



# Certificate of Calibration

| Calibration Certification Information |                             |           |       |
|---------------------------------------|-----------------------------|-----------|-------|
| Cal. Date: January 24, 2018           | Rootsmeter S/N: 438320      | Ta: 293   | °K    |
| Operator: Jim Tisch                   |                             | Pa: 756.9 | mm Hg |
| Calibration Model #: TE-5025A         | Calibrator S/N: <b>3166</b> |           |       |

| Run | Vol. Init (m3) | Vol. Final (m3) | ΔVol. (m3) | ΔTime (min) | ΔP (mm Hg) | ΔH (in H2O) |
|-----|----------------|-----------------|------------|-------------|------------|-------------|
| 1   | 1              | 2               | 1          | 1.4430      | 3.2        | 2.00        |
| 2   | 3              | 4               | 1          | 1.0270      | 6.4        | 4.00        |
| 3   | 5              | 6               | 1          | 0.9220      | 7.9        | 5.00        |
| 4   | 7              | 8               | 1          | 0.8780      | 8.7        | 5.50        |
| 5   | 9              | 10              | 1          | 0.7270      | 12.6       | 8.00        |

| Data Tabulation |               |  |           |             |   |
|-----------------|---------------|--|-----------|-------------|---|
| Vstd (m3)       | Qstd (x-axis) | $\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis) | Va        | Qa (x-axis) | $\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis) |
| 1.0087          | 0.6990        | 1.4233   | 0.9958    | 0.6901      | 0.8799  |
| 1.0044          | 0.9780        | 2.0129   | 0.9915    | 0.9655      | 1.2443  |
| 1.0024          | 1.0872        | 2.2505   | 0.9896    | 1.0733      | 1.3912  |
| 1.0013          | 1.1404        | 2.3603   | 0.9885    | 1.1259      | 1.4591  |
| 0.9961          | 1.3701        | 2.8467   | 0.9834    | 1.3526      | 1.7598  |
| <b>QSTD</b>     | <b>m=</b>     | <b>2.12231</b>   | <b>QA</b> | <b>m=</b>   | <b>1.32895</b>  |
|                 | <b>b=</b>     | <b>-0.06016</b>  |           | <b>b=</b>   | <b>-0.03719</b>   |
|                 | <b>r=</b>     | <b>0.99999</b>   |           | <b>r=</b>   | <b>0.99999</b>  |

| Calculations   |   |
|--|---|
| <b>Vstd=</b> $\Delta Vol \left( \frac{Pa - \Delta P}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)$                                 | <b>Va=</b> $\Delta Vol \left( \frac{Pa - \Delta P}{Pa} \right)$                                 |
| <b>Qstd=</b> $Vstd / \Delta Time$  | <b>Qa=</b> $Va / \Delta Time$   |
| For subsequent flow rate calculations:   |   |
| <b>Qstd=</b> $1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$ | <b>Qa=</b> $1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$ |

| Standard Conditions |                                       |
|---------------------|---------------------------------------|
| Tstd:               | 298.15 °K                             |
| Pstd:               | 760 mm Hg                             |
| Key                 |                                       |
| ΔH:                 | calibrator manometer reading (in H2O) |
| ΔP:                 | rootsmeter manometer reading (mm Hg)  |
| Ta:                 | actual absolute temperature (°K)      |
| Pa:                 | actual barometric pressure (mm Hg)    |
| b:                  | intercept                             |
| m:                  | slope                                 |

| RECALIBRATION  |
|--|
| US EPA recommends annual recalibration per 1998<br>40 Code of Federal Regulations Part 50 to 51,<br>Appendix B to Part 50, Reference Method for the<br>Determination of Suspended Particulate Matter in<br>the Atmosphere, 9.2.17, page 30 |

# Certificate of Calibration

| Calibration Certification Information |                        |           |       |
|---------------------------------------|------------------------|-----------|-------|
| Cal. Date: January 11, 2019           | Rootsmeter S/N: 438320 | Ta: 293   | °K    |
| Operator: Jim Tisch                   |                        | Pa: 760.7 | mm Hg |
| Calibration Model #: TE-5025A         | Calibrator S/N: 0005   |           |       |

| Run | Vol. Init (m3) | Vol. Final (m3) | ΔVol. (m3) | ΔTime (min) | ΔP (mm Hg) | ΔH (in H2O) |
|-----|----------------|-----------------|------------|-------------|------------|-------------|
| 1   | 1              | 2               | 1          | 1.4090      | 3.2        | 2.00        |
| 2   | 3              | 4               | 1          | 0.9980      | 6.4        | 4.00        |
| 3   | 5              | 6               | 1          | 0.8900      | 7.8        | 5.00        |
| 4   | 7              | 8               | 1          | 0.8450      | 8.7        | 5.50        |
| 5   | 9              | 10              | 1          | 0.6990      | 12.6       | 8.00        |

| Data Tabulation |               |  |           |             |   |
|-----------------|---------------|--|-----------|-------------|---|
| Vstd (m3)       | Qstd (x-axis) | $\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis) | Va        | Qa (x-axis) | $\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis) |
| 1.0138          | 0.7195        | 1.4269   | 0.9958    | 0.7067      | 0.8777  |
| 1.0095          | 1.0115        | 2.0180   | 0.9916    | 0.9936      | 1.2412  |
| 1.0076          | 1.1321        | 2.2561   | 0.9897    | 1.1121      | 1.3877  |
| 1.0064          | 1.1910        | 2.3663   | 0.9886    | 1.1699      | 1.4555  |
| 1.0012          | 1.4323        | 2.8538   | 0.9834    | 1.4069      | 1.7553  |
| <b>QSTD</b>     | m=            | 1.99861  | <b>QA</b> | m=          | 1.25149   |
|                 | b=            | -0.00882   |           | b=          | -0.00543  |
|                 | r=            | 0.99997  |           | r=          | 0.99997   |

