

# AECOM Asia Company Limited

## TSP High Volume Sampler

### Field Calibration Report

Station: Tung Chung Development Pier (AMS2) Operator: Shum Kam Yuen  
 Cal. Date: 10-Jul-12 Next Due Date: 10-Sep-12  
 Equipment No.: A-001-78T Serial No.: 3383

| Ambient Condition   |       |                     |       |
|---------------------|-------|---------------------|-------|
| Temperature, Ta (K) | 305.0 | Pressure, Pa (mmHg) | 754.2 |

| Orifice Transfer Standard Information |           |  |         |               |          |
|---------------------------------------|-----------|--|---------|---------------|----------|
| Serial No:                            | 843       | Slope, mc  | 2.00834 | Intercept, bc | -0.02923 |
| Last Calibration Date:                | 15-Nov-11 | $mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$ |         |               |          |
| Next Calibration Date:                | 15-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)] <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                         | 8.3                        | 2.84                                      | 1.43                              | 44.0                        | 43.33  |
| 13                         | 7.6                        | 2.71                                      | 1.37                              | 42.0                        | 41.36  |
| 10                         | 5.7                        | 2.35                                      | 1.19                              | 36.0                        | 35.45  |
| 7                          | 3.9                        | 1.94                                      | 0.98                              | 30.0                        | 29.54  |
| 5                          | 2.2                        | 1.46                                      | 0.74                              | 22.0                        | 21.66  |

By Linear Regression of Y on X  
 Slope, mw = 31.4193 Intercept, bw = -1.5699  
 Correlation Coefficient\* = 0.9997  
 \*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> = 39.89

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

QC Reviewer: Yun Fung Signature: [Signature] Date: 12-Jul-12

# AECOM Asia Company Limited

## TSP High Volume Sampler

### Field Calibration Report

Station: Site Boundary of Site Office (WA2) (AMS3A) Operator: Shum Kam Yuen  
 Cal. Date: 10-Jul-12 Next Due Date: 10-Sep-12  
 Equipment No.: A-001-79T Serial No.: 3384

| Ambient Condition   |       |                     |       |
|---------------------|-------|---------------------|-------|
| Temperature, Ta (K) | 305.0 | Pressure, Pa (mmHg) | 754.2 |

| Orifice Transfer Standard Information |           |   |         |               |          |
|---------------------------------------|-----------|---|---------|---------------|----------|
| Serial No:                            | 843       | Slope, mc   | 2.00834 | Intercept, bc | -0.02923 |
| Last Calibration Date:                | 15-Nov-11 | $mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$  |         |               |          |
| Next Calibration Date:                | 15-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)] <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                         | 8.2                        | 2.82                                      | 1.42                              | 46.0                        | 45.30  |
| 13                         | 6.8                        | 2.57                                      | 1.29                              | 40.0                        | 39.39  |
| 10                         | 5.4                        | 2.29                                      | 1.15                              | 32.0                        | 31.51  |
| 7                          | 4.0                        | 1.97                                      | 1.00                              | 22.0                        | 21.66  |
| 5                          | 2.6                        | 1.59                                      | 0.81                              | 14.0                        | 13.79  |

By Linear Regression of Y on X

Slope, mw = 52.8275 Intercept, bw = -29.5340

Correlation Coefficient\* = 0.9956

\*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> = 39.75

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

QC Reviewer: Yiu Fung

Signature: [Signature]

Date: 12-Jul-12

# AECOM Asia Company Limited

## TSP High Volume Sampler

### Field Calibration Report

Station: Hong Kong SkyCity Marriott Hotel (AMS7) Operator: Shum Kam Yuen  
 Cal. Date: 10-Jul-12 Next Due Date: 10-Sep-12  
 Equipment No.: A-001-80T Serial No.: 3385

| Ambient Condition   |       |                     |       |
|---------------------|-------|---------------------|-------|
| Temperature, Ta (K) | 305.0 | Pressure, Pa (mmHg) | 754.2 |

