

AECOM Asia Company Limited  
TSP High Volume Sampler  
Field Calibration Report

Station Ha Wun Yiu (AM1) Operator: Shum Kam Yuen  
Cal. Date: 20-Oct-09 Next Due Date: 20-Dec-09  
Equipment No.: A-001-53T Serial No. 10216

Ambient Condition		
Temperature, Ta (K)	301	Pressure, Pa (mmHg) 755.7

Orifice Transfer Standard Information			
Serial No:	843	Slope, mc	2.02158
Last Calibration Date:	4-Nov-08	mc x Qstd + bc = [DH x (Pa/760) x (298/Ta)] <sup>1/2</sup>	
Next Calibration Date:	4-Nov-09	Qstd = {[DH x (Pa/760) x (298/Ta)] <sup>1/2</sup> - bc} / mc	
		Intercept, bc	-0.02524

Calibration of TSP Sampler			
Resistance Plate No.	Orifice		HVS Flow Recorder
	DH (orifice), in. of water	Qstd (m <sup>3</sup> /min) X-axis	Flow Recorder Reading (CFM) Y-axis
18	10.1	1.57	50.0
13	8.0	1.40	44.0
10	6.5	1.26	38.0
7	4.6	1.07	30.0
5	2.6	1.60	22.0
			21.83

By Linear Regression of Y on X

Slope , mw = 36.8527 Intercept, bw = -8.4900

Correlation Coefficient\* = 0.9960

\*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> =	
39.73	

Remarks:

QC Reviewer: Joe Fu Signature: Joe Date: 27 Oct 09

Station Ha Wun Yiu (AM1)

Cal. Date: 20-Oct-09

Next Due Date: 20-Dec-09

Set Point (IC) 39.73

IC (CFM)	Qstd (m <sup>3</sup> /min)
24	0.882
25	0.909
26	0.936
27	0.963
28	0.990
29	1.017
30	1.044
31	1.072
32	1.099
33	1.126
34	1.153
35	1.180
36	1.207
37	1.234
38	1.262
39	1.289
40	1.316
41	1.343
42	1.370
43	1.397
44	1.424
45	1.451
46	1.479
47	1.506
48	1.533
49	1.560
50	1.587
51	1.614
52	1.641
53	1.669
54	1.696
55	1.723
56	1.750
57	1.777
58	1.804
59	1.831
60	1.858
61	1.886
62	1.913
63	1.940
64	1.967
65	1.994



AECOM Asia Company Limited  
TSP High Volume Sampler  
Field Calibration Report

Station Shan Tong New Village (AM2) - 2

Cal. Date: 21-Oct-09

Next Due Date: 21-Dec-09

Set Point (IC) 36.20

Station Shan Tong New Village (AM2) - 2 Operator: Shum Kam Yuen

Cal. Date: 21-Oct-09 Next Due Date: 21-Dec-09

Equipment No.: A-001-29T Serial No. 10202

Ambient Condition		
Temperature, Ta (K)	298	Pressure, Pa (mmHg) 758.8

Orifice Transfer Standard Information			
Serial No:	843	Slope, mc	2.02158
Last Calibration Date:		4-Nov-08	
Next Calibration Date:		4-Nov-09	
		mc x Qstd + bc = [DH x (Pa/760) x (298/Ta)] <sup>1/2</sup>	
		Qstd = {[DH x (Pa/760) x (298/Ta)] <sup>1/2</sup> -bc} / mc	
		Intercept, bc	-0.02524

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	12.3	3.50	1.75	52.0 51.96
13	9.5	3.08	1.54	46.0 45.96
10	7.3	2.70	1.35	38.0 37.97
7	4.6	2.14	1.07	26.0 25.98
5	2.7	1.64	0.82	20.0 19.98

By Linear Regression of Y on X

Slope , mw = 36.3870

Correlation Coefficient\* = 0.9908

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

Intercept, bw = -11.1288

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

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

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

36.20

Remarks:

