

**AECOM Asia Company Limited**  
**TSP High Volume Sampler**  
**Field Calibration Report**

Station: Sheung Wun Yiu (AM1A) Operator: Shum Kam Yuen  
 Cal. Date: 28-Jan-11 Next Due Date: 28-Mar-11  
 Equipment No.: A-001-53T Serial No.: 10216

Station: Sheung Wun Yiu (AM1A)  
 Cal. Date: 28-Jan-11  
 Next Due Date: 28-Mar-11  
 Set Point (IC): 41.32

Ambient Condition			
Temperature, Ta (K)	290	Pressure, Pa (mmHg)	766.7

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	2.01259	Intercept, bc	-0.01532
Last Calibration Date:	7-May-10	mc x Qstd + bc = [DH x (Pa/760) x (298/Ta)] <sup>1/2</sup>			
Next Calibration Date:	7-May-11	Qstd = {[DH x (Pa/760) x (298/Ta)] <sup>1/2</sup> - bc} / mc			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] <sup>1/2</sup>	Qstd (m <sup>3</sup> /min) X axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.4	3.28	1.64	52.0	52.94
13	6.5	2.60	1.30	42.0	42.76
10	4.8	2.23	1.12	36.0	36.65
7	3.6	1.93	0.97	30.0	30.54
5	2.2	1.51	0.76	22.0	22.40

By Linear Regression of Y on X  
 Slope, mw = 34.6597 Intercept, bw = -2.9911  
 Correlation Coefficient\* = 0.9943  
 \*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**  
 From the TSP Field Calibration Curve, take Qstd = 1.30m<sup>3</sup>/min  
 From the Regression Equation, the "Y" value according to  

$$mw \times Qstd + bw = IC \times [(Pa/760) \times (298/Ta)]^{1/2}$$
 Therefore, Set Point; IC = (mw x Qstd + bw) x [(760 / Pa) x (298 / Ta)]<sup>1/2</sup> = 41.32

Remarks: \_\_\_\_\_

QC Reviewer: Joe Fu Signature: Joe Date: 31 Jan 11

IC (CFM)	Qstd (m <sup>3</sup> /min)
24	0.779
25	0.808
26	0.836
27	0.865
28	0.894
29	0.923
30	0.952
31	0.981
32	1.010
33	1.038
34	1.067
35	1.096
36	1.125
37	1.154
38	1.183
39	1.212
40	1.240
41	1.269
42	1.298
43	1.327
44	1.356
45	1.385
46	1.413
47	1.442
48	1.471
49	1.500
50	1.529
51	1.558
52	1.587
53	1.615
54	1.644
55	1.673
56	1.702
57	1.731
58	1.760
59	1.789
60	1.817
61	1.846
62	1.875
63	1.904
64	1.933
65	1.962

**AECOM Asia Company Limited**  
**TSP High Volume Sampler**  
**Field Calibration Report**

Station: Shan Tong New Village (AM2) Operator: Shum Kam Yuen  
 Cal. Date: 28-Jan-11 Next Due Date: 28-Mar-11  
 Equipment No.: A-001-29T Serial No.: 10202

Station: **Shan Tong New Village (AM2)**

Cal. Date: **28-Jan-11**

Next Due Date: **28-Mar-11**

Set Point (IC) **37.82**

Ambient Condition			
Temperature, Ta (K)	290	Pressure, Pa (mmHg)	766.7

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	2.01259	Intercept, bc	-0.01532
Last Calibration Date:	7-May-10	mc x Qstd + bc = [DH x (Pa/760) x (298/Ta)] <sup>1/2</sup>			
Next Calibration Date:	7-May-11	Qstd = {[DH x (Pa/760) x (298/Ta)] <sup>1/2</sup> - bc} / mc			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] <sup>1/2</sup>	Qstd (m <sup>3</sup> /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.5	3.30	1.65	50.0	50.91
13	8.1	2.90	1.45	42.0	42.76
10	5.5	2.39	1.19	34.0	34.62
7	4.1	2.06	1.03	28.0	28.51
5	2.3	1.54	0.77	22.0	22.40