| Orifice Transfer Standard Information |           |   |         |               |          |
|---------------------------------------|-----------|---|---------|---------------|----------|
| Serial No:                            | 843       | Slope, mc   | 2.00834 | Intercept, bc | -0.02923 |
| Last Calibration Date:                | 15-Nov-11 | $mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$  |         |               |          |
| Next Calibration Date:                | 15-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)] <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                         | 8.0                        | 2.79                                      | 1.40                              | 46.0                        | 45.30  |
| 13                         | 6.8                        | 2.57                                      | 1.29                              | 38.0                        | 37.42  |
| 10                         | 5.4                        | 2.29                                      | 1.15                              | 32.0                        | 31.51  |
| 7                          | 4.0                        | 1.97                                      | 1.00                              | 24.0                        | 23.63  |
| 5                          | 3.6                        | 1.87                                      | 0.94                              | 20.0                        | 19.69  |

By Linear Regression of Y on X  
 Slope, mw = 53.2285 Intercept, bw = -30.1104  
 Correlation Coefficient\* = 0.9924  
 \*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> = 39.69

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

QC Reviewer: YwFung Signature: Y Date: 12-Jul-12



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AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Nov 15, 2011 Rootsmeter 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 K<sub>o</sub>: 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<br>(dd-mm-yy) | Time          | Ambient Condition |             | Concentration <sup>1</sup><br>(mg/m <sup>3</sup> )<br>Y-axis | Total Count <sup>2</sup> | Count/<br>Minute <sup>3</sup><br>X-axis |
|------|--------------------|---------------|-------------------|-------------|--|--------------------------|---|
|      |                    |               | Temp<br>(°C)      | R.H.<br>(%) |  |                          |   |
| 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 K<sub>0</sub>: 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<br>(dd-mm-yy) | Time          | Ambient Condition |             | Concentration <sup>1</sup><br>(mg/m <sup>3</sup> )<br>Y-axis | Total Count <sup>2</sup> | Count/<br>Minute <sup>3</sup><br>X-axis |
|------|--------------------|---------------|-------------------|-------------|--|--------------------------|---|
|      |                    |               | Temp<br>(°C)      | R.H.<br>(%) |  |                          |   |
| 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 K<sub>o</sub>: 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<br>(dd-mm-yy) | Time          | Ambient Condition |             | Concentration <sup>1</sup><br>(mg/m <sup>3</sup> )<br>Y-axis | Total<br>Count <sup>2</sup> | Count/<br>Minute <sup>3</sup><br>X-axis |
|------|--------------------|---------------|-------------------|-------------|--|-----------------------------|---|
|      |                    |               | Temp<br>(°C)      | R.H.<br>(%) |  |                             |   |
| 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 K<sub>o</sub>: 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<br>(dd-mm-yy) | Time          | Ambient Condition |             | Concentration <sup>1</sup><br>(mg/m <sup>3</sup> )<br>Y-axis | Total Count <sup>2</sup> | Count/<br>Minute <sup>3</sup><br>X-axis |
|------|--------------------|---------------|-------------------|-------------|--|--------------------------|---|
|      |                    |               | Temp<br>(°C)      | R.H.<br>(%) |  |                          |   |
| 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 K<sub>0</sub>: 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<br>(dd-mm-yy) | Time          | Ambient Condition |             | Concentration <sup>1</sup><br>(mg/m <sup>3</sup> )<br>Y-axis | Total Count <sup>2</sup> | Count/<br>Minute <sup>3</sup><br>X-axis |
|------|--------------------|---------------|-------------------|-------------|--|--------------------------|---|
|      |                    |               | Temp<br>(°C)      | R.H.<br>(%) |  |                          |   |
| 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.005.13a  
 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 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 5 May 2012

