ANNEX D1   CALIBRATION CERTIFICATES FOR DUST MONITORING EQUIPMENT

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM1		Date of Calibration:	9-Oct-25
Name and Model : TISCH HVS Model TE-5170		Next Calibration Date:	9-Dec-25
		Operator:	P.F.Yeung

CONDITIONS

	1016	Corrected Pressure (mm Hg)	762.1
Temperature (^{o}C)	32.0	Temperature (K)	305.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
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	10.9	1.593	53	52.47	Slope= 30.289
13	4.0	4.0	8.0	1.368	48	47.52	Intercept= 5.351
10	3.0	3.0	6.0	1.188	43	42.57	Corr. Coeff.= 0.9951
7	2.0	2.0	4.0	0.974	35	34.65	
5	1.2	1.2	2.4	0.760	28	27.72	

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:
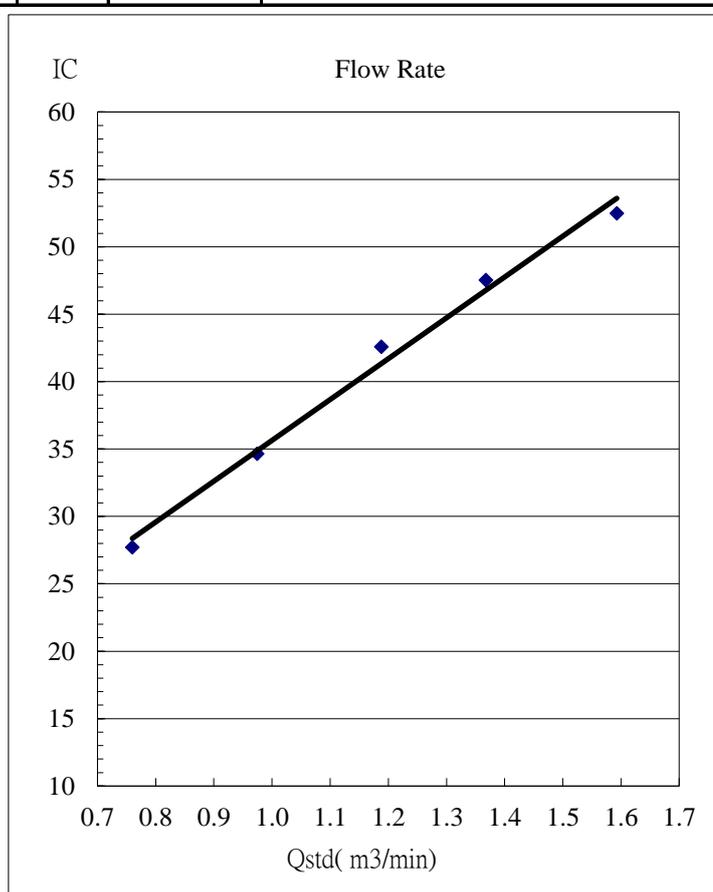
$1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)$

m   = sampler slope

b   = sampler intercept

I   = chart response

Tav = daily average temperature

Pav = daily average pressure

Flow Rate

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM2	Date of Calibration: 9-Oct-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date: 9-Dec-25
	Operator: P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	32.0	Temperature (K)	305.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
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	1.600	53	52.47	Slope= 30.371
13	4.4	4.4	8.8	1.434	48	47.52	Intercept= 4.031
10	3.4	3.4	6.8	1.263	43	42.57	Corr. Coeff.= 0.9997
7	2.1	2.1	4.2	0.998	35	34.65	
5	1.3	1.3	2.6	0.790	28	27.72	

