

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station: Sheung Wun Yiu (AM1A) Operator: Shum Kam Yuen
 Cal. Date: 7-Feb-12 Next Due Date: 7-Apr-12
 Equipment No.: A-001-53T Serial No.: 10216

Ambient Condition			
Temperature, Ta (K)	293.8	Pressure, Pa (mmHg)	766.9

Orifice Transfer Standard Information					
Serial No:	843	Slope, mc	2.00834	Intercept, bc	-0.02923
Last Calibration Date:	5-Nov-11	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	5-Nov-12	$Qstd = \{ [DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc \} / mc$			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	9.7	3.15	1.58	50.0	50.58
13	6.0	2.48	1.25	40.0	40.47
10	4.5	2.15	1.08	34.0	34.40
7	3.6	1.92	0.97	30.0	30.35
5	2.4	1.57	0.79	23.0	23.27

By Linear Regression of Y on X

Slope, mw = 34.4752 Intercept, bw = -3.3526

Correlation Coefficient* = 0.9956

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m³/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} = 40.99

Remarks: _____

QC Reviewer: K. M. SHEK Signature: Mike Date: 8 Feb 12

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station: Shan Tong New Village (AM2) Operator: Shum Kam Yuen
 Cal. Date: 11-Jan-12 Next Due Date: 11-Mar-12
 Equipment No.: A-001-29T Serial No.: 10202

Ambient Condition			
Temperature, Ta (K)	291	Pressure, Pa (mmHg)	766.5

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	2.01182	Intercept, bc	-0.02516
Last Calibration Date:	17-May-11	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	17-May-12	$Qstd = \{ [DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc \} / mc$			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.0	3.21	1.61	50.0	50.81
13	7.2	2.73	1.37	42.0	42.68
10	5.0	2.27	1.14	34.0	34.55
7	3.5	1.90	0.96	30.0	30.49
5	2.4	1.57	0.80	24.0	24.39

By Linear Regression of Y on X

Slope, mw = 31.9509 Intercept, bw = -0.9412

Correlation Coefficient* = 0.9958

*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>39.94</u>

Remarks: _____

QC Reviewer: Yw Fung

Signature: [Signature]

Date: 12-Jan-12

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station: Riverain Bayside (AM3) Operator: Shum Kam Yuen
 Cal. Date: 6-Mar-12 Next Due Date: 6-May-12
 Equipment No.: A-001-69T Serial No.: 716

Ambient Condition			
Temperature, Ta (K)	297.1	Pressure, Pa (mmHg)	765.9

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	2.01182	Intercept, bc	-0.02516
Last Calibration Date:	17-May-11	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	17-May-12	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	9.7	3.13	1.57	50.0	50.27
13	7.6	2.77	1.39	42.0	42.23
10	5.7	2.40	1.21	36.0	36.19
7	4.3	2.08	1.05	30.0	30.16
5	2.3	1.52	0.77	21.0	21.11

By Linear Regression of Y on X
 Slope, mw = 36.1556 Intercept, bw = -7.2777
 Correlation Coefficient* = 0.9964
 *If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m³/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} = 39.51

Remarks: _____

QC Reviewer: K. M. SHEK Signature: Mike Date: 6. Mar. 12

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station: 168 Shek Kwu Lung Village (AM4A) Operator: Choi wing ho
 Cal. Date: 29-Feb-12 Next Due Date: 29-Apr-12
 Equipment No.: A-001-70T Serial No.: 10273

Ambient Condition			
Temperature, Ta (K)	289	Pressure, Pa (mmHg)	759.0

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	2.01182	Intercept, bc	-0.02516
Last Calibration Date:	17-May-11	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	17-May-12	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

Calibration of TSP Sampler					
Resistance Plate No.	Orifice			HVS Flow Recorder	
	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X-axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.0	3.21	1.61	46.0	46.68
13	8.2	2.91	1.46	42.0	42.62
10	5.3	2.34	1.17	32.0	32.47
7	3.6	1.93	0.97	26.0	26.38
5	2.0	1.44	0.73	20.0	20.30

By Linear Regression of Y on X

Slope, mw = 30.7051 Intercept, bw = -2.7480

Correlation Coefficient* = 0.9957

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m³/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} = 36.63

Remarks: _____

QC Reviewer: K. H. SHEK Signature: Hike Date: 29 Feb. 12



TISCH ENVIROMENTAL, INC.
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AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 17, 2011 Rootsmeter S/N 0438320 Ta (K) - 294
 Operator Tisch Orifice I.D. - 0988 Pa (mm) - 748.03