QC Reviewer: Joe Fu Signature: Joe Date: 27 Oct 09

IC (CFM)	Qstd (m <sup>3</sup> /min)
24	0.965
25	0.993
26	1.020
27	1.048
28	1.075
29	1.103
30	1.130
31	1.158
32	1.185
33	1.213
34	1.240
35	1.268
36	1.295
37	1.323
38	1.350
39	1.378
40	1.405
41	1.433
42	1.460
43	1.488
44	1.515
45	1.543
46	1.570
47	1.598
48	1.625
49	1.652
50	1.680
51	1.707
52	1.735
53	1.762
54	1.790
55	1.817
56	1.845
57	1.872
58	1.900
59	1.927
60	1.955
61	1.982
62	2.010
63	2.037
64	2.065
65	2.092

AECOM Asia Company Limited  
 TSP High Volume Sampler  
 Field Calibration Report

Station Riverain Bayside (AM3)  
 Cal. Date: 20-Oct-09  
 Equipment No.: A-001-69T  
 Operator: Shum Kam Yuen  
 Next Due Date: 20-Dec-09  
 Serial No. 716  
 Set Point (IC) 35.42

Ambient Condition		
Temperature, Ta (K)	301	Pressure, Pa (mmHg) 755.7

Orifice Transfer Standard Information			
Serial No:	843	Slope, mc	2.02158
Last Calibration Date:	4-Nov-08	mc x Qstd + bc = [DH x (Pa/760) x (298/Ta)] <sup>1/2</sup>	
Next Calibration Date:	4-Nov-09	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>	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	12.5	3.51	52.0	51.59
13	9.6	3.07	46.0	45.64
10	7.5	2.72	38.0	37.70
7	4.8	2.17	26.0	25.80
5	2.9	1.69	18.0	17.86

By Linear Regression of Y on X

Slope , mw = 38.9432

Correlation Coefficient\* = 0.9943

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

Intercept, bw = -15.4801

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 x Qstd + bw = IC x [(Pa/760) x (298/Ta)]<sup>1/2</sup>

Therefore, Set Point, IC = ( mw x Qstd + bw ) x [ ( 760 / Pa ) x ( Ta / 298 ) ]<sup>1/2</sup> = 35.42

Remarks:

QC Reviewer:

Signature:

Date:





AECOM Asia Company Limited  
TSP High Volume Sampler  
Field Calibration Report

Station Tai Kwong Secondary School (AM4)  
Cal. Date: 22-Oct-09  
Next Due Date: 22-Dec-09  
Set Point (IC) 42.01

Station Tai Kwong Secondary School (AM4) Operator: Shum Kam Yuen  
Cal. Date: 22-Oct-09 Next Due Date: 22-Dec-09  
Equipment No.: A-001-70T Serial No. 10273

Ambient Condition		
Temperature, Ta (K)	301	Pressure, Pa (mmHg) 755.7

Orifice Transfer Standard Information			
Serial No:	843	Slope, mc	2.02158
Last Calibration Date:		Intercept, bc	
4-Nov-08		-0.02524	
Next Calibration Date:		$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$	
4-Nov-09		$Qstd = \{ [DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc \} / mc$	

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	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	12.0	3.44	1.71	55.56
13	9.8	3.11	1.55	49.61
10	7.5	2.72	1.36	43.66
7	4.7	2.15	1.08	35.72
5	3.0	1.72	0.86	25.80

By Linear Regression of Y on X

Slope, mw = 33.7587 Intercept, bw = -2.2041

Correlation Coefficient\* = 0.9927

\*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> =	
<u>42.01</u>	

Remarks:

QC Reviewer: Joe Fu Signature: Joe Date: 27 Oct 09

IC (CFM)	Qstd (m <sup>3</sup> /min)
24	0.776
25	0.806
26	0.835
27	0.865
28	0.895
29	0.924
30	0.954
31	0.984
32	1.013
33	1.043
34	1.072
35	1.102
36	1.132
37	1.161
38	1.191
39	1.221
40	1.250
41	1.280
42	1.309
43	1.339
44	1.369
45	1.398
46	1.428
47	1.458
48	1.487
49	1.517
50	1.546
51	1.576
52	1.606
53	1.635
54	1.665
55	1.695
56	1.724
57	1.754
58	1.783
59	1.813
60	1.843
61	1.872
62	1.902
63	1.931
64	1.961
65	1.991



## 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\*: 5 June 2009

\*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	06-06-09	09:00 - 10:00	30.2	76	0.04175	1392	23.20
2	06-06-09	10:00 - 11:00	30.6	76	0.03983	1330	22.17
3	06-06-09	11:00 - 12:00	31.0	75	0.04025	1339	22.31
4	06-06-09	13:00 - 14:00	31.2	76	0.04271	1426	23.77

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: 0.9965

Validity of Calibration Record: 5 June 2010

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 8 June 2009



## 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 K<sub>o</sub>: 12500  
 Last Calibration Date\*: 5 June 2009

\*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 <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	06-06-09	14:00 - 15:00	31.5	75	0.04325	2046	34.10
2	06-06-09	15:00 - 16:00	31.7	76	0.04278	2019	33.65
3	06-06-09	16:00 - 17:00	31.4	76	0.04351	2059	34.32
4	06-06-09	17:00 - 18:00	31.4	75	0.04152	1965	32.75

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): 0.0013  
 Correlation coefficient: 0.9959

Validity of Calibration Record: 5 June 2010

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 8 June 2009

## 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>o</sub>: 12500  
Last Calibration Date\*: 5 June 2009

\*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	07-06-09	09:00 - 10:00	30.5	76	0.04255	1546	25.77
2	07-06-09	10:00 - 11:00	30.7	76	0.04233	1537	25.62
3	07-06-09	11:00 - 12:00	30.7	75	0.04113	1492	24.87
4	07-06-09	12:00 - 13:00	30.9	76	0.04147	1507	25.12

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): 0.0017  
Correlation coefficient: 0.9976

Validity of Calibration Record: 6 June 2010

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 8 June 2009

## 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 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 5 June 2009

\*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 <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	04-07-09	11:00 - 12:00	29.7	78	0.03713	1498	24.97
2	04-07-09	12:00 - 13:00	29.7	78	0.03520	1404	23.41
3	04-07-09	14:00 - 15:00	30.1	81	0.03891	1553	25.91
4	04-07-09	15:00 - 16:00	30.1	81	0.04025	1618	26.97

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): 0.0015  
 Correlation coefficient: 0.9907

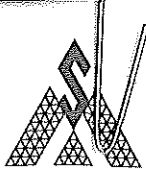
Validity of Calibration Record: 3 July 2010

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 6 July 2009



**綜合試驗有限公司**  
**SOILS & MATERIALS ENGINEERING CO., LTD.**

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Tel : (852) 2873 6860  
Fax : (852) 2555 7533



## CERTIFICATE OF CALIBRATION

Certificate No.: 09CA0710 04-02

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 / N009.01	2250447
Adaptors used:	-	-

### Item submitted by

Customer Name: ENSR ASIA (HK) LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 10-Jul-2009

Date of test: 11-Jul-2009

### Reference equipment used in the calibration

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

### Ambient conditions

Temperature: (23 ± 1) °C  
Relative humidity: (55 ± 10) %  
Air pressure: (1000 ± 10) 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.

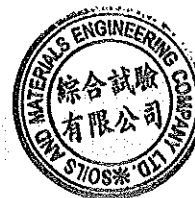
Actual Measurement data are documented on worksheets.

