

Annex D1

# Calibration Certificates for Dust Monitoring Equipment

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID: AM1	Date of Calibration:	26-Apr-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	26-Jun-23
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	20.0	Temperature (K)	293

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.06918
Model:	TE-5025A	Qstd Intercept	-0.04220
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	5.7	11.3	1.661	56	56.57	Slope= 30.829 Intercept= 6.182 Corr. Coeff.= 0.9976
13	4.3	4.3	8.6	1.452	51	51.52	
10	3.2	3.2	6.4	1.255	45	45.46	
7	2.0	2.0	4.0	0.997	37	37.37	
5	1.3	1.3	2.6	0.808	30	30.30	

#### 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:

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

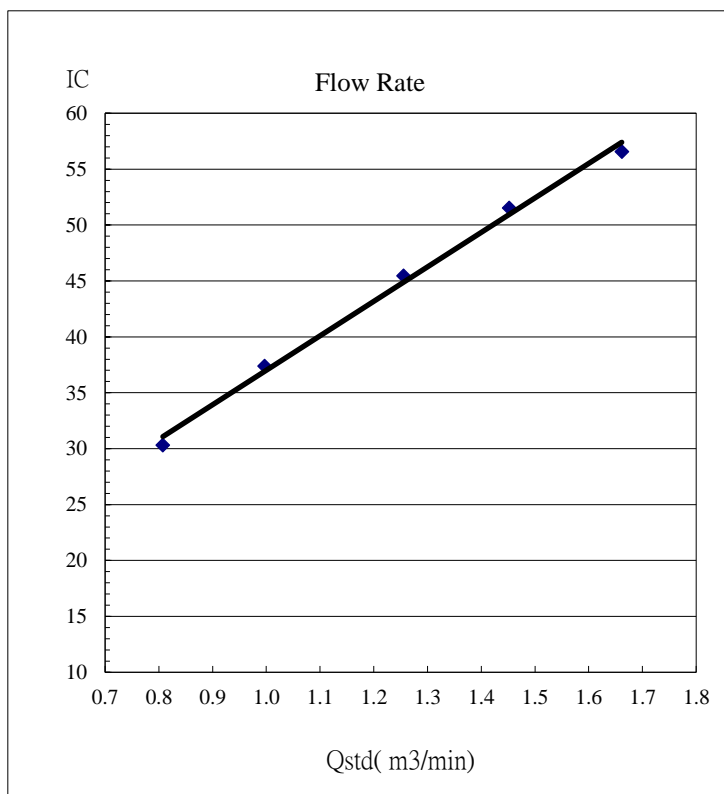
m = sampler slope

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:	26-Apr-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	26-Jun-23
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	20.0	Temperature (K)	293

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.06918
Model:	TE-5025A	Qstd Intercept	-0.04220
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.5	6.5	13.0	1.781	55	55.56	Slope= 26.274 Intercept= 9.159 Corr. Coeff.= 0.9970
13	5.0	5.0	10.0	1.564	50	50.51	
10	3.5	3.5	7.0	1.312	43	43.44	
7	2.3	2.3	4.6	1.067	38	38.38	
5	1.4	1.4	2.8	0.837	30	30.30	

