# AECOM Asia Company Limited
# TSP High Volume Sampler
# Field Calibration Report

| | | | |
|---|---|---|---|
| Station | Sheung Wun Yiu (AM1A) | Operator: | Shum Kam Yuen |
| Cal. Date: | 19-Apr-11 | Next Due Date: | 19-Jun-11 |
| Equipment No.: | A-001-53T | Serial No. | 10216 |

| Ambient Condition | | | |
|---|---|---|---|
| Temperature, Ta (K) | 292 | Pressure, Pa (mmHg) | 765.1 |

| Orifice Transfer Standard Information | | | | | |
|---|---|---|---|---|---|
| Serial No: | 988 | Slope, mc | 2.01259 | Intercept, bc | -0.01532 |
| Last Calibration Date: | 7-May-10 | $mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 7-May-11 | $Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

**Calibration of TSP Sampler**

| Resistance Plate No. | Orfice | | | HVS Flow Recorder | |
|---|---|---|---|---|---|
| | DH (orifice), in. of water | $[DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd ($m^3$/min) **X - axis** | Flow Recorder Reading (CFM) | Continuous Flow Recorder Reading IC (CFM) **Y-axis** |
| 18 | 10.4 | 3.27 | 1.63 | 54.0 | 54.73 |
| 13 | 6.3 | 2.54 | 1.27 | 41.0 | 41.56 |
| 10 | 4.7 | 2.20 | 1.10 | 33.0 | 33.45 |
| 7 | 3.6 | 1.92 | 0.96 | 30.0 | 30.41 |
| 5 | 2.3 | 1.54 | 0.77 | 21.0 | 21.29 |

**By Linear Regression of Y on X**

**Slope , mw =** 38.4641 **Intercept, bw =** -7.8509

**Correlation Coefficient* =** 0.9953

*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**

From the TSP Field Calibration Curve, take Qstd = 1.30$m^3$/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 )]$^{1/2}$= **41.59**

Remarks: _____

QC Reviewer: Ivy Fu Signature: Ivy Date: 20 Apr 11

| | |
|---|---|
| Station | Sheung Wun Yiu (AM1A) |
| Cal. Date: | 19-Apr-11 |
| Next Due Date: | 19-Jun-11 |
| Set Point (IC) | 41.59 |

| IC (CFM) | Qstd ($m^3$/min) |
|---|---|
| 24 | 0.828 |
| 25 | 0.854 |
| 26 | 0.880 |
| 27 | 0.906 |
| 28 | 0.932 |
| 29 | 0.958 |
| 30 | 0.984 |
| 31 | 1.010 |
| 32 | 1.036 |
| 33 | 1.062 |
| 34 | 1.088 |
| 35 | 1.114 |
| 36 | 1.140 |
| 37 | 1.166 |
| 38 | 1.192 |
| 39 | 1.218 |
| 40 | 1.244 |
| 41 | 1.270 |
| 42 | 1.296 |
| 43 | 1.322 |
| 44 | 1.348 |
| 45 | 1.374 |
| 46 | 1.400 |
| 47 | 1.426 |
| 48 | 1.452 |
| 49 | 1.478 |
| 50 | 1.504 |
| 51 | 1.530 |
| 52 | 1.556 |
| 53 | 1.582 |
| 54 | 1.608 |
| 55 | 1.634 |
| 56 | 1.660 |
| 57 | 1.686 |
| 58 | 1.712 |
| 59 | 1.738 |
| 60 | 1.764 |
| 61 | 1.790 |
| 62 | 1.816 |
| 63 | 1.842 |
| 64 | 1.868 |
| 65 | 1.894 |

# AECOM Asia Company Limited
# TSP High Volume Sampler
# Field Calibration Report

Station: Sheung Wun Yiu (AM1A)
Cal. Date: 15-Jun-11
Equipment No.: A-001-53T

Operator: Shum Kam Yuen
Next Due Date: 15-Aug-11
Serial No. 10216

| Ambient Condition | | | |
|---|---|---|---|
| Temperature, Ta (K) | 297.5 | Pressure, Pa (mmHg) | 759.2 |

| Orifice Transfer Standard Information | | | | | |
|---|---|---|---|---|---|
| Serial No: | 843 | Slope, mc | 2.00691 | Intercept, bc | -0.02214 |
| Last Calibration Date: | 8-Nov-10 | $mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 8-Nov-11 | $Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

**Calibration of TSP Sampler**

| Resistance Plate No. | Orifice | | | HVS Flow Recorder | |
|---|---|---|---|---|---|
| | DH (orifice), in. of water | $[DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd ($m^3$/min) **X - axis** | Flow Recorder Reading (CFM) | Continuous Flow Recorder Reading IC (CFM) **Y-axis** |
| 18 | 10.3 | 3.21 | 1.61 | 55.0 | 55.02 |
| 13 | 6.4 | 2.53 | 1.27 | 42.0 | 42.01 |
| 10 | 4.7 | 2.17 | 1.09 | 34.0 | 34.01 |
| 7 | 3.5 | 1.87 | 0.94 | 31.0 | 31.01 |
| 5 | 2.2 | 1.48 | 0.75 | 22.0 | 22.01 |

**By Linear Regression of Y on X**

**Slope , mw =** 37.7709 **Intercept, bw =** -6.0065

**Correlation Coefficient* =** 0.9943

*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**

From the TSP Field Calibration Curve, take Qstd = 1.30$m^3$/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; $IC = ( mw \times Qstd + bw ) \times [( 760 / Pa ) \times ( Ta / 298 )]^{1/2}$ = **43.08**

Remarks:

QC Reviewer: Mike Shek Signature: Mike Date: 16-Jun-11

Station: **Sheung Wun Yiu (AM1A)**

Cal. Date: **15-Jun-11**

Next Due Date: **15-Aug-11**

Set Point (IC) **43.08**

| IC (CFM) | Qstd ($m^3$/min) |
|---|---|
| 24 | 0.794 |
| 25 | 0.821 |
| 26 | 0.847 |
| 27 | 0.874 |
| 28 | 0.900 |
| 29 | 0.927 |
| 30 | 0.953 |
| 31 | 0.980 |
| 32 | 1.006 |
| 33 | 1.033 |
| 34 | 1.059 |
| 35 | 1.086 |
| 36 | 1.112 |
| 37 | 1.139 |
| 38 | 1.165 |
| 39 | 1.192 |
| 40 | 1.218 |
| 41 | 1.245 |
| 42 | 1.271 |
| 43 | 1.297 |
| 44 | 1.324 |
| 45 | 1.350 |
| 46 | 1.377 |
| 47 | 1.403 |
| 48 | 1.430 |
| 49 | 1.456 |
| 50 | 1.483 |
| 51 | 1.509 |
| 52 | 1.536 |
| 53 | 1.562 |
| 54 | 1.589 |
| 55 | 1.615 |
| 56 | 1.642 |
| 57 | 1.668 |
| 58 | 1.695 |
| 59 | 1.721 |
| 60 | 1.748 |
| 61 | 1.774 |
| 62 | 1.801 |
| 63 | 1.827 |
| 64 | 1.853 |
| 65 | 1.880 |

# AECOM Asia Company Limited
# TSP High Volume Sampler
# Field Calibration Report

| | | | |
|---|---|---|---|
| Station | Shan Tong New Village (AM2) | Operator: | Choi wing ho |
| Cal. Date: | 24-May-11 | Next Due Date: | 24-Jul-11 |
| Equipment No.: | A-001-29T | Serial No. | 10202 |

| Ambient Condition | | | |
|---|---|---|---|
| Temperature, Ta (K) | 297 | Pressure, Pa (mmHg) | 755.5 |

| Orifice Transfer Standard Information | | | | | |
|---|---|---|---|---|---|
| Serial No: | 843 | Slope, mc | 2.00691 | Intercept, bc | -0.0214 |
| Last Calibration Date: | 8-Nov-10 | $mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 8-Nov-11 | $Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

**Calibration of TSP Sampler**

| Resistance Plate No. | Orfice | | | HVS Flow Recorder | |
|---|---|---|---|---|---|
| | DH (orifice), in. of water | $[DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd ($m^3$/min) **X-axis** | Flow Recorder Reading (CFM) | Continuous Flow Recorder Reading IC (CFM) **Y-axis** |
| 18 | 10.8 | 3.28 | 1.65 | 48.0 | 47.94 |
| 13 | 8.0 | 2.82 | 1.42 | 42.0 | 41.95 |
| 10 | 5.4 | 2.32 | 1.17 | 34.0 | 33.96 |
| 7 | 4.2 | 2.05 | 1.03 | 28.0 | 27.96 |
| 5 | 2.5 | 1.58 | 0.80 | 22.0 | 21.97 |

**By Linear Regression of Y on X**

**Slope , mw =** 31.4651 **Intercept, bw =** -3.3763

**Correlation Coefficient* =** 0.9946

*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**

From the TSP Field Calibration Curve, take Qstd = 1.30$m^3$/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 )]$^{1/2}$= **37.58**

Remarks:

QC Reviewer: Joe Fu Signature: Joe Date: 30 May 11

| | |
|---|---|
| Station | Shan Tong New Village (AM2) |
| Cal. Date: | 24-May-11 |
| Next Due Date: | 24-Jul-11 |
| Set Point (IC) | 37.58 |

| IC (CFM) | Qstd ($m^3$/min) |
|---|---|
| 24 | 0.870 |
| 25 | 0.902 |
| 26 | 0.934 |
| 27 | 0.965 |
| 28 | 0.997 |
| 29 | 1.029 |
| 30 | 1.061 |
| 31 | 1.093 |
| 32 | 1.124 |
| 33 | 1.156 |
| 34 | 1.188 |
| 35 | 1.220 |
| 36 | 1.251 |
| 37 | 1.283 |
| 38 | 1.315 |
| 39 | 1.347 |
| 40 | 1.379 |
| 41 | 1.410 |
| 42 | 1.442 |
| 43 | 1.474 |
| 44 | 1.506 |
| 45 | 1.537 |
| 46 | 1.569 |
| 47 | 1.601 |
| 48 | 1.633 |
| 49 | 1.665 |
| 50 | 1.696 |
| 51 | 1.728 |
| 52 | 1.760 |
| 53 | 1.792 |
| 54 | 1.823 |
| 55 | 1.855 |
| 56 | 1.887 |
| 57 | 1.919 |
| 58 | 1.951 |
| 59 | 1.982 |
| 60 | 2.014 |
| 61 | 2.046 |
| 62 | 2.078 |
| 63 | 2.110 |
| 64 | 2.141 |
| 65 | 2.173 |

# AECOM Asia Company Limited
# TSP High Volume Sampler
# Field Calibration Report

| | | | |
|---|---|---|---|
| Station | Riverain Bayside (AM3) | Operator: | Choi wing ho |
| Cal. Date: | 24-May-11 | Next Due Date: | 24-Jul-11 |
| Equipment No.: | A-001-69T | Serial No. | 716 |

| Ambient Condition | | | |
|---|---|---|---|
| Temperature, Ta (K) | 297 | Pressure, Pa (mmHg) | 755.5 |

| Orifice Transfer Standard Information | | | | | |
|---|---|---|---|---|---|
| Serial No: | 843 | Slope, mc | 2.00691 | Intercept, bc | -0.0214 |
| Last Calibration Date: | 8-Nov-10 | $mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 8-Nov-11 | $Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

**Calibration of TSP Sampler**

| Resistance Plate No. | Orfice | | | HVS Flow Recorder | |
|---|---|---|---|---|---|
| | DH (orifice), in. of water | $[DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd ($m^3$/min) X - axis | Flow Recorder Reading (CFM) | Continuous Flow Recorder Reading IC (CFM) Y-axis |
| 18 | 10.5 | 3.24 | 1.62 | 50.0 | 49.94 |
| 13 | 8.5 | 2.91 | 1.46 | 46.0 | 45.94 |
| 10 | 6.4 | 2.53 | 1.27 | 40.0 | 39.95 |
| 7 | 4.5 | 2.12 | 1.07 | 34.0 | 33.96 |
| 5 | 2.7 | 1.64 | 0.83 | 24.0 | 23.97 |

**By Linear Regression of Y on X**

**Slope , mw =** 32.4101 **Intercept, bw =** -1.7559

**Correlation Coefficient* =** 0.9908

*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**

From the TSP Field Calibration Curve, take Qstd = 1.30$m^3$/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 )]$^{1/2}$= **40.43**

Remarks:

QC Reviewer: Joe Fu Signature: Joe Date: 30 May 11

| | |
|---|---|
| Station | Riverain Bayside (AM3) |
| Cal. Date: | 24-May-11 |
| Next Due Date: | 24-Jul-11 |
| Set Point (IC) | 40.43 |

| IC (CFM) | Qstd ($m^3$/min) |
|---|---|
| 24 | 0.795 |
| 25 | 0.826 |
| 26 | 0.856 |
| 27 | 0.887 |
| 28 | 0.918 |
| 29 | 0.949 |
| 30 | 0.980 |
| 31 | 1.011 |
| 32 | 1.042 |
| 33 | 1.072 |
| 34 | 1.103 |
| 35 | 1.134 |
| 36 | 1.165 |
| 37 | 1.196 |
| 38 | 1.227 |
| 39 | 1.258 |
| 40 | 1.288 |
| 41 | 1.319 |
| 42 | 1.350 |
| 43 | 1.381 |
| 44 | 1.412 |
| 45 | 1.443 |
| 46 | 1.473 |
| 47 | 1.504 |
| 48 | 1.535 |
| 49 | 1.566 |
| 50 | 1.597 |
| 51 | 1.628 |
| 52 | 1.659 |
| 53 | 1.689 |
| 54 | 1.720 |
| 55 | 1.751 |
| 56 | 1.782 |
| 57 | 1.813 |
| 58 | 1.844 |
| 59 | 1.875 |
| 60 | 1.905 |
| 61 | 1.936 |
| 62 | 1.967 |
| 63 | 1.998 |
| 64 | 2.029 |
| 65 | 2.060 |

# AECOM Asia Company Limited
# TSP High Volume Sampler
# Field Calibration Report

| | | | |
|---|---|---|---|
| Station | Tai Kwong Secondary School (AM4) | Operator: | Choi wing ho |
| Cal. Date: | 24-May-11 | Next Due Date: | 24-Jul-11 |
| Equipment No.: | A-001-70T | Serial No. | 10273 |

| Ambient Condition | | | |
|---|---|---|---|
| Temperature, Ta (K) | 297 | Pressure, Pa (mmHg) | 755.3 |

| Orifice Transfer Standard Information | | | | | |
|---|---|---|---|---|---|
| Serial No: | 843 | Slope, mc | 2.00691 | Intercept, bc | -0.0214 |
| Last Calibration Date: | 8-Nov-10 | $mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 8-Nov-11 | $Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$ | | | |

**Calibration of TSP Sampler**

| Resistance Plate No. | Orfice | | | HVS Flow Recorder | |
|---|---|---|---|---|---|
| | DH (orifice), in. of water | $[DH \times (Pa/760) \times (298/Ta)]^{1/2}$ | Qstd ($m^3$/min) **X - axis** | Flow Recorder Reading (CFM) | Continuous Flow Recorder Reading IC (CFM) **Y-axis** |
| 18 | 11.0 | 3.31 | 1.66 | 55.0 | 54.92 |
| 13 | 9.0 | 3.00 | 1.50 | 50.0 | 49.93 |
| 10 | 6.2 | 2.49 | 1.25 | 41.0 | 40.94 |
| 7 | 4.4 | 2.09 | 1.05 | 35.0 | 34.95 |
| 5 | 2.8 | 1.67 | 0.84 | 27.0 | 26.96 |

**By Linear Regression of Y on X**

**Slope , mw =** 34.0441 **Intercept, bw =** -1.4331

**Correlation Coefficient* =** 0.9991

*If Correlation Coefficient < 0.990, check and recalibrate.

**Set Point Calculation**

From the TSP Field Calibration Curve, take Qstd = 1.30$m^3$/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 )]$^{1/2}$= **42.89**

Remarks:

QC Reviewer: Joe Fu Signature: Joe Date: 30 May 11

| Station | Tai Kwong Secondary School (AM4) |
|---|---|
| Cal. Date: | 24-May-11 |
| Next Due Date: | 24-Jul-11 |
| Set Point (IC) | 42.89 |

| IC (CFM) | Qstd ($m^3$/min) |
|---|---|
| 24 | 0.747 |
| 25 | 0.776 |
| 26 | 0.806 |
| 27 | 0.835 |
| 28 | 0.865 |
| 29 | 0.894 |
| 30 | 0.923 |
| 31 | 0.953 |
| 32 | 0.982 |
| 33 | 1.011 |
| 34 | 1.041 |
| 35 | 1.070 |
| 36 | 1.100 |
| 37 | 1.129 |
| 38 | 1.158 |
| 39 | 1.188 |
| 40 | 1.217 |
| 41 | 1.246 |
| 42 | 1.276 |
| 43 | 1.305 |
| 44 | 1.335 |
| 45 | 1.364 |
| 46 | 1.393 |
| 47 | 1.423 |
| 48 | 1.452 |
| 49 | 1.481 |
| 50 | 1.511 |
| 51 | 1.540 |
| 52 | 1.570 |
| 53 | 1.599 |
| 54 | 1.628 |
| 55 | 1.658 |
| 56 | 1.687 |
| 57 | 1.716 |
| 58 | 1.746 |
| 59 | 1.775 |
| 60 | 1.805 |
| 61 | 1.834 |
| 62 | 1.863 |
| 63 | 1.893 |
| 64 | 1.922 |
| 65 | 1.951 |

TISCH ENVIROMENTAL, INC.
145 SOUTH MIAMI AVE.
VILLAGE OF CLEVES, OH 45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX
WWW.TISCH-ENV.COM

**AIR POLLUTION MONITORING EQUIPMENT**

# ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 07, 2010 Rootsmeter S/N 9833620 Ta (K) - 298
Operator Tisch Orifice I.D. - 0988 Pa (mm) - 744.22

| 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 | 1.3890 | 3.2 | 2.00 |
| 2 | NA | NA | 1.00 | 0.9800 | 6.4 | 4.00 |
| 3 | NA | NA | 1.00 | 0.8730 | 8.1 | 5.00 |
| 4 | NA | NA | 1.00 | 0.8330 | 9.0 | 5.50 |
| 5 | NA | NA | 1.00 | 0.6890 | 12.9 | 8.00 |