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3900	3.2	2.00
2	NA	NA	1.00	0.9830	6.4	4.00
3	NA	NA	1.00	0.8800	7.9	5.00
4	NA	NA	1.00	0.8380	8.8	5.50
5	NA	NA	1.00	0.6920	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9934	0.7146	1.4125	0.9957	0.7163	0.8866
0.9891	1.0062	1.9976	0.9915	1.0086	1.2538
0.9870	1.1216	2.2334	0.9893	1.1243	1.4018
0.9859	1.1765	2.3424	0.9882	1.1793	1.4703
0.9807	1.4172	2.8251	0.9830	1.4205	1.7732
Qstd slope (m) = 2.01182			Qa slope (m) = 1.25977		
intercept (b) = -0.02516			intercept (b) = -0.01579		
coefficient (r) = 0.99999			coefficient (r) = 0.99999		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

$$Vstd = \text{Diff. Vol} [(Pa - \text{Diff. Hg}) / 760] (298 / Ta)$$

$$Qstd = Vstd / \text{Time}$$

$$Va = \text{Diff Vol} [(Pa - \text{Diff Hg}) / Pa]$$

$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

$$Qstd = 1/m \{ [\text{SQRT}(\text{H2O}(\text{Pa}/760) (298/\text{Ta}))] - b \}$$

$$Qa = 1/m \{ [\text{SQRT} \text{H2O}(\text{Ta}/\text{Pa})] - b \}$$



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AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Nov 15, 2011 Rootmeter S/N 0438320 Ta (K) - 294
 Operator Tisch Orifice I.D. - 0843 Pa (mm) - 748.03

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3810	3.2	2.00
2	NA	NA	1.00	0.9810	6.4	4.00
3	NA	NA	1.00	0.8760	7.8	5.00
4	NA	NA	1.00	0.8370	8.8	5.50
5	NA	NA	1.00	0.6890	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9934	0.7193	1.4125	0.9957	0.7210	0.8866
0.9891	1.0083	1.9976	0.9915	1.0107	1.2538
0.9871	1.1269	2.2334	0.9895	1.1295	1.4018
0.9859	1.1779	2.3424	0.9882	1.1807	1.4703
0.9807	1.4233	2.8251	0.9830	1.4267	1.7732
Qstd slope (m) = 2.00834			Qa slope (m) = 1.25759		
intercept (b) = -0.02923			intercept (b) = -0.01835		
coefficient (r) = 0.99994			coefficient (r) = 0.99994		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)
 Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
 Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{ [SQRT(H2O(Pa/760) (298/Ta))] - b}
 Qa = 1/m{ [SQRT H2O(Ta/Pa)] - b}

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*: 4 June 2011

*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	05-06-11	09:30 - 10:30	31.3	67	0.04118	1540	25.67
2	05-06-11	10:30 - 11:30	31.3	67	0.04354	1637	27.28
3	05-06-11	11:30 - 12:30	31.3	67	0.04633	1730	28.83
4	05-06-11	12:30 - 13:30	31.4	66	0.04271	1603	26.72

- 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: 0.9958

Validity of Calibration Record: 4 June 2012

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 8 June 2011

EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor
 Manufacturer/Brand: SIBATA
 Model No.: LD-3
 Equipment No.: A.005.08a
 Sensitivity Adjustment Scale Setting: 702 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*: 4 June 2011

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 702 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 702 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	02-07-11	09:00 - 10:00	31.1	70	0.04313	1607	26.78
2	02-07-11	10:00 - 11:00	31.1	70	0.04137	1550	25.83
3	02-07-11	11:00 - 12:00	31.2	71	0.04552	1713	28.55
4	02-07-11	12:00 - 13:00	31.2	71	0.04736	1771	29.51

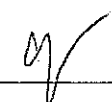
Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®
 2. Total Count was logged by Laser Dust Monitor
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0016
 Correlation coefficient: 0.9949

Validity of Calibration Record: 1 July 2012

Remarks:

QC Reviewer: YW Fung Signature:  Date: 4 July 2011

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*: 4 June 2011

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

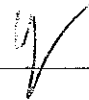
Sensitivity Adjustment Scale Setting (Before Calibration): 797 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 797 CPM

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	05-06-11	13:30 - 14:30	31.4	66	0.04416	1758	29.30
2	05-06-11	14:30 - 15:30	31.5	66	0.04752	1889	31.48
3	05-06-11	15:30 - 16:30	31.5	66	0.04371	1748	29.13
4	05-06-11	16:30 - 17:30	31.5	67	0.04543	1808	30.13

- 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): 0.0015
 Correlation coefficient: 0.9953
 Validity of Calibration Record: 4 June 2012

Remarks:

QC Reviewer: YW Fung Signature:  Date: 8 June 2011

EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor
 Manufacturer/Brand: SIBATA
 Model No.: LD-3
 Equipment No.: A.005.11a
 Sensitivity Adjustment Scale Setting: 799 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*: 4 June 2011

