

AECOM Asia Company Limited
TSP High Volume Sampler
Field Calibration Report

Station: Sheung Wun Yiu (AM1A) Operator: Shum Kam Yuen
 Cal. Date: 1-Dec-10 Next Due Date: 1-Feb-11
 Equipment No.: A-001-53T Serial No.: 10216

Station: Sheung Wun Yiu (AM1A)

Cal. Date: 1-Dec-10

Next Due Date: 1-Feb-11

Set Point (IC) 39.84

Ambient Condition			
Temperature, Ta (K)	298	Pressure, Pa (mmHg)	760.2

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 ³ /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.8	3.30	1.65	52.0	52.18
13	8.1	2.86	1.43	44.0	44.15
10	6.0	2.46	1.23	36.0	36.13
7	3.8	1.96	0.98	30.0	30.11
5	2.3	1.52	0.76	22.0	22.08

By Linear Regression of Y on X

Slope, mw = 33.4910 Intercept, bw = -3.5635

Correlation Coefficient* = 0.9941

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation	
From the TSP Field Calibration Curve, take Qstd = 1.30m ³ /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)] ^{1/2} =	<u>39.84</u>

Remarks: _____

QC Reviewer: Joe Fu Signature: Joe Date: 2 Dec 10

IC (CFM)	Qstd (m ³ /min)
24	0.823
25	0.853
26	0.883
27	0.913
28	0.942
29	0.972
30	1.002
31	1.032
32	1.062
33	1.092
34	1.122
35	1.151
36	1.181
37	1.211
38	1.241
39	1.271
40	1.301
41	1.331
42	1.360
43	1.390
44	1.420
45	1.450
46	1.480
47	1.510
48	1.540
49	1.569
50	1.599
51	1.629
52	1.659
53	1.689
54	1.719
55	1.749
56	1.778
57	1.808
58	1.838
59	1.868
60	1.898
61	1.928
62	1.958
63	1.987
64	2.017
65	2.047

AECOM Asia Company Limited
TSP High Volume Sampler
Field Calibration Report

Station Shan Tong New Village (AM2) Operator: Shum Kam Yuen
 Cal. Date: 1-Dec-10 Next Due Date: 1-Feb-11
 Equipment No.: A-001-29T Serial No. 10202

Ambient Condition			
Temperature, Ta (K)	296	Pressure, Pa (mmHg)	760.2

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 ³ /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	11.0	3.33	1.66	52.0	52.18
13	8.5	2.93	1.46	46.0	46.16
10	6.2	2.50	1.25	38.0	38.13
7	4.0	2.01	1.00	30.0	30.11
5	2.4	1.55	0.78	22.0	22.08

By Linear Regression of Y on X

Slope, mw = 34.3806 Intercept, bw = -4.6023

Correlation Coefficient* = 0.9992

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation	
From the TSP Field Calibration Curve, take Qstd = 1.30m ³ /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) ^{1/2} =	<u>39.95</u>

Remarks: _____

QC Reviewer: Joe Fu Signature: Joe Date: 2 Dec 10

Station Shan Tong New Village (AM2)

Cal. Date: 1-Dec-10

Next Due Date: 1-Feb-11

Set Point (IC) 39.95

IC (CFM)	Qstd (m ³ /min)
24	0.832
25	0.861
26	0.890
27	0.919
28	0.948
29	0.977
30	1.006
31	1.036
32	1.065
33	1.094
34	1.123
35	1.152
36	1.181
37	1.210
38	1.239
39	1.268
40	1.297
41	1.326
42	1.355
43	1.385
44	1.414
45	1.443
46	1.472
47	1.501
48	1.530
49	1.559
50	1.588
51	1.617
52	1.646
53	1.675
54	1.705
55	1.734
56	1.763
57	1.792
58	1.821
59	1.850
60	1.879
61	1.908
62	1.937
63	1.966
64	1.995
65	2.024

AECOM Asia Company Limited
TSP High Volume Sampler
Field Calibration Report

Station: Riverain Bayside (AM3) Operator: Shum Kam Yuen
 Cal. Date: 1-Dec-10 Next Due Date: 1-Feb-11
 Equipment No.: A-001-89T Serial No.: 716

Ambient Condition			
Temperature, Ta (K)	296	Pressure, Pa (mmHg)	760.2

Orifice Transfer Standard Information				
Serial No:	988	Slope, mc	2.01259	Intercept, bc
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 ³ /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	11.0	3.33	1.66	52.0	52.18
13	8.5	2.93	1.46	44.0	44.15
10	6.1	2.48	1.24	38.0	38.13
7	4.7	2.18	1.09	32.0	32.11
5	2.8	1.68	0.84	22.0	22.08

