

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station	Sheung Wun Yiu (AM1A)	Operator:	Gary Choi
Cal. Date:	23-Jan-13	Next Due Date:	23-Mar-13
Equipment No.:	A-001-53T	Serial No.	10216

Ambient Condition			
Temperature, Ta (K)	293	Pressure, Pa (mmHg)	763.2

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	1.97048	Intercept, bc	-0.00546
Last Calibration Date:	15-May-12	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	15-May-13	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

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	9.0	3.03	1.54	50.0	50.53
13	6.2	2.52	1.28	40.0	40.42
10	4.7	2.19	1.11	33.0	33.35
7	3.6	1.92	0.98	27.0	27.29
5	2.3	1.53	0.78	20.0	20.21

By Linear Regression of Y on X

Slope, mw = 40.3367 Intercept, bw = -11.5614

Correlation Coefficient* = 0.9991

*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>40.45</u>

Remarks:

QC Reviewer: WS CHAN

Signature: RI

Date: 24/1/13

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station	Sheung Wun Yiu (AM1A)	Operator:	Gary Choi
Cal. Date:	22-Mar-13	Next Due Date:	22-May-13
Equipment No.:	A-001-53T	Serial No.	10216

Ambient Condition			
Temperature, Ta (K)	299	Pressure, Pa (mmHg)	758.7

Orifice Transfer Standard Information					
Serial No:	843	Slope, mc	1.99238	Intercept, bc	-0.00351
Last Calibration Date:	06-Dec-12	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	06-Dec-13	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

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	8.9	2.98	1.50	48.0	47.88
13	6.2	2.48	1.25	38.0	37.90
10	4.6	2.14	1.08	32.0	31.92
7	3.4	1.84	0.92	26.0	25.93
5	2.2	1.48	0.74	20.0	19.95

By Linear Regression of Y on X

Slope, mw = 37.2342 Intercept, bw = -8.1545

Correlation Coefficient* = 0.9988

*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 = $(mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} =$ 40.35

Remarks:

QC Reviewer:

Signature:

Date:

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station <u>Shan Tong New Village (AM2)</u>	Operator: <u>Shum Kam Yuen</u>
Cal. Date: <u>27-Feb-13</u>	Next Due Date: <u>27-Apr-13</u>
Equipment No.: <u>A-001-29T</u>	Serial No. <u>10202</u>

Ambient Condition			
Temperature, Ta (K)	298	Pressure, Pa (mmHg)	759.3

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	1.97048	Intercept, bc	-0.00546
Last Calibration Date:	15-May-12	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	15-May-13	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

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	9.1	3.02	1.53	46.0	45.98
13	6.8	2.61	1.33	40.0	39.98
10	5.0	2.24	1.14	34.0	33.98
7	3.9	1.97	1.00	28.0	27.99
5	2.5	1.58	0.80	22.0	21.99

By Linear Regression of Y on X

Slope, mw = 33.5863 Intercept, bw = -5.0086

Correlation Coefficient* = 0.9954

*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} = 38.67

Remarks: _____

QC Reviewer: WS CHAN

Signature: R

Date: 28/2/13

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station: Riverain Bayside (AM3) Operator: Shum Kam Yuen
 Cal. Date: 27-Feb-13 Next Due Date: 27-Apr-13
 Equipment No.: A-001-69T Serial No.: 716

Ambient Condition			
Temperature, Ta (K)	298	Pressure, Pa (mmHg)	759.3

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	1.97048	Intercept, bc	-0.00546
Last Calibration Date:	15-May-12	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	15-May-13	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

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	8.9	2.98	1.52	44.0	43.98
13	7.5	2.74	1.39	40.0	39.98
10	5.8	2.41	1.22	34.0	33.98
7	4.7	2.17	1.10	30.0	29.99
5	2.9	1.70	0.87	22.0	21.99

By Linear Regression of Y on X

Slope, mw = 33.9888

Intercept, bw = -7.4922

Correlation Coefficient* = 0.9998

*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} = 36.71

Remarks:

QC Reviewer: WS CHAN

Signature: 71

Date: 28/2/13

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station: 168 Shek Kwu Lung Village (AM4A) Operator: Gary Choi
 Cal. Date: 23-Jan-13 Next Due Date: 23-Mar-13
 Equipment No.: A-001-70T Serial No. 10273