Approved Signatory:

Huang Jian Min / Feng Jun Qi

Date: 14-Jul-2009

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.: 09CA0311 02-04

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### Item tested

Description:	Sound Level Meter (Type I)	Microphone
Manufacturer:	B & K	B & K
Type/Model No.:	2238	4188
Serial/Equipment No.:	2125116 / N.002.04A	2141430
Adaptors used:	-	-

### Item submitted by

Customer Name: ENSR ASIA (HK) LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 11-Mar-2009

Date of test: 14-Mar-2009

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	12-Jan-2010	CIGISMEC
Signal generator	DS 360	33873	12-Jun-2009	CEPREI
Signal generator	DS 360	61227	18-Jul-2009	CEPREI

### Ambient conditions

Temperature:  $(22 \pm 2) ^\circ\text{C}$   
Relative humidity:  $(65 \pm 15) \%$   
Air pressure:  $(1000 \pm 10) \text{ hPa}$

### 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  $\pm 20\%$ .
- 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 response 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

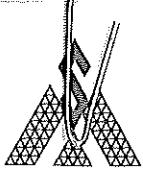
Date: 17-Mar-2009

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.





綜合試驗有限公司  
SOILS & MATERIALS ENGINEERING CO., LTD.

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Tel : (852) 2873 6860  
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## CERTIFICATE OF CALIBRATION

Certificate No.: 09CA0710 04-01

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 / N009.02	2250420
Adaptors used:	-	-

### Item submitted by

Customer Name: ENSR ASIA (HK) LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 10-Jul-2009

Date of test: 11-Jul-2009

### Reference equipment used in the calibration

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

### Ambient conditions

Temperature:  $(23 \pm 1) ^\circ\text{C}$   
Relative humidity:  $(55 \pm 10) \%$   
Air pressure:  $(1000 \pm 10) \text{ hPa}$

### 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  $\pm 20\%$ .
- 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 response 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.

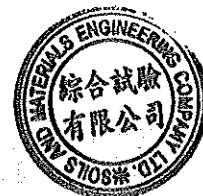
Actual Measurement data are documented on worksheets.

Approved Signatory:

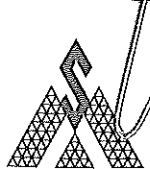
Huang Jian-Min/Feng Jun Qi

Date: 14-Jul-2009

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.: 09CA0820 04 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.:	2255687 / N.009.03	2250455
Adaptors used:	-	-

### Item submitted by

Customer Name: AECOM ASIA CO., LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 20-Aug-2009

Date of test: 24-Aug-2009

### Reference equipment used in the calibration

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

### Ambient conditions

Temperature: (21 ± 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 responsiveness of the Sound Level Meter.

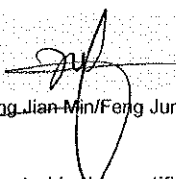
### Test results

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.

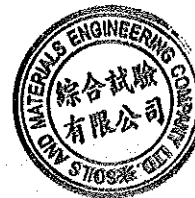
Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian-Min/Feng Jun Qi

Date: 26-Aug-2009

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.: 08CA0428 01 Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type I)	Microphone
Manufacturer:	B & K	B & K
Type/Model No.:	2238	4188
Serial/Equipment No.:	2255688 / N.009.05	2250454
Adaptors used:	-	-

### Item submitted by

Customer Name: ENSR ASIA (HK) LTD.  
Address of Customer: Room 1213-1219, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Rd, Sha Tin, New Territories, HK  
Request No.: -  
Date of request: 28-Apr-2008

Date of test: 29-Apr-2008

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	11-Jan-2009	CIGISMEC
Signal generator	DS 360	33873	13-Jun-2008	CEPREI
Signal generator	DS 360	61227	06-Dec-2008	CEPREI

### Ambient conditions

Temperature:  $(23 \pm 2) ^\circ\text{C}$   
Relative humidity:  $(50 \pm 15) \%$   
Air pressure:  $(995 \pm 10) \text{ hPa}$

### 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  $\pm 20\%$ .
- 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.

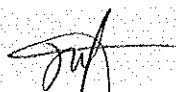
### Test results

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.