\*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<br>(dd-mm-yy) | Time          | Ambient Condition |             | Concentration <sup>1</sup><br>(mg/m <sup>3</sup> )<br>Y-axis | Total Count <sup>2</sup> | Count/<br>Minute <sup>3</sup><br>X-axis |
|------|--------------------|---------------|-------------------|-------------|--|--------------------------|---|
|      |                    |               | Temp<br>(°C)      | R.H.<br>(%) |  |                          |   |
| 1    | 02-06-12           | 13:30 - 14:30 | 27.9              | 63          | 0.04070  | 1623                     | 27.05                                   |
| 2    | 02-06-12           | 14:30 - 15:30 | 27.9              | 63          | 0.04167  | 1663                     | 27.72                                   |
| 3    | 02-06-12           | 15:30 - 16:30 | 28.2              | 64          | 0.04283  | 1771                     | 28.52                                   |
| 4    | 02-06-12           | 16:30 - 17:30 | 28.1              | 63          | 0.04146  | 1656                     | 27.60                                   |

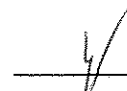
Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0015  
 Correlation coefficient: 0.9988

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-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<sub>0</sub>: 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<br>(dd-mm-yy) | Time          | Ambient Condition |             | Concentration <sup>1</sup><br>(mg/m <sup>3</sup> )<br>Y-axis | Total<br>Count <sup>2</sup> | Count/<br>Minute <sup>3</sup><br>X-axis |
|------|--------------------|---------------|-------------------|-------------|--|-----------------------------|---|
|      |                    |               | Temp<br>(°C)      | R.H.<br>(%) |  |                             |   |
| 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.: 11CA1221 01-01

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-21          |
| Serial/Equipment No.: | 00320534 / N.007.02A       | 90526          | 03581          |
| Adaptors used:        | -                          | -              | -              |

### Item submitted by

Customer Name: AECOM ASIA CO., LTD.  
Address of Customer: -  
Request No.: -  
Date of receipt: 21-Dec-2011

Date of test: 23-Dec-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: (60 ± 10) %  
Air pressure: (1000 ± 5) hPa

### Test specifications

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

### Test results

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

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

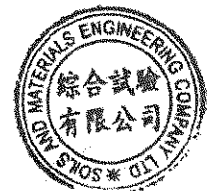
Actual Measurement data are documented on worksheets

Approved Signatory:

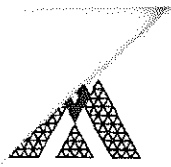
Huang Jian Min / Feng Jun Qi

Date: 16-Jan-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

(Continuation Page)

Certificate No.: 11CA1221 01-01

Page 2 of 2

### 1, Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

| Test:                   | Subtest:   | Status: | Uncertainty (dB) / Coverage Factor |     |
|-------------------------|--|---------|------------------------------------|-----|
| Self-generated noise    | A  | Pass    | 0.3                                |     |
|                         | C  | Pass    | 0.8                                | 2.1 |
|                         | Lin  | Pass    | 1.6                                | 2.2 |
| Linearity range for Leq | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                                |     |
|                         | Reference SPL on all other ranges                | Pass    | 0.3                                |     |
|                         | 2 dB below upper limit of each range             | Pass    | 0.3                                |     |
|                         | 2 dB above lower limit of each range             | Pass    | 0.3                                |     |
| Linearity range for SPL | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                                |     |
|                         | Frequency weightings                             |         |                                    |     |
| Time weightings         | A  | Pass    | 0.3                                |     |
|                         | C  | Pass    | 0.3                                |     |
|                         | Lin  | Pass    | 0.3                                |     |
| Peak response           | Single Burst Fast                                | Pass    | 0.3                                |     |
|                         | Single Burst Slow                                | Pass    | 0.3                                |     |
| R.M.S. accuracy         | Single 100µs rectangular pulse                   | Pass    | 0.3                                |     |
| Time weighting I        | Crest factor of 3                                | Pass    | 0.3                                |     |
|                         | Single burst 5 ms at 2000 Hz                     | N/A     | N/A                                |     |
|                         | Repeated at frequency of 100 Hz                  | N/A     | N/A                                |     |
| Time averaging          | 1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz | Pass    | 0.3                                |     |
|                         | 1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz | Pass    | 0.3                                |     |
| Pulse range             | Single burst 10 ms at 4 kHz                      | Pass    | 0.4                                |     |
| Sound exposure level    | Single burst 10 ms at 4 kHz                      | Pass    | 0.4                                |     |
| Overload indication     | SPL  | Pass    | 0.3                                |     |
|                         | Leq  | Pass    | 0.4                                |     |

### 2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

| Test:             | Subtest                | Status | Uncertainty (dB) / Coverage Factor |  |
|-------------------|------------------------|--------|------------------------------------|--|
| Acoustic response | Weighting A at 125 Hz  | Pass   | 0.3                                |  |
|                   | Weighting A at 8000 Hz | Pass   | 0.5                                |  |

### 3, Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date: 23-Dec-2011

Fung Chi Yip

- End -

Checked by:

Date: 16-Jan-2012

Chan Chun Lam

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.



