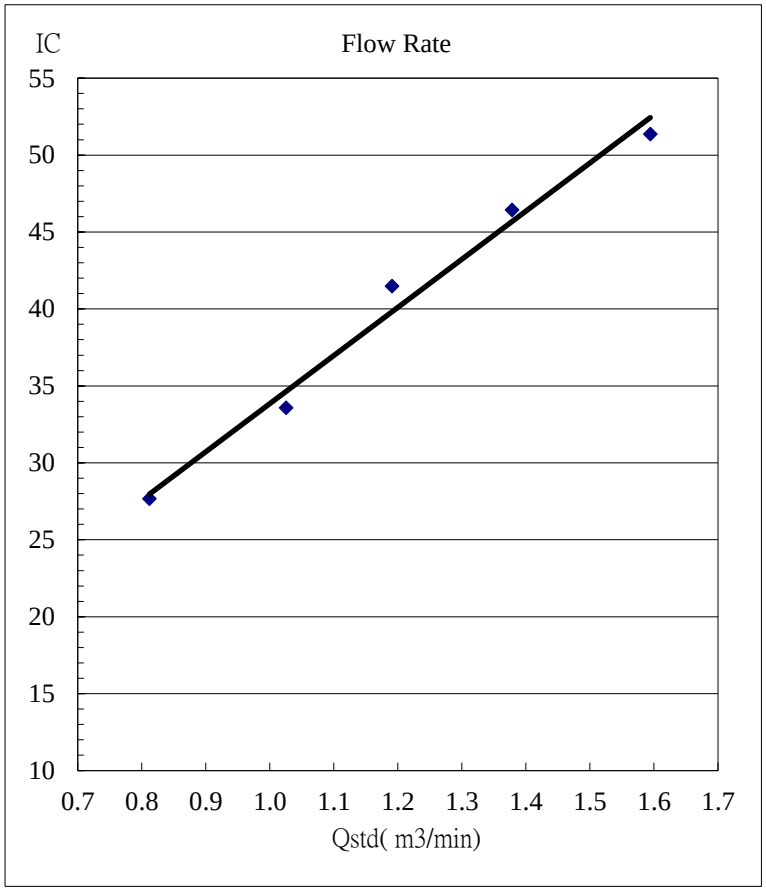
m = sampler slope

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:	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 (^{o}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)	H20(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
13	4.1	4.1	8.2	1.379	52	51.37	Intercept= 11.913
10	3.1	3.1	6.2	1.201	46	45.44	Corr. Coeff.= 0.9991
7	2.0	2.0	4.0	0.967	40	39.52	
5	1.2	1.2	2.4	0.753	34	33.59	

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)

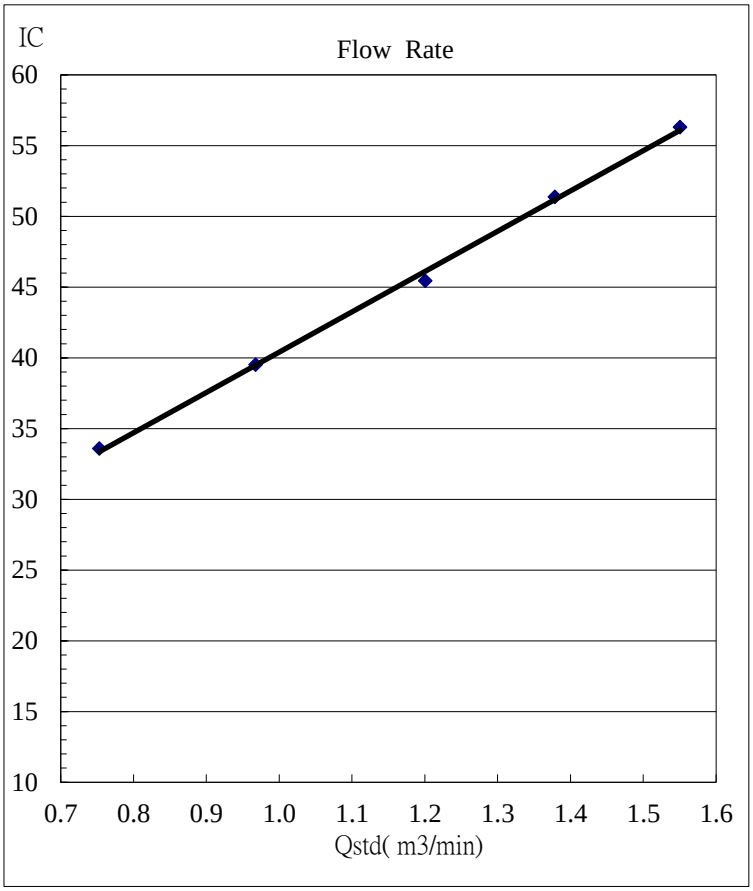
m = sampler slope

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:	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 (^{o}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)	H20(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
13	4.8	4.9	9.7	1.498	51	50.38	Intercept= 1.594
10	3.6	3.7	7.3	1.302	44	43.47	Corr. Coeff.= 0.9980
7	2.4	2.5	4.9	1.069	36	35.57	
5	1.4	1.5	2.9	0.826	28	27.66	

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