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:
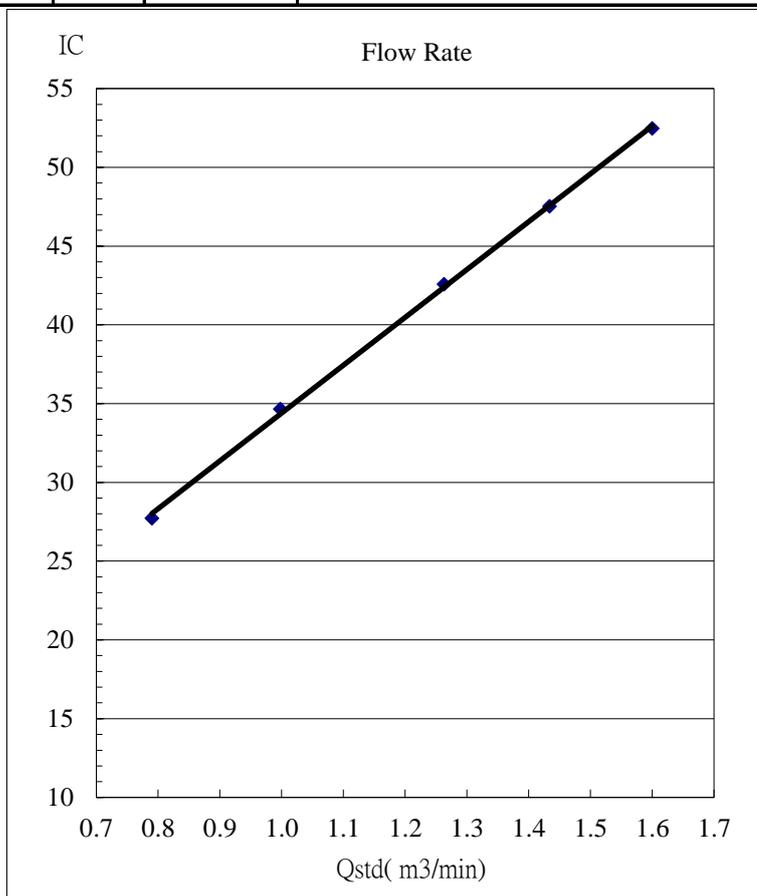
$1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Flow Rate

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM3	Date of Calibration: 9-Oct-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date: 9-Dec-25
	Operator: P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	32.0	Temperature (K)	305.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
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	1.600	57	56.43	Slope= 26.806
13	4.2	4.2	8.4	1.401	51	50.49	Intercept= 13.239
10	3.2	3.2	6.4	1.226	46	45.54	Corr. Coeff.= 0.9976
7	2.1	2.0	4.1	0.986	41	40.59	
5	1.3	1.2	2.5	0.775	34	33.66	

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:
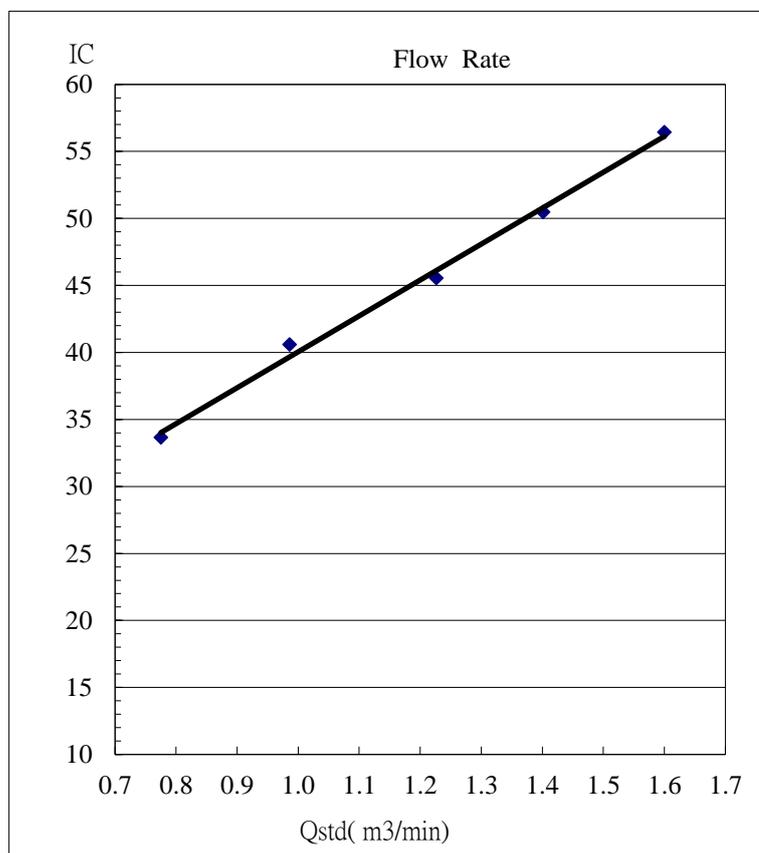
$1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Flow Rate