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 799 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 799 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	02-07-11	09:30 - 10:30	31.1	70	0.04305	1718	28.63
2	02-07-11	10:30 - 11:30	31.1	71	0.04257	1703	28.38
3	02-07-11	11:30 - 12:30	31.2	71	0.04424	1763	29.38
4	02-07-11	12:30 - 13:30	31.2	71	0.04632	1855	30.92


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): 0.0015
 Correlation coefficient: 0.9961

Validity of Calibration Record: 1 July 2012

Remarks:

QC Reviewer: YW Fung Signature:  Date: 4 July 2011

EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor
 Manufacturer/Brand: SIBATA
 Model No.: LD-3B
 Equipment No.: A.005.12a
 Sensitivity Adjustment Scale Setting: 805 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*: 4 June 2011

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 805 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 805 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	02-07-11	09:30 - 10:30	31.1	70	0.04305	1843	30.72
2	02-07-11	10:30 - 11:30	31.1	71	0.04257	1826	30.43
3	02-07-11	11:30 - 12:30	31.2	71	0.04424	1893	31.55
4	02-07-11	12:30 - 13:30	31.2	71	0.04632	1994	33.23

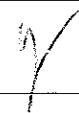
- Note:
1. Monitoring data was measured by Rupprecht & Patashnick TEOM®
 2. Total Count was logged by Laser Dust Monitor
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0014
 Correlation coefficient: 0.9947

Validity of Calibration Record: 1 July 2012

Remarks:

QC Reviewer: YW Fung Signature:  Date: 4 July 2011

EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor
 Manufacturer/Brand: SIBATA
 Model No.: LD-3B
 Equipment No.: A.005.13a
 Sensitivity Adjustment Scale Setting: 643 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*: 4 June 2011

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 643 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 643 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	05-06-11	11:00 - 12:00	31.4	67	0.04513	1933	32.21
2	05-06-11	12:00 - 13:00	31.4	67	0.04392	1833	31.38
3	05-06-11	13:00 - 14:00	31.5	66	0.04751	2042	34.03
4	05-06-11	14:00 - 15:00	31.5	66	0.04476	1918	31.97

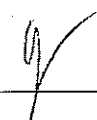
- Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®
 2. Total Count was logged by Laser Dust Monitor
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0014
 Correlation coefficient: 0.9978

Validity of Calibration Record: 4 June 2012

Remarks:

QC Reviewer: YW Fung Signature:  Date: 8 June 2011



CERTIFICATE OF CALIBRATION

Certificate No.: 11CA0711 01-02 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 / N.009.01	,	2250447
Adaptors used:	-	,	-

Item submitted by

Customer Name: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of receipt: 11-Jul-2011

Date of test: 12-Jul-2011

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	09-May-2012	CIGISMEC
Signal generator	DS 360	33873	30-May-2012	CEPREI
Signal generator	DS 360	61227	30-May-2012	CEPREI

Ambient conditions

Temperature: (22 ± 1) °C
Relative humidity: (55 ± 5) %
Air pressure: (995 ± 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.

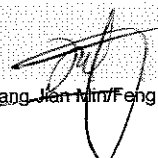
Test results

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.

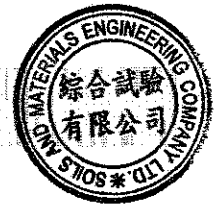
Actual Measurement data are documented on worksheets.

Approved Signatory:


Huang Jian Ming/Feng Jun Qi

Date: 13-Jul-2011

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.: 11CA0317 06-01 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.:	2285692/N.009.04	,	2250420
Adaptors used:	-	,	-

Item submitted by

Customer Name: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of request: 17-Mar-2011

Date of test: 26-Mar-2011

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	10-Jan-2012	CIGISMEC
Signal generator	DS 360	33873	28-Jun-2011	CEPREI
Signal generator	DS 360	61227	24-Jun-2011	CEPREI

Ambient conditions

Temperature: (22 ± 1) °C
Relative humidity: (60 ± 5) %
Air pressure: (1005 ± 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.

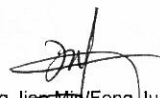
Test results

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.

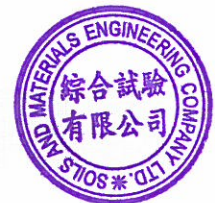
Actual Measurement data are documented on worksheets.