By Linear Regression of Y on X  
 Slope, mw = 32.8959 Intercept, bw = -4.2620  
 Correlation Coefficient\* = 0.9917  
 \*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**

From the TSP Field Calibration Curve, take Qstd = 1.30m<sup>3</sup>/min  
 From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = IC \times [(Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; IC = (mw x Qstd + bw) x [(760 / Pa) x (Ta / 298)]<sup>1/2</sup> = 37.82

Remarks: \_\_\_\_\_

QC Reviewer: be fu Signature: be Date: 31 Jan 11

IC (CFM)	Qstd (m <sup>3</sup> /min)
24	0.859
25	0.890
26	0.920
27	0.950
28	0.981
29	1.011
30	1.042
31	1.072
32	1.102
33	1.133
34	1.163
35	1.194
36	1.224
37	1.254
38	1.285
39	1.315
40	1.346
41	1.376
42	1.406
43	1.437
44	1.467
45	1.498
46	1.528
47	1.558
48	1.589
49	1.619
50	1.650
51	1.680
52	1.710
53	1.741
54	1.771
55	1.802
56	1.832
57	1.862
58	1.893
59	1.923
60	1.953
61	1.984
62	2.014
63	2.045
64	2.075
65	2.105

**AECOM Asia Company Limited**  
**TSP High Volume Sampler**  
**Field Calibration Report**

Station: Riverain Bayside (AM3) Operator: Shum Kam Yuen  
 Cal. Date: 28-Jan-11 Next Due Date: 28-Mar-11  
 Equipment No.: A-001-69T Serial No.: 716

Station: Riverain Bayside (AM3)

Cal. Date: 28-Jan-11

Next Due Date: 28-Mar-11

Set Point (IC) 40.78

Ambient Condition			
Temperature, Ta (K)	290	Pressure, Pa (mmHg)	766.7

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	2.01259	Intercept, bc	-0.01532
Last Calibration Date:	7-May-10	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	7-May-11	$Qstd = \{ [DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc \} / mc$			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m <sup>3</sup> /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.4	3.28	1.64	52.0	52.94
13	8.1	2.90	1.45	46.0	46.84
10	5.9	2.47	1.24	40.0	40.73
7	4.4	2.14	1.07	32.0	32.58
5	2.6	1.64	0.82	24.0	24.44

**By Linear Regression of Y on X**

Slope, mw = 35.4015 Intercept, bw = -4.4998

Correlation Coefficient\* = 0.9940

\*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**

From the TSP Field Calibration Curve, take Qstd = 1.30m<sup>3</sup>/min

From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = IC \times [(Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; IC = ( mw x Qstd + bw ) x [ ( 760 / Pa ) x ( Ta / 298 ) ]<sup>1/2</sup> = 40.78

IC (CFM)	Qstd (m <sup>3</sup> /min)
24	0.805
25	0.833
26	0.862
27	0.890
28	0.918
29	0.946
30	0.975
31	1.003
32	1.031
33	1.059
34	1.088
35	1.116
36	1.144
37	1.172
38	1.201
39	1.229
40	1.257
41	1.285
42	1.313
43	1.342
44	1.370
45	1.398
46	1.426
47	1.455
48	1.483
49	1.511
50	1.539
51	1.568
52	1.596
53	1.624
54	1.652
55	1.681
56	1.709
57	1.737
58	1.765
59	1.794
60	1.822
61	1.850
62	1.878
63	1.907
64	1.935
65	1.963