## DATA TABULATION

| Vstd | (x axis) Qstd | (y axis) |
|---|---|---|
| 0.9750 | 0.7019 | 1.3995 |
| 0.9707 | 0.9905 | 1.9791 |
| 0.9685 | 1.1094 | 2.2127 |
| 0.9674 | 1.1613 | 2.3207 |
| 0.9622 | 1.3966 | 2.7989 |

Qstd slope (m) = 2.01259
intercept (b) = -0.01532
coefficient (r) = 0.99996

y axis = SQRT[H2O(Pa/760)(298/Ta)]

| Va | (x axis) Qa | (y axis) |
|---|---|---|
| 0.9957 | 0.7168 | 0.8949 |
| 0.9913 | 1.0115 | 1.2656 |
| 0.9890 | 1.1329 | 1.4150 |
| 0.9879 | 1.1860 | 1.4840 |
| 0.9826 | 1.4262 | 1.7898 |

Qa slope (m) = 1.26025
intercept (b) = -0.00980
coefficient (r) = 0.99996

y axis = SQRT[H2O(Ta/Pa)]

## CALCULATIONS

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

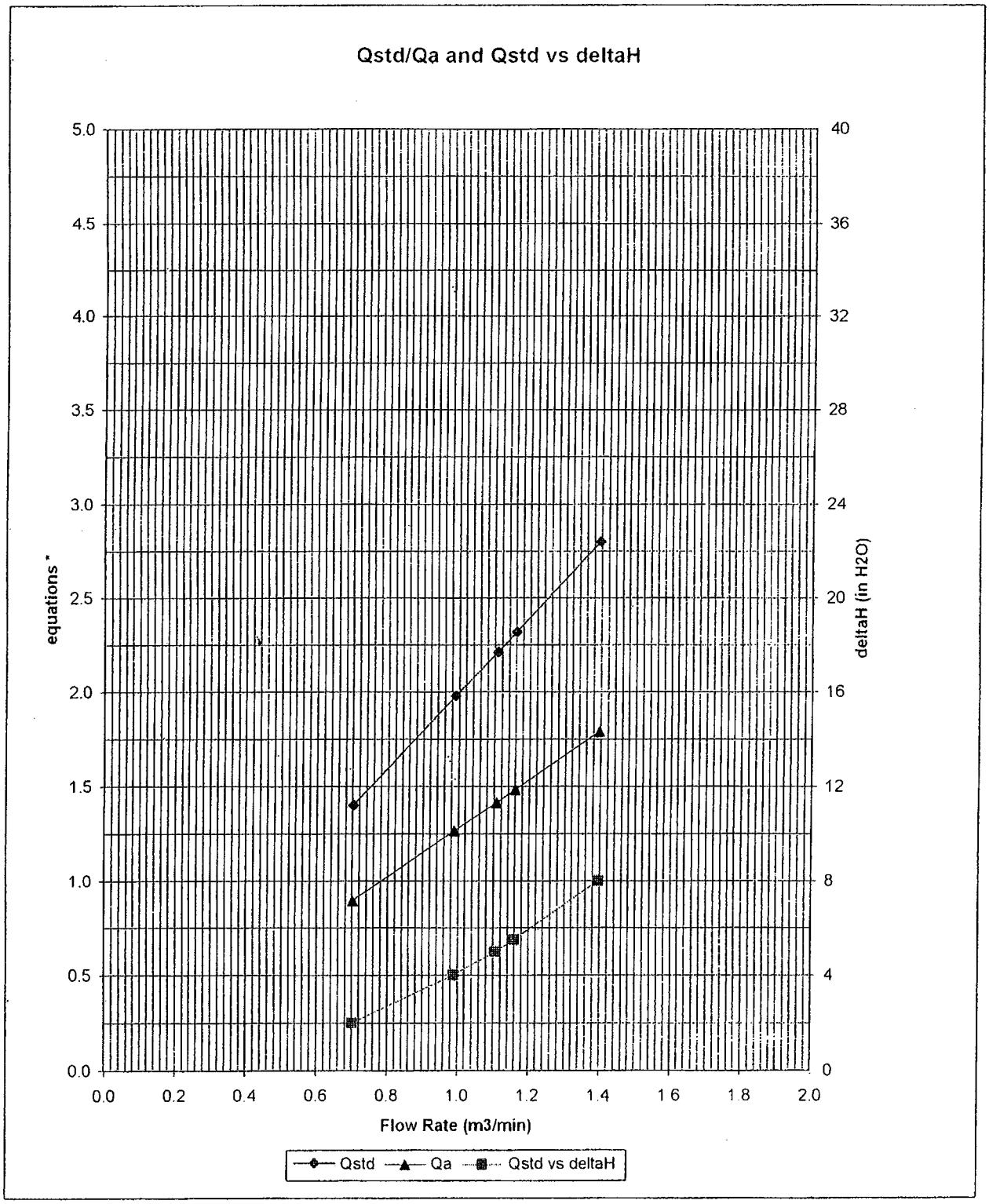
Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

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

TISCH ENVIROMENTAL, INC.
145 SOUTH MIAMI AVE.
VILLAGE OF CLEVES, OH 45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX
WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT




*** y-axis equations:**

Qstd series: $\sqrt{\Delta H \left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$

Qa series: $\sqrt{(\Delta H\ (Ta\ /\ Pa))}$

#0988

TISCH ENVIROMENTAL, INC.
145 SOUTH MIAMI AVE.
VILLAGE OF CLEVES, OH 45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX
WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

# ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Nov 08, 2010 Rootsmeter S/N 9833620 Ta (K) - 292
Operator Tisch Orifice I.D. - 0843 Pa (mm) - 754.38

| 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 | 1.4030 | 3.2 | 2.00 |
| 2 | NA | NA | 1.00 | 0.9880 | 6.4 | 4.00 |
| 3 | NA | NA | 1.00 | 0.8850 | 7.9 | 5.00 |
| 4 | NA | NA | 1.00 | 0.8440 | 8.8 | 5.50 |
| 5 | NA | NA | 1.00 | 0.6970 | 12.7 | 8.00 |