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM4	Date of Calibration: 9-Oct-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date: 9-Dec-25
	Operator: P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (^{o}C)	32.0	Temperature (K)	305.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
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	5.7	11.5	1.635	56	55.44	Slope= 30.206
13	4.4	4.3	8.7	1.426	51	50.49	Intercept= 6.483
10	3.5	3.5	7.0	1.281	45	44.55	Corr. Coeff.= 0.9981
7	2.2	2.2	4.4	1.021	38	37.62	
5	1.3	1.2	2.5	0.775	30	29.70	

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:
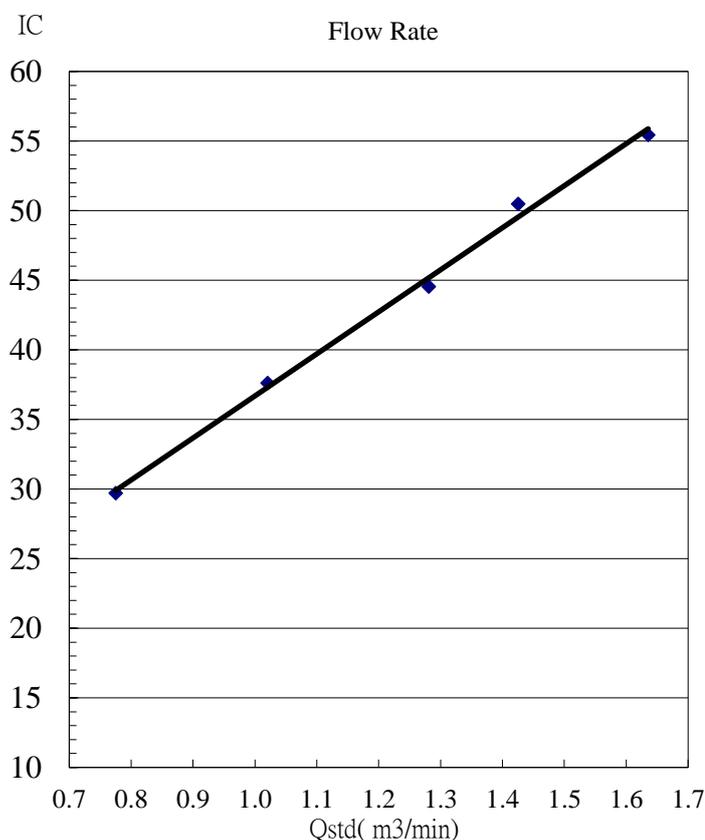
$1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Flow Rate

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM1		Date of Calibration:	8-Dec-25
Name and Model : TISCH HVS Model TE-5170		Next Calibration Date:	8-Feb-26
		Operator:	P.F.Yeung

CONDITIONS

	1024	Corrected Pressure (mm Hg)	768.1
Temperature (^{o}C)	24.0	Temperature (K)	297.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07213
Model:	TE-5025A	Qstd Intercept	-0.03919
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	5.6	11.2	1.646	54	54.39	Slope= 28.553
13	4.3	4.2	8.5	1.436	48	48.35	Intercept= 7.1476
10	3.2	3.2	6.4	1.249	42	42.30	Corr. Coeff.= 0.9987
7	2.1	2.0	4.1	1.003	35	35.25	
5	1.3	1.2	2.5	0.787	30	30.22	

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:

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

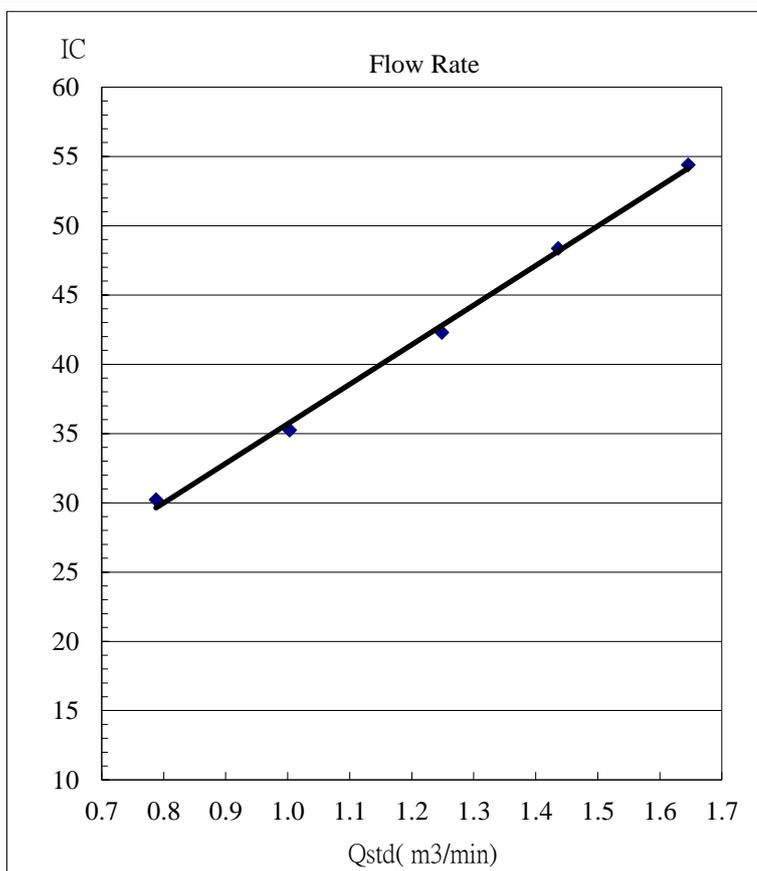m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Flow Rate

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM2	Date of Calibration: 8-Dec-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date: 8-Feb-26
	Operator: P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1024	Corrected Pressure (mm Hg)	768.1
Temperature (°C)	24.0	Temperature (K)	297.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07213
Model:	TE-5025A	Qstd Intercept	-0.03919
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H20(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.9	5.9	11.8	1.689	53	53.38	Slope= 29.213
13	4.7	4.7	9.4	1.509	48	48.35	Intercept= 4.3443
10	3.5	3.5	7.0	1.305	43	43.31	Corr. Coeff.= 0.9988
7	2.2	2.2	4.4	1.039	34	34.25	
5	1.4	1.3	2.7	0.818	28	28.20	

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:
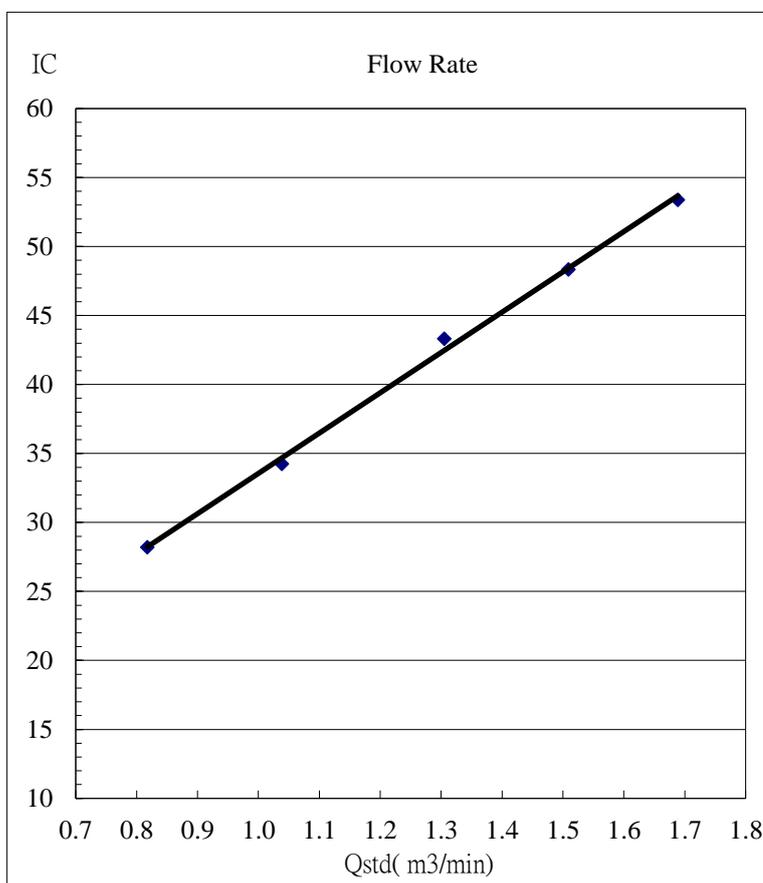
$1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Flow Rate