Ambient Condition			
Temperature, Ta (K)	293	Pressure, Pa (mmHg)	763.2

Orifice Transfer Standard Information					
Serial No:	988	Slope, mc	1.97048	Intercept, bc	-0.00546
Last Calibration Date:	15-May-12	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	15-May-13	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

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	9.2	3.07	1.56	50.0	50.53
13	7.4	2.75	1.40	44.0	44.47
10	5.3	2.33	1.18	37.0	37.39
7	3.5	1.89	0.96	30.0	30.32
5	2.2	1.50	0.76	22.0	22.23

By Linear Regression of Y on X

Slope, mw = 34.8938 Intercept, bw = -3.9463

Correlation Coefficient* = 0.9983

*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} =	40.98

Remarks:

QC Reviewer: WS CHAN

Signature: [Signature]

Date: 24/1/13

AECOM Asia Company Limited
TSP High Volume Sampler
Field Calibration Report

Station	168 Shek Kwu Lung Village (AM4A)	Operator:	Gary Choi
Cal. Date:	22-Mar-13	Next Due Date:	22-May-13
Equipment No.:	A-001-70T	Serial No.	10273

Ambient Condition			
Temperature, Ta (K)	299	Pressure, Pa (mmHg)	758.7

Orifice Transfer Standard Information					
Serial No:	843	Slope, mc	1.99238	Intercept, bc	-0.00351
Last Calibration Date:	06-Dec-12	$mc \times Q_{std} + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$ $Q_{std} = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			
Next Calibration Date:	06-Dec-13				

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	9.1	3.01	1.51	48.0	47.88
13	7.3	2.70	1.35	42.0	41.89
10	5.2	2.27	1.14	36.0	35.91
7	3.4	1.84	0.92	30.0	29.92
5	2.3	1.51	0.76	24.0	23.94

By Linear Regression of Y on X

Slope, mw = 30.8861

Intercept, bw = 0.7250

Correlation Coefficient* = 0.9968

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take $Q_{std} = 1.30 \text{ m}^3/\text{min}$

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 = $(mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} = 40.98$

Remarks:

QC Reviewer:

Signature:

Date:



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AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 15, 2012 Rootsmeter S/N 0438320 Ta (K) - 295
Operator Tisch Orifice I.D. - 0988 Pa (mm) - 751.84

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	1.3860	3.2	2.00
2	NA	NA	1.00	0.9700	6.4	4.00
3	NA	NA	1.00	0.8690	7.9	5.00
4	NA	NA	1.00	0.8290	8.8	5.50
5	NA	NA	1.00	0.6840	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9951	0.7179	1.4137	0.9957	0.7184	0.8859
0.9908	1.0215	1.9993	0.9915	1.0222	1.2528
0.9887	1.1378	2.2353	0.9894	1.1385	1.4007
0.9876	1.1913	2.3444	0.9883	1.1921	1.4690
0.9824	1.4363	2.8275	0.9831	1.4372	1.7717
Qstd slope (m) = 1.97048			Qa slope (m) = 1.23388		
intercept (b) = -0.00546			intercept (b) = -0.00342		
coefficient (r) = 0.99991			coefficient (r) = 0.99991		
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:

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

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

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 K_o: 12500
 Last Calibration Date*: 5 May 2012

*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	02-06-12	13:30 - 14:30	27.9	63	0.04070	1628	27.13
2	02-06-12	14:30 - 15:30	27.9	63	0.04167	1669	27.82
3	02-06-12	15:30 - 16:30	28.2	64	0.04283	1713	28.55
4	02-06-12	16:30 - 17:30	28.1	63	0.04146	1655	27.58

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: 0.9951

Validity of Calibration Record: 1 June 2013

Remarks:

QC Reviewer: YW Fung Signature:  Date: 4 June 2012

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*: 5 May 2012

*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	02-07-12	13:30 - 14:30	28.9	73	0.04127	1545	25.75
2	02-07-12	14:30 - 15:30	29.0	73	0.04163	1566	26.10
3	02-07-12	15:30 - 16:30	29.0	73	0.04334	1630	27.17
4	02-07-12	16:30 - 17:30	29.1	74	0.04426	1665	27.74