## DATA TABULATION

| Vstd | (x axis) Qstd | (y axis) | | Va | (x axis) Qa | (y axis) |
|---|---|---|---|---|---|---|
| 1.0087 | 0.7189 | 1.4234 | | 0.9957 | 0.7097 | 0.8799 |
| 1.0044 | 1.0166 | 2.0130 | | 0.9915 | 1.0036 | 1.2443 |
| 1.0023 | 1.1325 | 2.2506 | | 0.9894 | 1.1180 | 1.3912 |
| 1.0012 | 1.1862 | 2.3604 | | 0.9883 | 1.1710 | 1.4591 |
| 0.9959 | 1.4289 | 2.8468 | | 0.9831 | 1.4105 | 1.7597 |
| Qstd slope (m) = | | 2.00691 | | Qa slope (m) = | | 1.25670 |
| intercept (b) = | | -0.02214 | | intercept (b) = | | -0.01369 |
| coefficient (r) = | | 0.99996 | | coefficient (r) = | | 0.99996 |
| 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

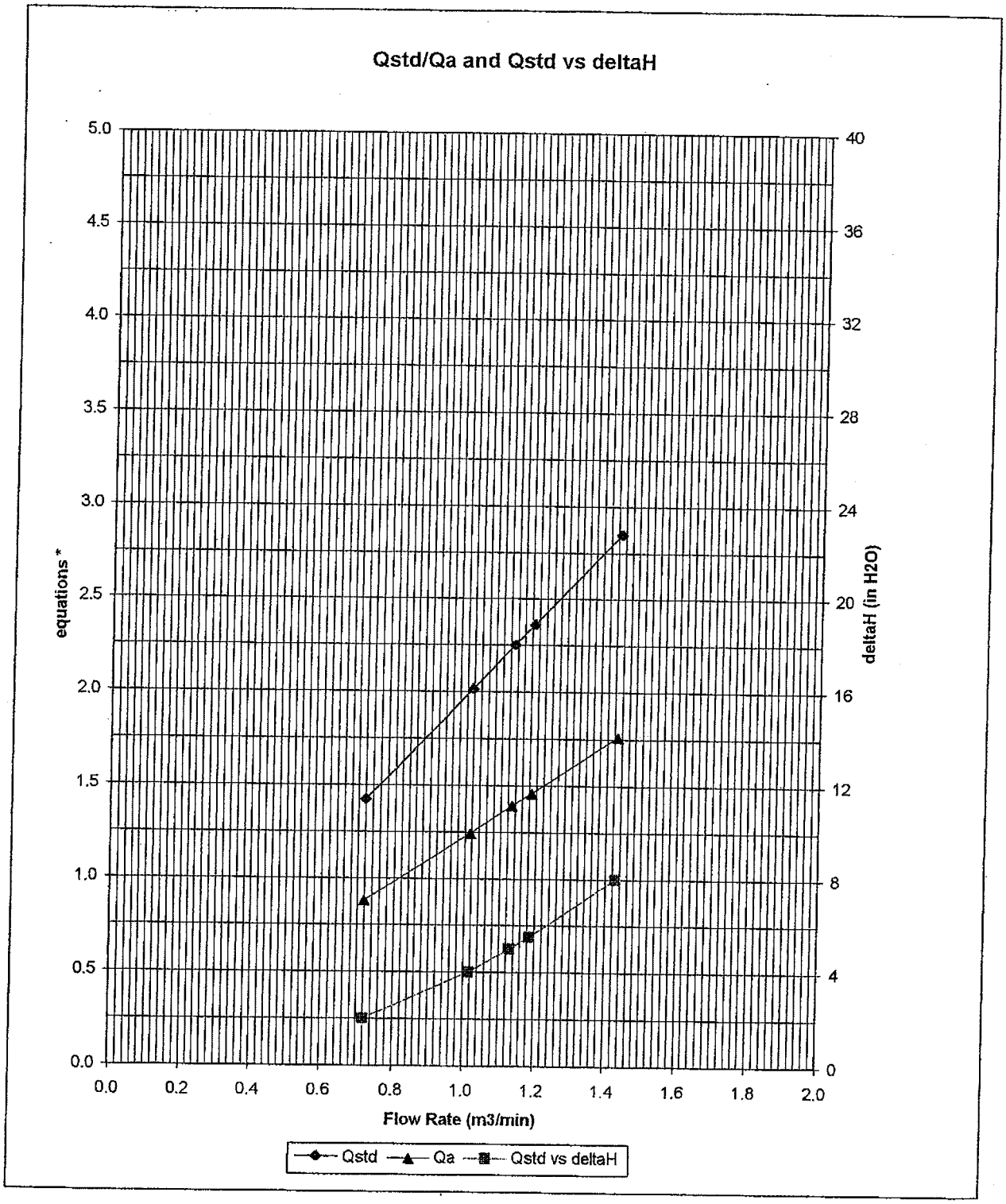
Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

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

TISCH ENVIROMENTAL, INC.
145 SOUTH MIAMI AVE.
VILLAGE OF CLEVES, OH 45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX
WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT




*** y-axis equations:**

Qstd series: $\sqrt{\Delta H \left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$

Qa series: $\sqrt{(\Delta H\ (Ta\ /\ Pa))}$

#0843

# 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*: | *30 May 2010* | | |

*Remarks: Recommended interval for hardware calibration is 1 year

## *Calibration Result*

Sensitivity Adjustment Scale Setting (Before Calibration): *557* CPM
Sensitivity Adjustment Scale Setting (After Calibration): *557* CPM

| Hour | Date (dd-mm-yy) | Time | Ambient Condition | | Concentration[1] ($mg/m^3$) **Y-axis** | Total Count[2] | Count/ Minute[3] **X-axis** |
|---|---|---|---|---|---|---|---|
| | | | Temp (°C) | R.H. (%) | | | |
| 1 | *05-06-10* | *10:00 - 11:00* | *27.3* | *78* | *0.05537* | *1850* | *30.83* |
| 2 | *05-06-10* | *11:00 - 12:00* | *27.4* | *77* | *0.05441* | *1812* | *30.20* |
| 3 | *05-06-10* | *12:00 - 13:00* | *27.4* | *78* | *0.05245* | *1753* | *29.22* |
| 4 | *05-06-10* | *13:00 - 14:00* | *27.5* | *78* | *0.05355* | *1787* | *29.78* |

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

By Linear Regression of Y or X
Slope (K-factor): *0.0018*
Correlation coefficient: *0.9949*

Validity of Calibration Record: *4 June 2011*

Remarks:

QC Reviewer: *YW Fung* Signature: Date: 7 June 2010

# EQUIPMENT CALIBRATION RECORD

| | |
|---|---|
| Type: | ***Laser Dust Monitor*** |
| Manufacturer/Brand: | ***SIBATA*** |
| Model No.: | ***LD-3*** |
| Equipment No.: | ***A.005.07a*** |
| 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*: | *4 June 2011* | | |

*Remarks: Recommended interval for hardware calibration is 1 year

## *Calibration Result*

Sensitivity Adjustment Scale Setting (Before Calibration): *557* CPM
Sensitivity Adjustment Scale Setting (After Calibration): *557* CPM

| Hour | Date (dd-mm-yy) | Time | Ambient Condition | | Concentration[1] ($mg/m^3$) **Y-axis** | Total Count[2] | Count/ Minute[3] **X-axis** |
|---|---|---|---|---|---|---|---|
| | | | Temp (°C) | R.H. (%) | | | |
| 1 | *05-06-11* | *09:30 - 10:30* | *31.3* | *67* | *0.04118* | *1540* | *25.67* |
| 2 | *05-06-11* | *10:30 - 11:30* | *31.3* | *67* | *0.04354* | *1637* | *27.28* |
| 3 | *05-06-11* | *11:30 - 12:30* | *31.3* | *67* | *0.04633* | *1730* | *28.83* |
| 4 | *05-06-11* | *12:30 - 13:30* | *31.4* | *66* | *0.04271* | *1603* | *26.72* |

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

By Linear Regression of Y or X
Slope (K-factor): *0.0016*
Correlation coefficient: *0.9958*

Validity of Calibration Record: *4 June 2012*

Remarks:

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

# EQUIPMENT CALIBRATION RECORD

| | |
|---|---|
| Type: | ***Laser Dust Monitor*** |
| Manufacturer/Brand: | ***SIBATA*** |
| Model No.: | ***LD-3*** |
| Equipment No.: | ***A.005.08a*** |
| Sensitivity Adjustment Scale Setting: | ***702 CPM*** |
| Operator: | *Mike Shek (MSKM)* |

## *Standard Equipment*

| | | | |
|---|---|---|---|
| Equipment: | *Rupprecht & Patashnick TEOM®* | | |
| Venue: | *Cyberport (Pui Ying Secondary School)* | | |
| Model No.: | *Series 1400AB* | | |
| Serial No: | Control: *140AB219899803* | | |
| | Sensor: *1200C143659803* | $K_o$: *12500* | |
| Last Calibration Date*: | *30 May 2010* | | |

*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 | *06-06-10* | *09:00 - 10:00* | *27.7* | *77* | *0.06361* | *2381* | *39.68* |
| 2 | *06-06-10* | *10:00 - 11:00* | *27.7* | *77* | *0.06176* | *2301* | *38.35* |
| 3 | *06-06-10* | *11:00 - 12:00* | *27.8* | *78* | *0.06704* | *2518* | *41.97* |
| 4 | *06-06-10* | *12:00 - 13:00* | *27.8* | *77* | *0.06728* | *2522* | *42.03* |

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: *0.9933*

Validity of Calibration Record: *5 June 2011*

Remarks:

QC Reviewer: *YW Fung* Signature: Date: 7 June 2010

# EQUIPMENT CALIBRATION RECORD

| | |
|---|---|
| Type: | ***Laser Dust Monitor*** |
| Manufacturer/Brand: | ***SIBATA*** |
| Model No.: | ***LD-3*** |
| Equipment No.: | ***A.005.09a*** |
| Sensitivity Adjustment Scale Setting: | ***797 CPM*** |
| Operator: | *Mike Shek (MSKM)* |

## *Standard Equipment*

| | | | |
|---|---|---|---|
| Equipment: | *Rupprecht & Patashnick TEOM®* | | |
| Venue: | *Cyberport (Pui Ying Secondary School)* | | |
| Model No.: | *Series 1400AB* | | |
| Serial No: | Control: *140AB219899803* | | |
| | Sensor: *1200C143659803* | $K_o$: *12500* | |
| Last Calibration Date*: | *30 May 2010* | | |

*Remarks: Recommended interval for hardware calibration is 1 year

## *Calibration Result*

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

| Hour | Date (dd-mm-yy) | Time | Ambient Condition | | Concentration[1] ($mg/m^3$) **Y-axis** | Total Count[2] | Count/ Minute[3] **X-axis** |
|---|---|---|---|---|---|---|---|
| | | | Temp (°C) | R.H. (%) | | | |
| 1 | *06-06-10* | *13:30 - 14:30* | *27.8* | *77* | *0.06421* | *2408* | *40.13* |
| 2 | *06-06-10* | *14:30 - 15:30* | *27.8* | *78* | *0.06643* | *2491* | *41.52* |
| 3 | *06-06-10* | *15:30 - 16:30* | *27.9* | *78* | *0.06375* | *2379* | *39.65* |
| 4 | *06-06-10* | *16:30 - 17:30* | *27.7* | *78* | *0.06159* | *2305* | *38.42* |

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

By Linear Regression of Y or X
Slope (K-factor): *0.0016*
Correlation coefficient: *0.9944*

Validity of Calibration Record: *5 June 2011*

Remarks:

QC Reviewer: *YW Fung* Signature: Date: 7 June 2010

# 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* $K_o$: *12500* |
| Last Calibration Date*: | *4 June 2011* |

*Remarks: Recommended interval for hardware calibration is 1 year

## *Calibration Result*

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

| Hour | Date (dd-mm-yy) | Time | Ambient Condition | | Concentration[1] ($mg/m^3$) **Y-axis** | Total Count[2] | Count/ Minute[3] **X-axis** |
|---|---|---|---|---|---|---|---|
| | | | Temp (°C) | R.H. (%) | | | |
| 1 | *05-06-11* | *13:30 - 14:30* | *31.4* | *66* | *0.04416* | *1758* | *29.30* |
| 2 | *05-06-11* | *14:30 - 15:30* | *31.5* | *66* | *0.04752* | *1889* | *31.48* |
| 3 | *05-06-11* | *15:30 - 16:30* | *31.5* | *66* | *0.04371* | *1748* | *29.13* |
| 4 | *05-06-11* | *16:30 - 17:30* | *31.5* | *67* | *0.04543* | *1808* | *30.13* |

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

By Linear Regression of Y or X
Slope (K-factor): *0.0015*
Correlation coefficient: *0.9953*

Validity of Calibration Record: *4 June 2012*

Remarks:

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

# EQUIPMENT CALIBRATION RECORD

| | |
|---|---|
| Type: | ***Laser Dust Monitor*** |
| Manufacturer/Brand: | ***SIBATA*** |
| Model No.: | ***LD-3*** |
| Equipment No.: | ***A.005.11a*** |
| Sensitivity Adjustment Scale Setting: | ***799 CPM*** |
| Operator: | *Mike Shek (MSKM)* |

## *Standard Equipment*

| | | | |
|---|---|---|---|
| Equipment: | *Rupprecht & Patashnick TEOM®* | | |
| Venue: | *Cyberport (Pui Ying Secondary School)* | | |
| Model No.: | *Series 1400AB* | | |
| Serial No: | Control: *140AB219899803* | | |
| | Sensor: *1200C143659803* | $K_o$: *12500* | |
| Last Calibration Date*: | *30 May 2010* | | |

*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 | *04-07-10* | *11:30 - 12:30* | *31.2* | *81* | *0.04924* | *1849* | *30.82* |
| 2 | *04-07-10* | *12:30 - 13:30* | *31.3* | *81* | *0.05529* | *2072* | *34.53* |
| 3 | *04-07-10* | *13:30 - 14:30* | *31.3* | *81* | *0.05861* | *2205* | *36.75* |
| 4 | *04-07-10* | *14:30 - 15:30* | *31.4* | *81* | *0.05215* | *1971* | *32.85* |

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: *0.9977*

Validity of Calibration Record: *3 July 2011*

Remarks:

QC Reviewer: *YW Fung* Signature: Date: 5 July 2010

# EQUIPMENT CALIBRATION RECORD

| | |
|---|---|
| Type: | ***Laser Dust Monitor*** |
| Manufacturer/Brand: | ***SIBATA*** |
| Model No.: | ***LD-3B*** |
| Equipment No.: | ***A.005.12a*** |
| Sensitivity Adjustment Scale Setting: | ***805 CPM*** |
| Operator: | *Mike Shek (MSKM)* |

## *Standard Equipment*

| | | | |
|---|---|---|---|
| Equipment: | *Rupprecht & Patashnick TEOM®* | | |
| Venue: | *Cyberport (Pui Ying Secondary School)* | | |
| Model No.: | *Series 1400AB* | | |
| Serial No: | Control: *140AB219899803* | | |
| | Sensor: *1200C143659803* | $K_o$: *12500* | |
| Last Calibration Date*: | *30 May 2010* | | |

*Remarks: Recommended interval for hardware calibration is 1 year

## *Calibration Result*

Sensitivity Adjustment Scale Setting (Before Calibration): *805* CPM
Sensitivity Adjustment Scale Setting (After Calibration): *805* CPM

| Hour | Date (dd-mm-yy) | Time | Ambient Condition | | Concentration[1] ($mg/m^3$) **Y-axis** | Total Count[2] | Count/ Minute[3] **X-axis** |
|---|---|---|---|---|---|---|---|
| | | | Temp (°C) | R.H. (%) | | | |
| 1 | *24-10-10* | *12:30 - 13:30* | *26.6* | *68* | *0.07973* | *2984* | *49.73* |
| 2 | *24-10-10* | *13:30 - 14:30* | *26.6* | *69* | *0.08356* | *3144* | *52.40* |
| 3 | *24-10-10* | *15:30 - 16:30* | *26.7* | *69* | *0.08867* | *3338* | *55.63* |
| 4 | *24-10-10* | *16:30 - 17:30* | *26.7* | *68* | *0.09234* | *3449* | *57.48* |

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): *0.0016*
Correlation coefficient: *0.9962*

Validity of Calibration Record: *23 October 2011*

Remarks:

QC Reviewer: *YW Fung* Signature: Date: 25 Oct 2010

# 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* | $K_o$: *12500* | |
| Last Calibration Date*: | *4 June 2011* | | |

*Remarks: Recommended interval for hardware calibration is 1 year

## *Calibration Result*

Sensitivity Adjustment Scale Setting (Before Calibration): *643* CPM
Sensitivity Adjustment Scale Setting (After Calibration): *643* CPM

| Hour | Date (dd-mm-yy) | Time | Ambient Condition | | Concentration[1] ($mg/m^3$) **Y-axis** | Total Count[2] | Count/ Minute[3] **X-axis** |
|---|---|---|---|---|---|---|---|
| | | | Temp (°C) | R.H. (%) | | | |
| 1 | *05-06-11* | *11:00 - 12:00* | *31.4* | *67* | *0.04513* | *1933* | *32.21* |
| 2 | *05-06-11* | *12:00 - 13:00* | *31.4* | *67* | *0.04392* | *1833* | *31.38* |
| 3 | *05-06-11* | *13:00 - 14:00* | *31.5* | *66* | *0.04751* | *2042* | *34.03* |
| 4 | *05-06-11* | *14:00 - 15:00* | *31.5* | *66* | *0.04476* | *1918* | *31.97* |

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

By Linear Regression of Y or X
Slope (K-factor): *0.0014*
Correlation coefficient: *0.9978*

Validity of Calibration Record: *4 June 2012*

Remarks:

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

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
E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533
HOKLAS 028

# CERTIFICATE OF CALIBRATION

**Certificate No.:** 11CA0317 06-01 **Page** 1 **of** 2

## Item tested

| | | | |
|---|---|---|---|
| Description: | Sound Level Meter (Type 1) | , | Microphone |
| Manufacturer: | B & K | , | B & K |
| Type/Model No.: | 2238 | , | 4188 |
| Serial/Equipment No.: | 2285692/N.009.04 | , | 2250420 |
| Adaptors used: | - | , | - |

## Item submitted by

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

## Date of test: 26-Mar-2011

## Reference equipment used in the calibration

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

## Ambient conditions

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

## Test specifications

1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.

2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.

3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

## Test results

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

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

Actual Measurement data are documented on worksheets.