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

G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong.  
香港黃竹坑道37號利達中心地下、9樓、12樓、13樓及20樓  
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Tel : (852) 2873 6860  
Fax : (852) 2555 7533



## 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 350   | 33673      | 30-May-2012  | CEPREI        |
| Signal generator                | DS 350   | 61227      | 30-May-2012  | CEPREI        |

### Ambient conditions

Temperature: (23 ± 1) °C  
Relative humidity: (60 ± 5) %  
Air pressure: (1000 ± 5) hPa

### Test specifications

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

### Test results

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

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

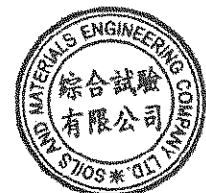
Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian An/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

(Continuation Page)

Certificate No.: 11CA0830 02 Page 2 of 2

### 1, Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

| Test:                   | Subtest:   | Status:                      | Uncertainty (dB) / Coverage Factor |     |
|-------------------------|--|------------------------------|------------------------------------|-----|
| Self-generated noise    | A  | Pass                         | 0.3                                |     |
|                         | C  | Pass                         | 0.8                                | 2.1 |
|                         | Lin  | Pass                         | 1.6                                | 2.2 |
| Linearity range for Leq | At reference range, Step 5 dB at 4 kHz           | Pass                         | 0.3                                |     |
|                         | Reference SPL on all other ranges                | Pass                         | 0.3                                |     |
|                         | 2 dB below upper limit of each range             | Pass                         | 0.3                                |     |
|                         | 2 dB above lower limit of each range             | Pass                         | 0.3                                |     |
| Linearity range for SPL | At reference range, Step 5 dB at 4 kHz           | Pass                         | 0.3                                |     |
|                         | Frequency weightings                             | A                            | Pass                               | 0.3 |
| Time weightings         | C  | Pass                         | 0.3                                |     |
|                         | Lin  | Pass                         | 0.3                                |     |
|                         | Single Burst Fast                                | Pass                         | 0.3                                |     |
| Peak response           | Single Burst Slow                                | Pass                         | 0.3                                |     |
|                         | Single 100µs rectangular pulse                   | Pass                         | 0.3                                |     |
| R.M.S. accuracy         | Crest factor of 3                                | Pass                         | 0.3                                |     |
|                         | Time weighting f                                 | Single burst 5 ms at 2000 Hz | N/A                                | N/A |
| Time averaging          | Repeated at frequency of 100 Hz                  | N/A                          | N/A                                |     |
|                         | 1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz | Pass                         | 0.3                                |     |
|                         | 1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz | Pass                         | 0.3                                |     |
| Pulse range             | Single burst 10 ms at 4 kHz                      | Pass                         | 0.4                                |     |
|                         | Sound exposure level                             | Single burst 10 ms at 4 kHz  | Pass                               | 0.4 |
| Overload indication     | SPL  | Pass                         | 0.3                                |     |
|                         | Leq  | Pass                         | 0.4                                |     |

### 2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

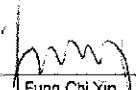
| Test:             | Subtest                | Status | Uncertainty (dB) / Coverage Factor |  |
|-------------------|------------------------|--------|------------------------------------|--|
| Acoustic response | Weighting A at 125 Hz  | Pass   | 0.3                                |  |
|                   | Weighting A at 8000 Hz | Pass   | 0.5                                |  |


### 3, Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by:   
Date: 31-Aug-2011

Checked by:   
Date: 31-Aug-2011

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.