Remarks: \_\_\_\_\_

QC Reviewer: Joe Fu Signature: Joe Date: 31 Jan 11

**AECOM Asia Company Limited**  
**TSP High Volume Sampler**  
**Field Calibration Report**

Station: Tai Kwong Secondary School (AM4) Operator: Shum Kam Yuen  
 Cal. Date: 28-Jan-11 Next Due Date: 28-Mar-11  
 Equipment No.: A-001-70T Serial No.: 10273

Station: Tai Kwong Secondary School (AM4)  
 Cal. Date: 28-Jan-11  
 Next Due Date: 28-Mar-11  
 Set Point (IC) 40.70

Ambient Condition			
Temperature, Ta (K)	290	Pressure, Pa (mmHg)	766.7

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	2.01259	Intercept, bc	-0.01532
Last Calibration Date:	7-May-10	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	7-May-11	$Qstd = \{ [DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc \} / mc$			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m <sup>3</sup> /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.1	3.24	1.62	52.0	52.94
13	8.4	2.95	1.47	48.0	48.87
10	6.0	2.49	1.25	38.0	38.69
7	4.1	2.06	1.03	30.0	30.54
5	2.2	1.51	0.76	22.0	22.40

By Linear Regression of Y on X  
 Slope, mw = 36.7503 Intercept, bw = -6.3360  
 Correlation Coefficient\* = 0.9944  
 \*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**

From the TSP Field Calibration Curve, take Qstd = 1.30m<sup>3</sup>/min  
 From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = IC \times [(Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point, IC =  $(mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} =$  40.70

Remarks: \_\_\_\_\_

QC Reviewer: Joe Fu Signature: Joe Date: 31 Jan 11

IC (CFM)	Qstd (m <sup>3</sup> /min)
24	0.825
25	0.853
26	0.880
27	0.907
28	0.934
29	0.962
30	0.989
31	1.016
32	1.043
33	1.070
34	1.098
35	1.125
36	1.152
37	1.179
38	1.206
39	1.234
40	1.261
41	1.288
42	1.315
43	1.342
44	1.370
45	1.397
46	1.424
47	1.451
48	1.479
49	1.506
50	1.533
51	1.560
52	1.587
53	1.615
54	1.642
55	1.669
56	1.696
57	1.723
58	1.751
59	1.778
60	1.805
61	1.832
62	1.859
63	1.887
64	1.914
65	1.941

## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3  
 Equipment No.: A.005.07a  
 Sensitivity Adjustment Scale Setting: 557 CPM  
 Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 30 May 2010

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 557 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 557 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	05-06-10	10:00 - 11:00	27.3	78	0.05537	1850	30.83
2	05-06-10	11:00 - 12:00	27.4	77	0.05441	1812	30.20
3	05-06-10	12:00 - 13:00	27.4	78	0.05245	1753	29.22
4	05-06-10	13:00 - 14:00	27.5	78	0.05355	1787	29.78

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0018  
 Correlation coefficient: 0.9949

Validity of Calibration Record: 4 June 2011

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 7 June 2010

## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3  
 Equipment No.: A.005.09a  
 Sensitivity Adjustment Scale Setting: 797 CPM  
 Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No.: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 30 May 2010

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 797 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 797 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	06-06-10	13:30 - 14:30	27.8	77	0.06421	2408	40.13
2	06-06-10	14:30 - 15:30	27.8	78	0.06643	2491	41.52
3	06-06-10	15:30 - 16:30	27.9	78	0.06375	2379	39.65
4	06-06-10	16:30 - 17:30	27.7	78	0.06159	2305	38.42

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0016  
 Correlation coefficient: 0.9944

Validity of Calibration Record: 5 June 2011

Remarks:

QC Reviewer: YW Fung Signature:  Date: 7 June 2010



## CERTIFICATE OF CALIBRATION

Certificate No.: 10CA0728 02-01 Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type 1)	,	Microphone
Manufacturer:	B & K	,	B & K
Type/Model No.:	2238	,	4188
Serial/Equipment No.:	2255680	,	2250447
Adaptors used:	-	,	-

### Item submitted by

Customer Name: AECOM ASIA CO., LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 28-Jul-2010

Date of test: 29-Jul-2010

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	12-Jan-2011	CIGISMEC
Signal generator	DS 360	33873	28-Jun-2011	CEPREI
Signal generator	DS 360	61227	24-Jun-2011	CEPREI

### Ambient conditions

Temperature: (21 ± 1) °C  
Relative humidity: (60 ± 5) %  
Air pressure: (1000 ± 5) hPa

### Test specifications

- 1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- 2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
- 3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.


### Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

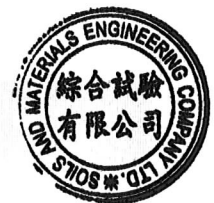
Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian Min/Feng Jun Qi

Date: 29-Jul-2010

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



## CERTIFICATE OF CALIBRATION

Certificate No.: 10CA0724 01 Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type 1)	,	Microphone
Manufacturer:	B & K	,	B & K
Type/Model No.:	2238	,	4188
Serial/Equipment No.:	2255677	,	2250455
Adaptors used:	-	,	-

### Item submitted by

Customer Name: AECOM ASIA CO., LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 24-Jul-2010

Date of test: 26-Jul-2010

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	12-Jan-2011	CIGISMEC
Signal generator	DS 360	33873	28-Jun-2011	CEPREI
Signal generator	DS 360	81227	24-Jun-2011	CEPREI

### Ambient conditions

Temperature: (21 ± 1) °C  
Relative humidity: (60 ± 5) %  
Air pressure: (1000 ± 5) hPa

### Test specifications

- The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
- The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.


### Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian-Ming/Feng Jun Qi

Date: 26-Jul-2010

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.





## CERTIFICATE OF CALIBRATION

Certificate No.: 10CA0313 05-03 Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type 1)	,	Microphone
Manufacturer:	B & K	,	B & K
Type/Model No.:	2238	,	4188
Serial/Equipment No.:	2285692	,	2565556
Adaptors used:	-	,	-

### Item submitted by

Customer Name: AECOM ASIA CO., LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 13-Mar-2010

Date of test: 15-Mar-2010

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	12-Jan-2011	CIGISMEC
Signal generator	DS 360	33873	22-Jun-2010	CEPREI
Signal generator	DS 360	61227	22-Jun-2010	CEPREI

### Ambient conditions

Temperature: (22 ± 1) °C  
Relative humidity: (60 ± 10) %  
Air pressure: (1010 ± 5) hPa

### Test specifications

- 1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- 2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
- 3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

### Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian-Min/Feng Jun Qi

Date: 27-Mar-2010

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



## CERTIFICATE OF CALIBRATION

Certificate No.: 10CA0708 04-01

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: B&K  
Type/Model No.: 4231  
Serial/Equipment No.: 1790985 / N004.01  
Adaptors used: -

### Item submitted by

Customer: AECOM ASIA CO. LTD  
Address of Customer: -  
Request No.: -  
Date of request: 08-Jul-2010

Date of test: 14-Jul-2010

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	02-Jul-2011	SCL
Preamplifier	B&K 2673	2239857	15-Dec-2010	CEPREI
Measuring amplifier	B&K 2810	2348941	11-Dec-2010	CEPREI
Signal generator	DS 360	61227	24-Jun-2011	CEPREI
Digital multi-meter	34401A	US38087050	03-Dec-2010	CIGISMEC
Audio analyzer	8903B	GB41300350	07-Dec-2010	CEPREI
Universal counter	53132A	MY40003662	05-Jul-2011	CEPREI

### Ambient conditions

Temperature:  $22 \pm 1$  °C  
Relative humidity:  $60 \pm 5$  %  
Air pressure:  $1000 \pm 5$  hPa

### Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

### Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

  
Huang Jun Qi/Feng Jun Qi

Date: 14-Jul-2010

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.