IC vs Qstd(m3/min)

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM3	Date of Calibration: 8-Dec-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date: 8-Feb-26
	Operator: P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1024	Corrected Pressure (mm Hg)	768.1
Temperature (^{o}C)	24.0	Temperature (K)	297.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07213
Model:	TE-5025A	Qstd Intercept	-0.03919
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	1.631	56	56.41	Slope= 28.037
13	4.6	4.6	9.2	1.493	51	51.37	Intercept= 10.027
10	3.5	3.5	7.0	1.305	46	46.33	Corr. Coeff.= 0.9987
7	2.4	2.4	4.8	1.084	40	40.29	
5	1.4	1.3	2.7	0.818	33	33.24	

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:
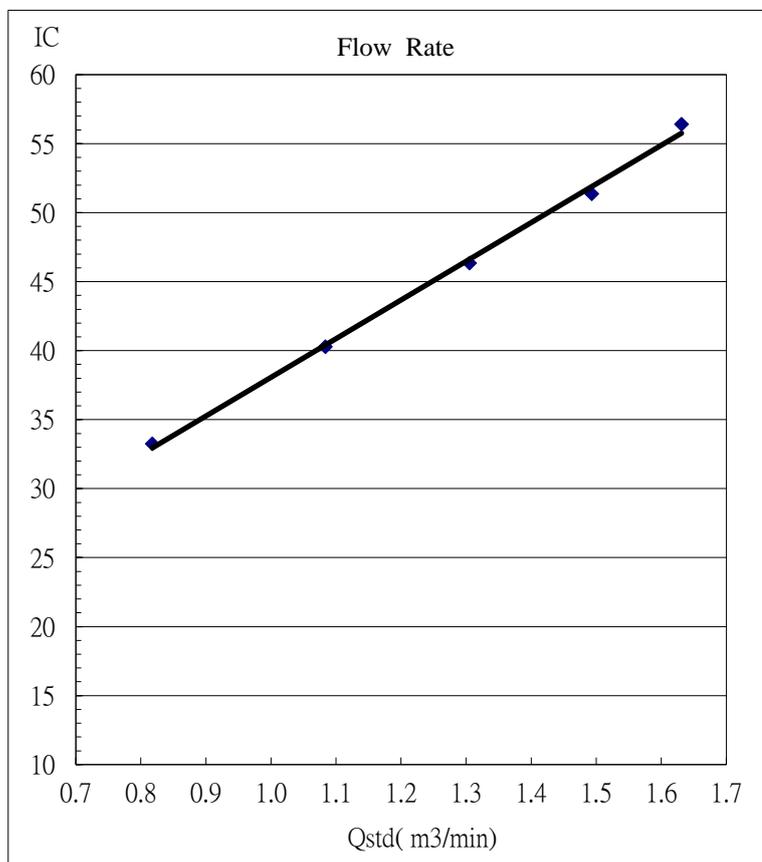
$1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Flow Rate

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location ID: AM4	Date of Calibration: 8-Dec-25
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date: 8-Feb-26
	Operator: P.F.Yeung

CONDITIONS

Sea Level Pressure (hpa)	1024	Corrected Pressure (mm Hg)	768.1
Temperature (°C)	24.0	Temperature (K)	297.0

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.07213
Model:	TE-5025A	Qstd Intercept	-0.03919
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	1.717	57	57.41	Slope= 30.180
13	4.8	4.7	9.5	1.517	51	51.37	Intercept= 5.3918
10	3.5	3.6	7.1	1.314	44	44.32	Corr. Coeff.= 0.9993
7	2.3	2.2	4.5	1.050	37	37.27	
5	1.4	1.3	2.7	0.818	30	30.22	

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

Flow Rate — IC vs Qstd(m3/min)