## CERTIFICATE OF CALIBRATION

Certificate No.: 11CA1221 01-02

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: Rion Co., Ltd.  
Type/Model No.: NC-73  
Serial/Equipment No.: 10307216 / N.004.06  
Adaptors used: -

### Item submitted by

Customer: AECOM ASIA CO., LTD.  
Address of Customer: -  
Request No.: -  
Date of receipt: 21-Dec-2011

Date of test: 16-Jan-2012

### Reference equipment used in the calibration

| Description:            | Model:   | Serial No. | Expiry Date: | Traceable to: |
|-------------------------|----------|------------|--------------|---------------|
| Lab standard microphone | B&K 4180 | 2341427    | 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:  $22 \pm 1$  °C  
Relative humidity:  $65 \pm 5$  %  
Air pressure:  $1005 \pm 5$  hPa

### Test specifications

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

### Test results

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

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

Approved Signatory:

  
Huang Jian Min/Feng Jun Qi

Date: 16-Jan-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

(Continuation Page)

Certificate No.: 11CA1221 01-02

Page: 2 of 2

### 1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

| Frequency Shown<br>Hz | Output Sound Pressure Level Setting<br>dB | Measured Output Sound Pressure Level<br>dB | Estimated Uncertainty<br>dB |
|-----------------------|---|--|-----------------------------|
| 1000                  | 94.00                                     | 93.92                                      | 0.10                        |

(Output level in dB re 20  $\mu$ Pa)

### 2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz STF = 0.002 dB  
 Estimated uncertainty 0.005 dB

### 3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

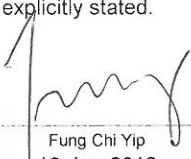
At 1000 Hz Actual Frequency = 990.6 Hz  
 Estimated uncertainty 0.2 Hz Coverage factor k = 2.2

### 4, Total Noise and Distortion

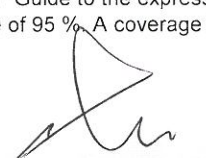
For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz TND = 0.7%  
 Estimated uncertainty 0.7%

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:   
 Date: Fung Chi Yip  
 16-Jan-2012

- End -

Checked by:   
 Date: Chan Chun Lam  
 16-Jan-2012

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.



## 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.: 10185482 / 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:  $21 \pm 1$  °C  
Relative humidity:  $60 \pm 10$  %  
Air pressure:  $1005 \pm 5$  hPa

### Test specifications

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

### Test results

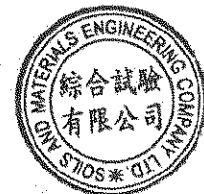
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

  
Huang Jun Qi / 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

(Continuation Page)

Certificate No.: 12CA0321 01-04

Page: 2 of 2

### 1. Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

| Frequency Shown<br>Hz | Output Sound Pressure<br>Level Setting<br>dB | Measured Output<br>Sound Pressure Level<br>dB | (Output level in dB re 20 μPa)<br>Estimated<br>Uncertainty<br>dB |
|-----------------------|--|---|--|
| 1000                  | 94.00  | 93.59   | 0.10   |

### 2. Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz STF = 0.002 dB

Estimated uncertainty 0.005 dB

### 3. Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz Actual Frequency = 990.9 Hz

Estimated uncertainty 0.7 Hz Coverage factor k = 2.2

### 4. Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz TND = 0.6%

Estimated uncertainty 0.7%

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date:

Fung Chi Yip  
21-Mar-2012

- End -

Checked by:

Date:

Chan Chun Lam  
23-Mar-2012

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1218922  
**Amendment:** 1  
**Date of Issue:** 13/08/2012  
**Client:** AECOM ASIA COMPANY LIMITED



**Description:** YSI Sonde  
**Brand Name:** YSI  
**Model No.:** YSI 6820-C-M  
**Serial No.:** W.026.09  
**Equipment No.:** W.026.09  
**Date of Calibration:** 17 July, 2012      **Date of next Calibration:** 17 October, 2012