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: 0.9952

Validity of Calibration Record: 1 July 2013

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 3 July 2012

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*: 5 May 2012

*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	02-06-12	13:30 - 14:30	27.9	63	0.04070	1626	27.10
2	02-06-12	14:30 - 15:30	27.9	63	0.04167	1667	27.78
3	02-06-12	15:30 - 16:30	28.2	64	0.04283	1708	28.47
4	02-06-12	16:30 - 17:30	28.1	63	0.04146	1659	27.65

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: 0.9949

Validity of Calibration Record: 1 June 2013

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 4 June 2012

EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor
 Manufacturer/Brand: SIBATA
 Model No.: LD-3
 Equipment No.: A.005.10a
 Sensitivity Adjustment Scale Setting: 753 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*: 5 May 2012

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 753 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 753 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	02-06-12	12:45 - 13:45	27.9	63	0.04041	1613	26.88
2	02-06-12	13:45 - 14:45	27.9	63	0.04085	1631	27.18
3	02-06-12	14:45 - 15:45	27.9	63	0.04154	1663	27.72
4	02-06-12	15:45 - 16:45	28.1	64	0.04272	1711	28.52

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: 0.9939

Validity of Calibration Record: 1 June 2013

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 4 June 2012

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*: 5 May 2012

*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	02-07-12	13:45 - 14:45	29.0	73	0.04152	1659	27.65
2	02-07-12	14:45 - 15:45	29.0	73	0.04194	1670	27.83
3	02-07-12	15:45 - 16:45	29.1	74	0.04318	1725	28.75
4	02-07-12	16:45 - 17:45	29.1	74	0.04443	1780	29.67

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: 0.9928

Validity of Calibration Record: 1 July 2013

Remarks:

QC Reviewer: YW Fung

Signature: 

Date: 3 July 2012

EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor
 Manufacturer/Brand: SIBATA
 Model No.: LD-3B
 Equipment No.: A.005.14a
 Sensitivity Adjustment Scale Setting: 786 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_o: 12500
 Last Calibration Date*: 5 May 2012

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 786 CPM
 Sensitivity Adjustment Scale Setting (After Calibration): 786 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	02-06-12	13:15 - 14:15	27.9	63	0.04073	1746	29.10
2	02-06-12	14:15 - 15:15	27.9	63	0.04154	1778	29.63
3	02-06-12	15:15 - 16:15	28.1	64	0.04269	1830	30.50
4	02-06-12	16:15 - 17:15	28.1	64	0.04136	1769	29.48

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: 0.9963

Validity of Calibration Record: 1 June 2013

Remarks:

QC Reviewer: YW Fung Signature:  Date: 4 June 2012



CERTIFICATE OF CALIBRATION

Certificate No.: 12CA1115 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.:	2255680 / N.009.01	2250447
Adaptors used:	-	-

Item submitted by

Customer Name: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of receipt: 15-Nov-2012

Date of test: 15-Nov-2012

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	22-Jun-2013	CIGISMEC
Signal generator	DS 360	33873	29-May-2013	CEPREI
Signal generator	DS 360	61227	29-May-2013	CEPREI

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 60 ± 10 %
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 $\pm 20\%$.
- 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: 17-Nov-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.: 12CA1008 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 / <i>NL-007.03A</i>	90565	75883
Adaptors used:	-	-	-

Item submitted by

Customer Name: AECOM ASIA CO., LTD.
Address of Customer: -
Request No.: -
Date of receipt: 08-Oct-2012

Date of test: 08-Oct-2012

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	22-Jun-2013	CIGISMEC
Signal generator	DS 360	33873	29-May-2013	CEPREI
Signal generator	DS 360	61227	29-May-2013	CEPREI

Ambient conditions

Temperature: (22 ± 1) °C
Relative humidity: (60 ± 10) %
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 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: 08-Oct-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.: 12CA0817 01

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: 17-Aug-2012

Date of test: 17-Aug-2012

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	29-May-2013	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	29-May-2013	CEPREI
Digital multi-meter	34401A	US36087050	16-Dec-2012	CEPREI
Audio analyzer	8903B	GB41300350	29-May-2013	CEPREI
Universal counter	53132A	MY40003662	29-May-2013	CEPREI

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 60 ± 10 %
Air pressure: 995 ± 5 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

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

Approved Signatory:

Huang Jian Min / Feng Jun Qi

Date: 17-Aug-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.