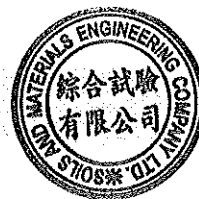
Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian Min/Feng Jun Qi

Date: 30-Apr-2008

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.: 09CA0311 02-05

Page 1 of 2

### Item tested

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

### Item submitted by

Customer Name: ENSR ASIA (HK) LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 11-Mar-2009

Date of test: 14-Mar-2009

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	12-Jan-2010	CIGISMEC
Signal generator	DS 360	33873	12-Jun-2009	CEPREI
Signal generator	DS 360	61227	18-Jul-2009	CEPREI

### Ambient conditions

Temperature: (22 ± 2) °C  
Relative humidity: (65 ± 15) %  
Air pressure: (1000 ± 10) 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.

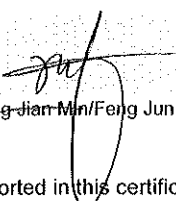
### Test results

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:

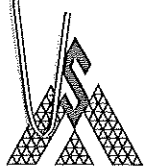
  
Huang Jian-Min/Feng Jun Qi

Date: 17-Mar-2009

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.



**綜合試驗有限公司**  
**SOILS & MATERIALS ENGINEERING CO., LTD.**

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Fax : (852) 2555 7533



## CERTIFICATE OF CALIBRATION

Certificate No.: 09CA0710 04-05

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: B&K  
Type/Model No.: BK4231  
Serial/Equipment No.: 1790985 / N.004.001  
Adaptors used: -

### Item submitted by

Customer: ENSR ASIA (HK) LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 10-Jul-2009

Date of test: 14-Jul-2009

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	23-Jun-2010	SCL
Preamplifier	B&K 2673	2239857	02-Dec-2009	CEPREI
Measuring amplifier	B&K 2610	2346941	03-Dec-2009	CEPREI
Signal generator	DS 360	61227	22-Jun-2010	CEPREI
Digital multi-meter	34401A	US36087050	03-Dec-2009	CIGISMEC
Audio analyzer	8903B	GB41300350	27-Nov-2009	CEPREI
Universal counter	53132A	MY40003662	23-Jun-2010	CEPREI

### Ambient conditions

Temperature:  $23 \pm 1$  °C  
Relative humidity:  $55 \pm 10$  %  
Air pressure:  $995 \pm 10$  hPa

### Test specifications

- 1, 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.
- 2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- 3, 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: 14-Jul-2009

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.





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Fax : (852) 2555 7533



## CERTIFICATE OF CALIBRATION

Certificate No.: 09CA0311 02-02

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: B&K  
Type/Model No.: BK4231  
Serial/Equipment No.: 1850426 / N.004.02  
Adaptors used: -

### Item submitted by

Customer: ENSR ASIA (HK) LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 11-Mar-2009

Date of test: 13-Mar-2009

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	29-Jun-2009	SCL
Preamplifier	B&K 2673	2239857	02-Dec-2009	CEPREI
Measuring amplifier	B&K 2610	2346941	03-Dec-2009	CEPREI
Signal generator	DS 360	61227	18-Jul-2009	CEPREI
Digital multi-meter	34401A	US36087050	03-Dec-2009	CIGISMEC
Audio analyzer	8903B	GB41300350	27-Nov-2009	CEPREI
Universal counter	53132A	MY40003662	11-Jul-2009	CEPREI

### Ambient conditions

Temperature:  $23 \pm 1$  °C  
Relative humidity:  $65 \pm 10$  %  
Air pressure:  $1000 \pm 15$  hPa

### Test specifications

- 1, 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.
- 2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- 3, 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:

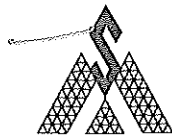
Huang Jian-Min/Feng Jun Qi

Date: 17-Mar-2009

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.: 09CA0311 02-03

Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type I)	Microphone	Preamp
Manufacturer:	RION CO. LTD.	RION CO. LTD.	RION CO. LTD.
Type/Model No.:	NL-18	UC-53A	NH-19
Serial/Equipment No.:	00570446	90565	75883
Adaptors used:	-	-	-

### Item submitted by

Customer Name: ENSR ASIA (HK) LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 11-Mar-2009

Date of test: 13-Mar-2009

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	12-Jan-2010	CIGISMEC
Signal generator	DS 360	33873	12-Jun-2009	CEPREI
Signal generator	DS 360	61227	18-Jul-2009	CEPREI

### Ambient conditions

Temperature: (23 ± 2) °C  
Relative humidity: (65 ± 15) %  
Air pressure: (1000 ± 10) 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 response 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: 17-Mar-2009

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.



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## CERTIFICATE OF CALIBRATION

Certificate No.: 09CA0827 02-01

Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type 1)	Microphone
Manufacturer:	RION CO., LTD.	RION CO., LTD.
Type/Model No.:	NL-31	UC-53A
Serial/Equipment No.:	00320534 / N.007.02A	90526
Adaptors used:	-	-

### Item submitted by

Customer Name: AECOM ASIA CO., LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 27-Aug-2009

Date of test: 29-Aug-2009

### Reference equipment used in the calibration

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

### Ambient conditions

Temperature:  $23 \pm 2$  °C  
Relative humidity:  $60 \pm 10$  %  
Air pressure:  $995 \pm 10$  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  $\pm 20\%$ .
- 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: 31-Aug-2009

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.: 09CA0827 02-02

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: Rion Co., Ltd.  
Type/Model No.: NC-73  
Serial/Equipment No.: 10307216  
Adaptors used: -

### Item submitted by

Customer: AECOM AISA CO., LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 27-Aug-2009

Date of test: 29-Aug-2009

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	23-Jun-2010	SCL
Preamplifier	B&K 2673	2239857	02-Dec-2009	CEPREI
Measuring amplifier	B&K 2610	2346941	03-Dec-2009	CEPREI
Signal generator	DS 360	61227	22-Jun-2010	CEPREI
Digital multi-meter	34401A	US36087050	03-Dec-2009	CIGISMEC
Audio analyzer	8903B	GB41300350	27-Nov-2009	CEPREI
Universal counter	53132A	MY40003662	23-Jun-2010	CEPREI

### Ambient conditions

Temperature:  $23 \pm 1$  °C  
Relative humidity:  $60 \pm 10$  %  
Air pressure:  $995 \pm 10$  hPa

### Test specifications

- 1, 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.
- 2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- 3, 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.

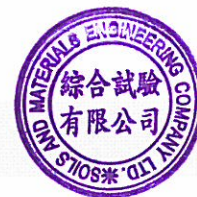
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

Huang Jian Min/Feng Jun Qi

Date: 31-Aug-2009

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.: 09CA0710 04-04

Page: 1 of 2

### Item tested

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

### Item submitted by

Customer: ENSR ASIA (H.K.) LTD.  
Address of Customer: -  
Request No.: -  
Date of request: 10-Jul-2009

Date of test: 14-Jul-2009

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	23-Jun-2010	SCL
Preamplifier	B&K 2673	2239857	02-Dec-2009	CEPREI
Measuring amplifier	B&K 2610	2346941	03-Dec-2009	CEPREI
Signal generator	DS 360	61227	22-Jun-2010	CEPREI
Digital multi-meter	34401A	US36087050	03-Dec-2009	CIGISMEC
Audio analyzer	8903B	GB41300350	27-Nov-2009	CEPREI
Universal counter	53132A	MY40003662	23-Jun-2010	CEPREI

### Ambient conditions

Temperature:  $23 \pm 1$  °C  
Relative humidity:  $55 \pm 10$  %  
Air pressure:  $995 \pm 10$  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: 14-Jul-2009

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.