**Parameters:**

**Conductivity**

**Method Ref: APHA (21st edition), 2510B**

| Expected Reading (uS/cm) | Displayed Reading (uS/cm ) | Tolerance (%) |
|--------------------------|----------------------------|---------------|
| 142.6                    | 136.8                      | -4.1          |
| 6667                     | 6747                       | 1.2           |
| 12890                    | 12470                      | -3.3          |
| 58670                    | 57330                      | -2.3          |
| Tolerance Limit (%)      |                            | 10.0          |

**Dissolved Oxygen**

**Method Ref: APHA (21st edition), 4500O: G**

| Expected Reading (mg/L) | Displayed Reading (mg/L) | Tolerance (mg/L) |
|-------------------------|--------------------------|------------------|
| 3.91                    | 4.06                     | 0.15             |
| 5.01                    | 5.15                     | 0.14             |
| 6.97                    | 6.88                     | -0.09            |
| Tolerance Limit (±mg/L) |                          | 0.20             |

**Salinity**

**Method Ref: APHA (21st edition), 2520B**

| Expected Reading (NTU) | Displayed Reading (NTU) | Tolerance (%) |
|------------------------|-------------------------|---------------|
| 0                      | 0.03                    | --            |
| 10                     | 10.22                   | 2.2           |
| 20                     | 19.06                   | -4.7          |
| 30                     | 29.76                   | -0.8          |
| Tolerance Limit (±%)   |                         | 10.0          |

  
 Mr. Chan Kwok Fai, Godfrey  
 Laboratory Manager - Hong Kong

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**Work Order:** HK1218922  
**Amendment:** 1  
**Date of Issue:** 13/08/2012  
**Client:** AECOM ASIA COMPANY LIMITED

**Description:** YSI Sonde  
**Brand Name:** YSI  
**Model No.:** YSI 6820-C-M  
**Serial No.:** W.026.09  
**Equipment No.:** W.026.09  
**Date of Calibration:** 17 July, 2012                      **Date of next Calibration:** 17 October, 2012

**Parameters:**

**Temperature**


**Method Ref:** Section 6 of International Accreditation New Zealand Technical  
**Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

| Expected Reading (°C) | Displayed Reading (°C) | Tolerance (°C) |
|-----------------------|------------------------|----------------|
| 21.0                  | 21.14                  | 0.1            |
| 27.5                  | 26.60                  | -0.9           |
| 33.0                  | 32.05                  | -1.0           |
|                       | Tolerance Limit (°C)   | 2.0            |

**Turbidity**

**Method Ref:** APHA (21st edition), 2130B

| Expected Reading (NTU) | Displayed Reading (NTU) | Tolerance (%) |
|------------------------|-------------------------|---------------|
| 0                      | 0.1                     | --            |
| 4                      | 4.1                     | 2.5           |
| 10                     | 10.0                    | 0.0           |
| 20                     | 20.0                    | 0.0           |
| 50                     | 49.7                    | -0.6          |
| 100                    | 98.7                    | -1.3          |
|                        | Tolerance Limit (±%)    | 10.0          |

  
 \_\_\_\_\_  
 Mr. Chan Kwok Fai, Geoffrey  
 Laboratory Manager - Hong Kong

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1212871  
**Date of Issue:** 17/05/2012  
**Client:** AECOM ASIA COMPANY LIMITED



**Description:** Sonde  
**Brand Name:** YSI  
**Model No.:** 6820 V2  
**Serial No.:** 12A101545  
**Equipment No.:** R1  
**Date of Calibration:** 17 May, 2012                      **Date of next Calibration:** 17 August, 2012

**Parameters:**

**Conductivity**

**Method Ref:** APHA (20th edition), 2510B

| Expected Reading (uS/cm) | Displayed Reading (uS/cm ) | Tolerance (%) |
|--------------------------|----------------------------|---------------|
| 142.6                    | 150.0                      | 5.2           |
| 6667                     | 6162                       | -7.6          |
| 12890                    | 12140                      | -5.8          |
| 58670                    | 58500                      | -0.3          |
| Tolerance Limit (±%)     |                            | 10.0          |