Approved Signatory:


Huang Jian Min/Feng Jun Qi

Date: 29-Mar-2011

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.: 12CA0321 01-01

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.:	2285692 / N.009.04	,	2250420
Adaptors used:	-	,	-

Item submitted by

Customer Name: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of receipt: 21-Mar-2012

Date of test: 21-Mar-2012

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	09-May-2012	CIGISMEC
Signal generator	DS 360	33873	30-May-2012	CEPREI
Signal generator	DS 360	61227	30-May-2012	CEPREI

Ambient conditions

Temperature: (22 ± 1) °C
Relative humidity: (60 ± 10) %
Air pressure: (1005 ± 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: 23-Mar-2012

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.: 11CA0830 02 Page 1 of 2

Item tested

Description:	Sound Level Meter (Type 1)	Microphone	Preamp
Manufacturer:	Rion Co., Ltd.	Rion Co., Ltd.	Rion Co., Ltd.
Type/Model No.:	NL-31	UC-53A	NH-19
Serial/Equipment No.:	00320528 / N.007.03A	90565	75883
Adaptors used:	-	-	-

Item submitted by

Customer Name: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of receipt: 30-Aug-2011

Date of test: 31-Aug-2011

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	09-May-2012	CIGISMEC
Signal generator	DS 360	33873	30-May-2012	CEPREI
Signal generator	DS 360	61227	30-May-2012	CEPREI

Ambient conditions

Temperature: (23 ± 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 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.

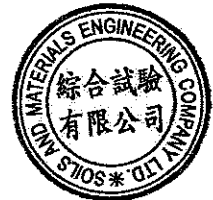
Actual Measurement data are documented on worksheets.

Approved Signatory:


Huang Jian Aia/Feng Jun Qi

Date: 31-Aug-2011

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.: 11CA0711 01-05

Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: Rion Co., Ltd.
Type/Model No.: NC-73
Serial/Equipment No.: 10307223 / N.004.08
Adaptors used: -

Item submitted by

Customer: AECOM ASIA CO. LTD.
Address of Customer: -
Request No.: -
Date of receipt: 11-Jul-2011

Date of test: 13-Jul-2011

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	18-May-2012	SCL
Preamplifier	B&K 2673	2239857	14-Dec-2011	CEPREI
Measuring amplifier	B&K 2610	2346941	15-Dec-2011	CEPREI
Signal generator	DS 360	61227	30-May-2012	CEPREI
Digital multi-meter	34401A	US36087050	09-Dec-2011	CEPREI
Audio analyzer	8903B	GB41300350	27-May-2012	CEPREI
Universal counter	53132A	MY40003662	30-May-2012	CEPREI

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 55 ± 5 %
Air pressure: 990 ± 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.

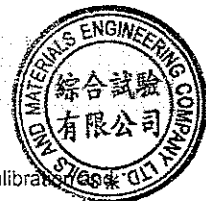
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

Huang Jian Min Feng Jun Qi

Date: 13-Jul-2011

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.: 11CA0317 06-02

Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: Rion Co., Ltd.
Type/Model No.: NC-73
Serial/Equipment No.: 10186482/N.004.09
Adaptors used: -

Item submitted by

Customer: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of request: 17-Mar-2011

Date of test: 26-Mar-2011

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	14-Dec-2011	CEPREI
Measuring amplifier	B&K 2610	2346941	15-Dec-2011	CEPREI
Signal generator	DS 360	61227	24-Jun-2011	CEPREI
Digital multi-meter	34401A	US36087050	09-Dec-2011	CEPREI
Audio analyzer	8903B	GB41300350	28-Jun-2011	CEPREI
Universal counter	53132A	MY40003662	05-Jul-2011	CEPREI

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 60 ± 5 %
Air pressure: 1005 ± 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

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

Approved Signatory:


Huang Jian Min / Feng Jun Qi

Date: 29-Mar-2011

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.: 12CA0321 01-04

Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: Rion Co., Ltd.
Type/Model No.: NC-73
Serial/Equipment No.: 10186482 / N.004.09
Adaptors used: -

Item submitted by

Customer: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of receipt: 21-Mar-2012

Date of test: 21-Mar-2012

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	18-May-2012	SCL
Preamplifier	B&K 2673	2239857	05-Jan-2013	CEPREI
Measuring amplifier	B&K 2610	2346941	29-Dec-2012	CEPREI
Signal generator	DS 360	61227	30-May-2012	CEPREI
Digital multi-meter	34401A	US36087050	16-Dec-2012	CEPREI
Audio analyzer	8903B	GB41300350	27-May-2012	CEPREI
Universal counter	53132A	MY40003662	30-May-2012	CEPREI

Ambient conditions

Temperature: 21 ± 1 °C
Relative humidity: 60 ± 10 %
Air pressure: 1005 ± 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

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

Approved Signatory:


Huang Jian Min/Feng Jun Qi

Date: 23-Mar-2012

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.