#### 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:

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

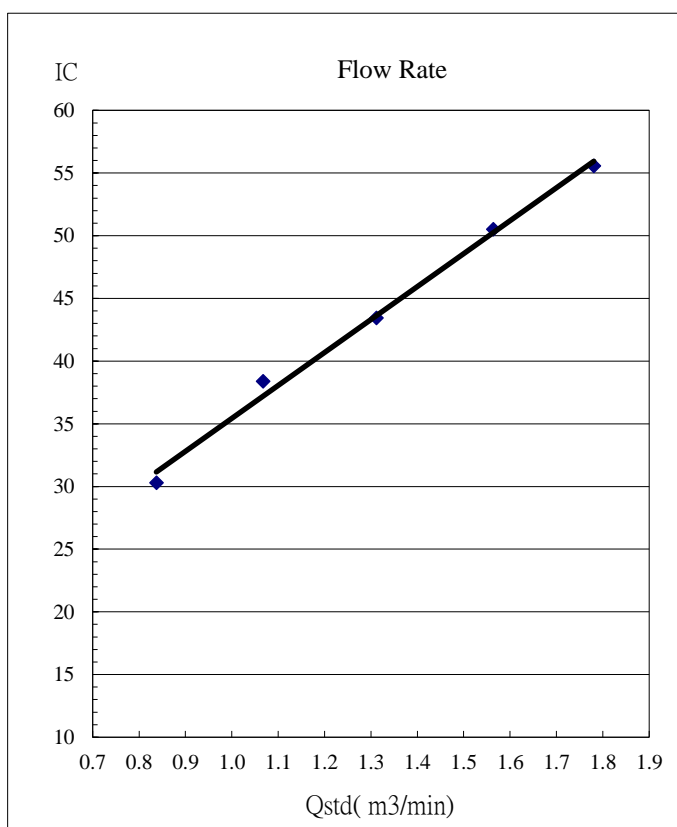
m = sampler slope

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:	26-Apr-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	26-Jun-23
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	20.0	Temperature (K)	293

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.06918
Model:	TE-5025A	Qstd Intercept	-0.04220
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	1.654	63	63.64	Slope= 27.841 Intercept= 17.667 Corr. Coeff.= 0.9971
13	4.3	4.2	8.5	1.444	58	58.59	
10	3.2	3.3	6.5	1.265	52	52.53	
7	2.2	2.1	4.3	1.033	45	45.46	
5	1.3	1.2	2.5	0.792	40	40.40	

**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:**

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

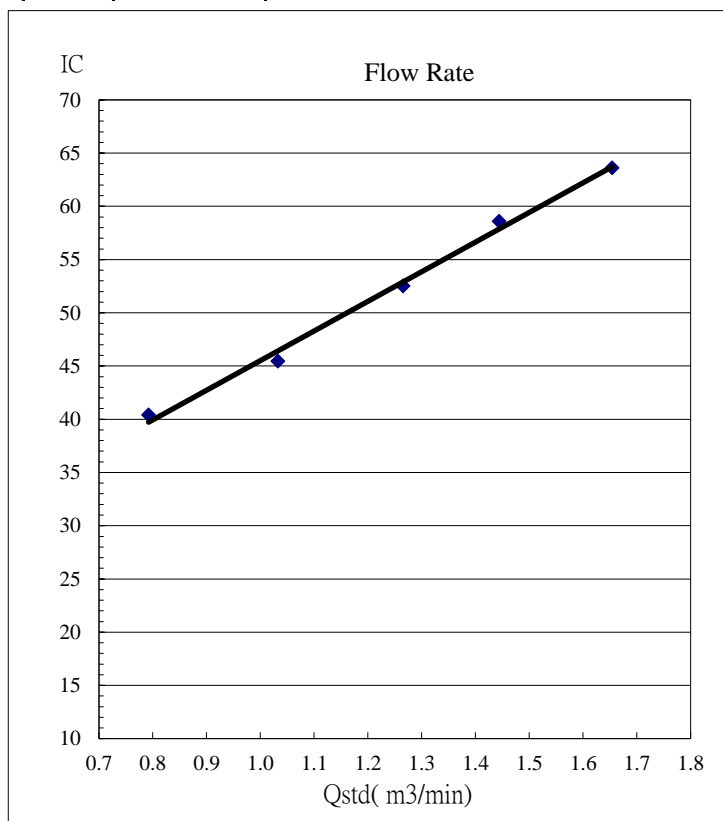
m = sampler slope

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:	26-Apr-23
Name and Model : TISCH HVS Model TE-5170	Next Calibration Date:	26-Jun-23
	Operator:	P.F.Yeung

### CONDITIONS

Sea Level Pressure (hpa)	1016	Corrected Pressure (mm Hg)	762.1
Temperature (°C)	20.0	Temperature (K)	293

### CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.06918
Model:	TE-5025A	Qstd Intercept	-0.04220
Serial#:	2454		

### CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.4	6.5	12.9	1.774	58	58.59	Slope= 30.581 Intercept= 4.669 Corr. Coeff.= 0.9973
13	5.1	5.1	10.2	1.579	52	52.53	
10	3.4	3.4	6.8	1.293	45	45.46	
7	2.4	2.4	4.8	1.090	38	38.38	
5	1.5	1.5	3.0	0.866	30	30.30	

#### 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