**Dissolved Oxygen**

**Method Ref:** APHA (21st edition), 45000: G

| Expected Reading (mg/L) | Displayed Reading (mg/L) | Tolerance (mg/L) |
|-------------------------|--------------------------|------------------|
| 6.13                    | 6.28                     | 0.15             |
| 7.66                    | 7.56                     | -0.10            |
| 8.06                    | 8.11                     | 0.05             |
| Tolerance Limit (±mg/L) |                          | 0.20             |

**Salinity**


**Method Ref:** APHA (21st edition), 2520B

| Expected Reading (ppt) | Displayed Reading (ppt) | Tolerance (%) |
|------------------------|-------------------------|---------------|
| 0                      | 0.09                    | --            |
| 10                     | 9.58                    | -4.2          |
| 20                     | 19.16                   | -4.2          |
| 30                     | 29.42                   | -1.9          |
| Tolerance Limit (±%)   |                         | 10.0          |

**Temperature**

**Method Ref:** Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

| Expected Reading (°C) | Displayed Reading (°C) | Tolerance (°C) |
|-----------------------|------------------------|----------------|
| 18.5                  | 18.43                  | -0.1           |
| 27.0                  | 26.68                  | -0.3           |
| 30.0                  | 29.90                  | -0.1           |
| Tolerance Limit (°C)  |                        | 2.0            |

  
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 Mr. Fung Lim Chee, Richard  
 General Manager  
 Greater China & Hong Kong

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1212871  
**Date of Issue:** 17/05/2012  
**Client:** AECOM ASIA COMPANY LIMITED



**Description:** Sonde  
**Brand Name:** YSI  
**Model No.:** 6820 V2  
**Serial No.:** 12A101545  
**Equipment No.:** R1  
**Date of Calibration:** 17 May, 2012      **Date of next Calibration:** 17 August, 2012

**Parameters:**

**pH Value**

**Method Ref:** APHA 21st Ed. 4500H:8

| Expected Reading (pH Unit) | Displayed Reading (pH Unit) | Tolerance (pH unit) |
|----------------------------|-----------------------------|---------------------|
| 4.0                        | 4.12                        | 0.12                |
| 7.0                        | 7.18                        | 0.18                |
| 10.0                       | 9.99                        | -0.01               |
| Tolerance Limit (±unit)    |                             | 0.2                 |

**Turbidity**

**Method Ref:** APHA (21st edition), 2130B

| Expected Reading (NTU) | Displayed Reading (NTU) | Tolerance (%) |
|------------------------|-------------------------|---------------|
| 0                      | 0.1                     | --            |
| 4                      | 4.2                     | 5.0           |
| 10                     | 10.7                    | 7.0           |
| 20                     | 20.2                    | 1.0           |
| 50                     | 51.5                    | 3.0           |
| 100                    | 99.4                    | -0.6          |
| Tolerance Limit (±%)   |                         | 10.0          |

Mr. Fung Lim Chee, Richard  
 General Manager -  
 Greater China & Hong Kong

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**Work Order:** HK1221702  
**Date of Issue:** 16/08/2012  
**Client:** AECOM ASIA COMPANY LIMITED

**Description:** YSI Sonde V2  
**Brand Name:** YSI  
**Model No.:** YSI 6820 V2  
**Serial No.:** 12A101545  
**Equipment No.:** W.026.35  
**Date of Calibration:** 16 August, 2012      **Date of next Calibration:** 17 October, 2012

**Parameters:**

**Conductivity**

**Method Ref: APHA (21st edition), 2510B**

| Expected Reading (uS/cm) | Displayed Reading (uS/cm ) | Tolerance (%) |
|--------------------------|----------------------------|---------------|
| 146.9                    | 152.9                      | 4.1           |
| 6667                     | 6342                       | -4.9          |
| 12890                    | 12110                      | -6.1          |
| 58670                    | 56140                      | -4.3          |
| Tolerance Limit (%)      |                            | 10.0          |

**Dissolved Oxygen**

**Method Ref: APHA (21st edition), 4500G: G**

| Expected Reading (mg/L) | Displayed Reading (mg/L) | Tolerance (mg/L) |
|-------------------------|--------------------------|------------------|
| 5.65                    | 5.65                     | 0.00             |
| 6.50                    | 6.66                     | 0.16             |
| 6.84                    | 7.00                     | 0.16             |
| Tolerance Limit (±mg/L) |                          | 0.20             |

