

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Siu Ho Wan WTW Administration
 Location ID : SHWAB
 Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 24-Apr-26
 Next Calibration Date: 24-Jun-26
 Technician: Dicky Chan

CONDITIONS

Sea Level Pressure (hPa)
 Temperature (°C)

1012.8
 21.1

Corrected Pressure (mm Hg)
 Temperature (K)

759.6
 294

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 1941

Qstd Slope ->
 Qstd Intercept ->

2.09671
 -0.01852

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.10	6.10	12.2	1.685	53	53.69	Slope = 28.8347 Intercept = 4.9965 Corr. coeff. = 0.9984
13	4.80	4.80	9.6	1.496	48	48.62	
10	3.60	3.60	7.2	1.297	41	41.53	
7	2.40	2.40	4.8	1.060	35	35.45	
5	1.60	1.60	3.2	0.867	30	30.39	

Calculations :

$$Q_{std} = 1/m[\text{Sqrt}(H_{20}(P_a/P_{std})(T_{std}/T_a)) - b]$$

$$IC = I[\text{Sqrt}(P_a/P_{std})(T_{std}/T_a)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/T_{av})(P_{av}/760)] - b)$$

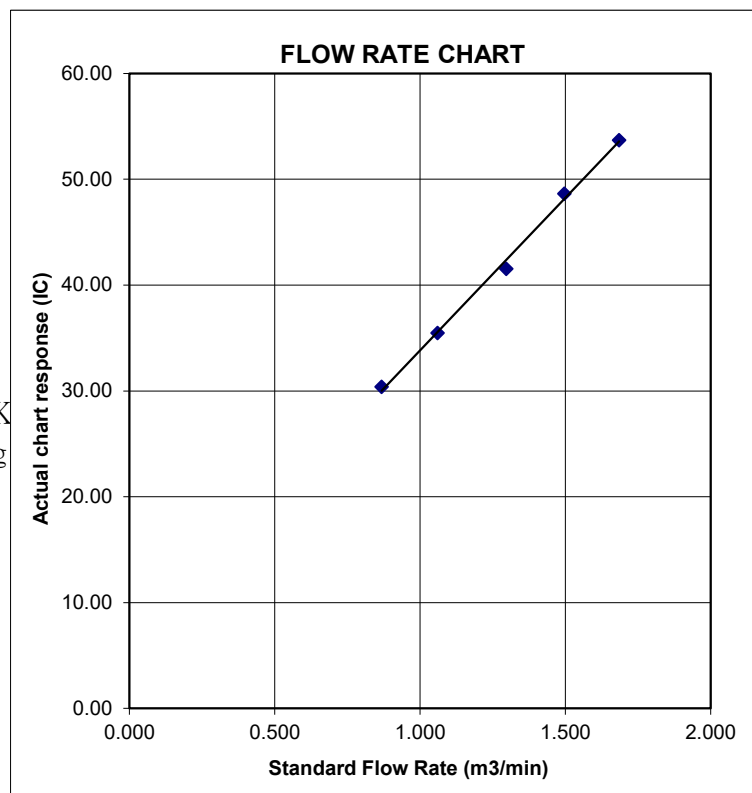
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Siu Ho Wan WTW Administration
 Location ID : SHWAB
 Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 23-Jun-26
 Next Calibration Date: 23-Aug-26
 Technician: Dicky Chan

CONDITIONS

Sea Level Pressure (hPa)
 Temperature (°C)

1004
 30.4

Corrected Pressure (mm Hg)
 Temperature (K)

753
 303

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 1941

Qstd Slope ->
 Qstd Intercept ->

2.09671
 -0.01852

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.20	6.20	12.4	1.666	52	50.84	Slope = 29.6806 Intercept = 1.4818 Corr. coeff. = 0.9985
13	4.90	4.90	9.8	1.482	46	44.97	
10	3.60	3.60	7.2	1.271	41	40.08	
7	2.70	2.70	5.4	1.102	35	34.22	
5	1.60	1.60	3.2	0.850	27	26.40	

Calculations :

$$Q_{std} = 1/m[\text{Sqrt}(H_{20}(P_a/P_{std})(T_{std}/T_a)) - b]$$

$$IC = I[\text{Sqrt}(P_a/P_{std})(T_{std}/T_a)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/T_{av})(P_{av}/760)] - b)$$

m = sampler slope

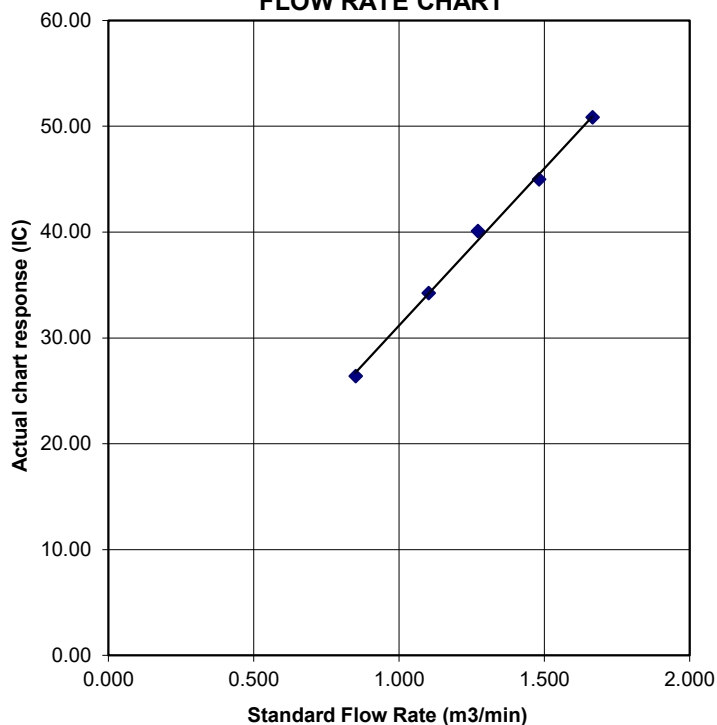
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



Certificate of Calibration

Calibration Certification Information

Cal. Date: December 8, 2025 Rootsmeter S/N: 438320 Ta: 294 °K
Operator: Jim Tisch Pa: 755.7 mm Hg
Calibration Model #: TE-5025A Calibrator S/N: 1941

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4570	3.2	2.00
2	3	4	1	1.0380	6.4	4.00
3	5	6	1	0.9290	7.9	5.00
4	7	8	1	0.8850	8.8	5.50
5	9	10	1	0.7320	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
1.0035	0.6888	1.4197	0.9958	0.6834	0.8821
0.9993	0.9627	2.0078	0.9915	0.9552	1.2475
0.9973	1.0735	2.2448	0.9895	1.0652	1.3948
0.9961	1.1255	2.3543	0.9884	1.1168	1.4628
0.9907	1.3535	2.8394	0.9831	1.3430	1.7642
QSTD	m=	2.13603	QA	m=	1.33754
	b=	-0.04992		b=	-0.03102
	r=	1.00000		r=	1.00000

Calculations

Vstd=	$\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	Va=	$\Delta Vol((Pa-\Delta P)/Pa)$
Qstd=	$Vstd/\Delta Time$	Qa=	$Va/\Delta Time$
For subsequent flow rate calculations:			
Qstd=	$1/m \left(\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa=	$1/m \left(\left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} \right) - b \right)$

Standard Conditions

Tstd: 298.15 °K
Pstd: 760 mm Hg

Key

ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30