By Linear Regression of Y on X

Slope, mw = 35.9255 Intercept, bw = -7.4788

Correlation Coefficient* = 0.9949

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation	
From the TSP Field Calibration Curve, take Qstd = 1.30m ³ /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)] ^{1/2} =	<u>39.09</u>

Remarks: _____

QC Reviewer: Joe Fu Signature: Joe Date: 2 Dec 10

Station: Riverain Bayside (AM3)

Cal. Date: 1-Dec-10

Next Due Date: 1-Feb-11

Set Point (IC) 39.09

IC (CFM)	Qstd (m ³ /min)
24	0.876
25	0.904
26	0.932
27	0.960
28	0.988
29	1.015
30	1.043
31	1.071
32	1.099
33	1.127
34	1.155
35	1.182
36	1.210
37	1.238
38	1.266
39	1.294
40	1.322
41	1.349
42	1.377
43	1.405
44	1.433
45	1.461
46	1.489
47	1.516
48	1.544
49	1.572
50	1.600
51	1.628
52	1.656
53	1.683
54	1.711
55	1.739
56	1.767
57	1.795
58	1.823
59	1.850
60	1.878
61	1.906
62	1.934
63	1.962
64	1.990
65	2.017

AECOM Asia Company Limited
TSP High Volume Sampler
Field Calibration Report

Station: Tai Kwong Secondary School (AM4) Operator: Shum Kam Yuen
 Cal. Date: 1-Dec-10 Next Due Date: 1-Feb-11
 Equipment No.: A-001-70T Serial No.: 10273

Station: Tai Kwong Secondary School (AM4)

Cal. Date: 1-Dec-10

Next Due Date: 1-Feb-11

Set Point (IC) 40.54

Ambient Condition			
Temperature, Ta (K)	296	Pressure, Pa (mmHg)	760.2

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

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	$Q_{std} (m^3/min) \times$ axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	11.4	3.39	1.69	54.0	54.19
13	8.9	2.99	1.50	46.0	46.16
10	6.8	2.62	1.31	40.0	40.14
7	4.1	2.03	1.02	32.0	32.11
5	2.4	1.55	0.78	24.0	24.08

By Linear Regression of Y on X

Slope, mw = 32.1390 Intercept, bw = -1.1023

Correlation Coefficient* = 0.9956

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation	
From the TSP Field Calibration Curve, take $Q_{std} = 1.30 m^3/min$	
From the Regression Equation, the "Y" value according to	
$mw \times Q_{std} + bw = IC \times [(Pa/760) \times (298/Ta)]^{1/2}$	
Therefore, Set Point; IC = (mw x Qstd + bw) x (760 / Pa) x (Ta / 298) ^{1/2} =	<u>40.54</u>

Remarks: _____

QC Reviewer: Joe Fu Signature: [Signature] Date: 2 Dec 10

IC (CFM)	Qstd (m ³ /min)
24	0.781
25	0.812
26	0.843
27	0.874
28	0.906
29	0.937
30	0.968
31	0.999
32	1.030
33	1.061
34	1.092
35	1.123
36	1.154
37	1.186
38	1.217
39	1.248
40	1.279
41	1.310
42	1.341
43	1.372
44	1.403
45	1.434
46	1.466
47	1.497
48	1.528
49	1.559
50	1.590
51	1.621
52	1.652
53	1.683
54	1.714
55	1.746
56	1.777
57	1.808
58	1.839
59	1.870
60	1.901
61	1.932
62	1.963
63	1.995
64	2.026
65	2.057

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 K₀: 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 ¹ (mg/m ³) Y-axis	Total Count ²	Count/ Minute ³ 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 K₀: 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 ¹ (mg/m ³) Y-axis	Total Count ²	Count/ Minute ³ 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)

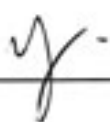
By Linear Regression of Y or X

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	61227	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 responsiveness 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 2610	2348941	11-Dec-2010	CEPREI
Signal generator	DS 360	61227	24-Jun-2011	CEPREI
Digital multi-meter	34401A	US36087050	03-Dec-2010	CIGISMEC
Audio analyzer	8903B	GB41300350	07-Dec-2010	CEPREI
Universal counter	53132A	MY40003662	05-Jul-2011	CEPREI

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 60 ± 5 %
Air pressure: 1000 ± 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 hPa 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/Guo/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.