**pH Value**

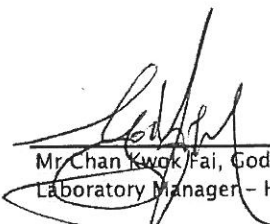
**Method Ref: APHA 21st Ed. 4500H:B**

| Expected Reading (pH Unit) | Displayed Reading (pH Unit) | Tolerance (pH unit) |
|----------------------------|-----------------------------|---------------------|
| 4.0                        | 3.97                        | -0.03               |
| 7.0                        | 6.92                        | -0.08               |
| 10.0                       | 9.92                        | -0.08               |
| Tolerance Limit (±unit)    |                             | 0.2                 |

**Salinity**

**Method Ref: APHA (21st edition), 2520B**

| Expected Reading (NTU) | Displayed Reading (NTU) | Tolerance (%) |
|------------------------|-------------------------|---------------|
| 0                      | 0.08                    | --            |
| 10                     | 9.85                    | -1.5          |
| 20                     | 19.27                   | -3.7          |
| 30                     | 29.22                   | -2.6          |
| Tolerance Limit (±%)   |                         | 10.0          |

  
 Mr. Chan Kwok Fai, Godfrey  
 Laboratory Manager - Hong Kong



# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**Work Order:** HK1221702  
**Date of Issue:** 16/08/2012  
**Client:** AECOM ASIA COMPANY LIMITED

**Description:** YSI Sonde V2  
**Brand Name:** YSI  
**Model No.:** YSI 6820 V2  
**Serial No.:** 12A101545  
**Equipment No.:** W.026.35  
**Date of Calibration:** 16 August, 2012      **Date of next Calibration:** 17 October, 2012

**Parameters:**

**Temperature**

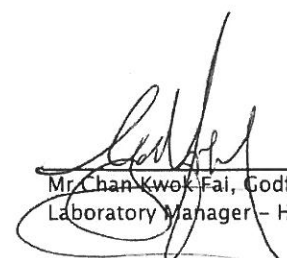
**Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

| Expected Reading (°C) | Displayed Reading (°C) | Tolerance (°C) |
|-----------------------|------------------------|----------------|
| 22.5                  | 22.2                   | -0.3           |
| 25.5                  | 25.0                   | -0.5           |
| 30.0                  | 31.1                   | 1.1            |
|                       | Tolerance Limit (°C)   | 2.0            |

**Turbidity**

**Method Ref: APHA (21st edition), 2130B**

| Expected Reading (NTU) | Displayed Reading (NTU) | Tolerance (%) |
|------------------------|-------------------------|---------------|
| 0                      | 0.0                     | --            |
| 4                      | 3.9                     | -2.5          |
| 10                     | 9.8                     | -2.0          |
| 20                     | 20.1                    | 0.5           |
| 50                     | 50.2                    | 0.4           |
| 100                    | 98.9                    | -1.1          |
|                        | Tolerance Limit (±%)    | 10.0          |

  
 Mr. Chan Kwok Fai, Godfrey  
 Laboratory Manager - Hong Kong

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1219200  
Date of Issue: 25/07/2012  
Client: AECOM ASIA COMPANY LIMITED

Description: pH Meter  
Brand Name: Thermo  
Model No.: Orion 230A+  
Serial No.: 020365  
Equipment No.: W.039.04  
Date of Calibration: 24 July, 2012  
Date of next Calibration: 24 October, 2012

## Parameters:

### pH Value

Method Ref: APHA 21st Ed. 4500H:B

| Expected Reading (pH Unit) | Displayed Reading (pH Unit)   | Tolerance (pH unit) |
|----------------------------|-------------------------------|---------------------|
| 4.0                        | 3.96                          | -0.04               |
| 7.0                        | 6.94                          | -0.06               |
| 10.0                       | 9.82                          | -0.18               |
|                            | Tolerance Limit ( $\pm$ unit) | 0.2                 |