**Approved Signatory:** Huang Jian Min/Feng Jun Qi **Date:** 29-Mar-2011 **Company Chop:** SOILS & MATERIALS ENGINEERING COMPANY LTD. 綜合試驗有限公司

**Comments:** The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
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
E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533
HOKLAS 028

# CERTIFICATE OF CALIBRATION

Certificate No.: 10CA1105 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.: | 2255688 | , | 2141430 |
| Adaptors used: | - | , | - |

## Item submitted by

| | |
|---|---|
| Customer Name: | AECOM ASIA CO., LTD. |
| Address of Customer: | - |
| Request No.: | - |
| Date of request: | 05-Nov-2010 |

## Date of test: 08-Nov-2010

## Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|---|---|---|---|---|
| Multi function sound calibrator | B&K 4226 | 2288444 | 12-Jan-2011 | CIGISMEC |
| Signal generator | DS 360 | 33873 | 28-Jun-2011 | CEPREI |
| Signal generator | DS 360 | 61227 | 24-Jun-2011 | CEPREI |

## Ambient conditions

| | |
|---|---|
| Temperature: | (21 ± 1) °C |
| Relative humidity: | (60 ± 5) % |
| Air pressure: | (1000 ± 5) hPa |

## Test specifications

1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.

2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.

3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess 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: 09-Nov-2010 Company Chop:

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

**Comments:** The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
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
E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533
HKAS 026

# CERTIFICATE OF CALIBRATION

**Certificate No.:** 10CA0708 04-01 **Page:** 1 of 2

## Item tested

| | |
|---|---|
| Description: | Acoustical Calibrator (Class 1) |
| Manufacturer: | B&K |
| Type/Model No.: | 4231 |
| Serial/Equipment No.: | 1790985 / N004.01 |
| Adaptors used: | - |

## Item submitted by

| | |
|---|---|
| Curstomer: | AECOM ASIA CO. LTD |
| Address of Customer: | - |
| Request No.: | - |
| Date of request: | 08-Jul-2010 |

## Date of test: 14-Jul-2010

## Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|---|---|---|---|---|
| Lab standard microphone | B&K 4180 | 2412857 | 02-Jul-2011 | SCL |
| Preamplifier | B&K 2673 | 2239857 | 15-Dec-2010 | CEPREI |
| Measuring amplifier | B&K 2610 | 2346941 | 11-Dec-2010 | CEPREI |
| Signal generator | DS 360 | 61227 | 24-Jun-2011 | CEPREI |
| Digital multi-meter | 34401A | US36087050 | 03-Dec-2010 | CIGISMEC |
| Audio analyzer | 8903B | GB41300350 | 07-Dec-2010 | CEPREI |
| Universal counter | 53132A | MY40003662 | 05-Jul-2011 | CEPREI |

## Ambient conditions

| | |
|---|---|
| Temperature: | 22 ± 1 °C |
| Relative humidity: | 60 ± 5 % |
| Air pressure: | 1000 ± 5 hPa |

## Test specifications

1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.

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

3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

## Test results

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

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

**Approved Signatory:** Huang Jian Min/Feng Jun Qi **Date:** 14-Jul-2010 **Company Chop:**

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

**Comments:** The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

**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
E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533
HKLAS 028

# CERTIFICATE OF CALIBRATION

**Certificate No.:** 10CA0803 01 **Page** 1 **of** 2

## Item tested

| | | | |
|---|---|---|---|
| Description: | Sound Level Meter (Type 1) | , | Microphone |
| Manufacturer: | RION CO., LTD. | , | RION CO., LTD. |
| Type/Model No.: | NL-31 | , | UC-53A |
| Serial/Equipment No.: | 00320528 / N.007.03A | , | 88783 |
| Adaptors used: | - | , | - |

## Item submitted by

| | |
|---|---|
| Customer Name: | AECOM ASIA CO., LTD. |
| Address of Customer: | - |
| Request No.: | - |
| Date of request: | 03-Aug-2010 |

## Date of test: 05-Aug-2010

## Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|---|---|---|---|---|
| Multi function sound calibrator | B&K 4226 | 2288444 | 12-Jan-2011 | CIGISMEC |
| Signal generator | DS 360 | 33873 | 28-Jun-2011 | CEPREI |
| Signal generator | DS 360 | 61227 | 24-Jun-2011 | CEPREI |

## Ambient conditions

| | |
|---|---|
| Temperature: | 22 ± 1 °C |
| Relative humidity: | 60 ± 5 % |
| Air pressure: | 1000 ± 5 hPa |

## Test specifications

1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess 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:** 06-Aug-2010 **Company Chop:** SOILS & MATERIALS ENGINEERING CO., LTD. 綜合試驗有限公司

**Comments:** The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. Tel : (852) 2873 6860
香港黃竹坑道37號利邊中心地下，9樓，12樓，13樓及20樓 Fax : (852) 2555 7533
E-mail: smec@cigismec.com Website: www.cigismec.com
HOKLAS 028

# CERTIFICATE OF CALIBRATION

**Certificate No.:** 10CA0728 02-02 **Page:** 1 of 2

## Item tested

| | |
|---|---|
| Description: | Acoustical Calibrator (Class 1) |
| Manufacturer: | Rion Co., Ltd. |
| Type/Model No.: | NC-73 |
| Serial/Equipment No.: | 10307223 / N-004-08 |
| Adaptors used: | - |

## Item submitted by

| | |
|---|---|
| Curstomer: | AECOM ASIA CO., LTD. |
| Address of Customer: | - |
| Request No.: | - |
| Date of request: | 28-Jul-2010 |

**Date of test:** 29-Jul-2010

## Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|---|---|---|---|---|
| Lab standard microphone | B&K 4180 | 2412857 | 02-Jul-2011 | SCL |
| Preamplifier | B&K 2673 | 2239857 | 15-Dec-2010 | CEPREI |
| Measuring amplifier | B&K 2610 | 2346941 | 11-Dec-2010 | CEPREI |
| Signal generator | DS 360 | 61227 | 24-Jun-2011 | CEPREI |
| Digital multi-meter | 34401A | US36087050 | 03-Dec-2010 | CIGISMEC |
| Audio analyzer | 8903B | GB41300350 | 07-Dec-2010 | CEPREI |
| Universal counter | 53132A | MY40003662 | 05-Jul-2011 | CEPREI |

## Ambient conditions

| | |
|---|---|
| Temperature: | 22 ± 1 °C |
| Relative humidity: | 60 ± 5 % |
| Air pressure: | 1000 ± 5 hPa |

## Test specifications

1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.

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

3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

## Test results

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

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

**Approved Signatory:** Huang Jian Min/Feng Jun Qi **Date:** 29-Jul-2010 **Company Chop:**

**Comments:** The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.