| Calculations   |   |   |  |
|--|---|---|--|
| $Vstd = \Delta Vol \left( \frac{Pa - \Delta P}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)$                                 | $Va = \Delta Vol \left( \frac{Pa - \Delta P}{Pa} \right)$ |   |  |
| $Qstd = Vstd / \Delta Time$  | $Qa = Va / \Delta Time$                                   |   |  |
| For subsequent flow rate calculations:   |   |   |  |
| $Qstd = 1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$ |   | $Qa = 1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$ |  |

| Standard Conditions                       |           |
|---|-----------|
| Tstd:                                     | 298.15 °K |
| Pstd:                                     | 760 mm Hg |
| Key                                       |           |
| ΔH: calibrator manometer reading (in H2O) |           |
| ΔP: rootsmeter manometer reading (mm Hg)  |           |
| Ta: actual absolute temperature (°K)      |           |
| Pa: actual barometric pressure (mm Hg)    |           |
| b: intercept                              |           |
| m: slope                                  |           |

| RECALIBRATION  |
|--|
| US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30 |



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA1b Calibration Date : 19-Dec-18  
 Equipment no. : HVS001 Calibration Due Date : 18-Feb-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 293 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1020 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | Ori3166   | Slope, m <sub>c</sub>  | 2.12231 | Intercept, b <sub>c</sub> | -0.06016 |
| Last Calibration Date                 | 24-Jan-18 | $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$<br>$= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 24-Jan-19 |  |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>$W(P_a/1013.3 \times 298/T_a)^{1/2}/35.3$<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.6               | 1.6    | 3.2          | 0.8812  | 26                                   | 26.3074   |
| 2                  | 2.7               | 2.7    | 5.4          | 1.1362  | 34                                   | 34.4020   |
| 3                  | 4.0               | 4.0    | 8.0          | 1.3768  | 45                                   | 45.5321   |
| 4                  | 5.2               | 5.2    | 10.4         | 1.5658  | 48                                   | 48.5676   |
| 5                  | 6.3               | 6.3    | 12.6         | 1.7207  | 54                                   | 54.6385   |

By Linear Regression of Y on X

Slope, m = 33.7706 Intercept, b = -3.2329  
 Correlation Coefficient\* = 0.9933  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau Checked by : Chan Ka Chun  
 Date : 19-Dec-18 Date : 19-Dec-18



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA1b Calibration Date : 18-Feb-19  
 Equipment no. : HVS001 Calibration Due Date : 20-Apr-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition                     |                   |   |                          |   |                                      |   |
|---------------------------------------|-------------------|---|--------------------------|---|--------------------------------------|---|
| Temperature, T <sub>a</sub>           | 291               | Kelvin  | Pressure, P <sub>a</sub> | 1015  | mmHg                                 |   |
| Orifice Transfer Standard Information |                   |   |                          |   |                                      |   |
| Equipment No.                         | Ori0005           | Slope, m <sub>c</sub>   | 1.99861                  | Intercept, b <sub>c</sub>                             | -0.00882                             |   |
| Last Calibration Date                 | 11-Jan-19         | $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$ |                          |   |                                      |   |
| Next Calibration Date                 | 11-Jan-20         |   |                          |   |                                      |   |
| Calibration of TSP                    |                   |   |                          |   |                                      |   |
| Calibration Point                     | Manometer Reading |   |                          | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                                       | (up)              | (down)  | (difference)             |   |                                      |   |
| 1                                     | 1.4               | 1.4   | 2.8                      | 0.8524  | 22                                   | 22.2817   |
| 2                                     | 2.4               | 2.4   | 4.8                      | 1.1147  | 34                                   | 34.4354   |
| 3                                     | 3.6               | 3.6   | 7.2                      | 1.3642  | 42                                   | 42.5378   |
| 4                                     | 4.6               | 4.6   | 9.2                      | 1.5415  | 47                                   | 47.6018   |
| 5                                     | 5.9               | 5.9   | 11.8                     | 1.7452  | 54                                   | 54.6914   |
| By Linear Regression of Y on X        |                   |   |                          |   |                                      |   |
| Slope, m                              |                   | =   | 35.4579                  | Intercept, b  |                                      | = -6.6215   |
| Correlation Coefficient*              |                   | =   | 0.9958                   |   |                                      |   |
| Calibration Accepted                  |                   | =   | Yes/No**                 |   |                                      |   |

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau Checked by : Chan Ka Chun  
 Date : 18-Feb-19 Date : 18-Feb-19



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA2a Calibration Date : 19-Dec-18  
 Equipment no. : HVS002 Calibration Due Date : 18-Feb-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 293 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1020 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | Ori3166   | Slope, m <sub>c</sub>  | 2.12231 | Intercept, b <sub>c</sub> | -0.06016 |
| Last Calibration Date                 | 24-Jan-18 | $\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 24-Jan-19 |  |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.5               | 1.5    | 3.0          | 0.8541  | 28                                   | 28.3311   |
| 2                  | 2.2               | 2.2    | 4.4          | 1.0284  | 32                                   | 32.3784   |
| 3                  | 3.7               | 3.7    | 7.4          | 1.3253  | 40                                   | 40.4730   |
| 4                  | 4.5               | 4.5    | 9.0          | 1.4586  | 44                                   | 44.5203   |
| 5                  | 6.0               | 6.0    | 12.0         | 1.6799  | 52                                   | 52.6149   |

By Linear Regression of Y on X

Slope, m = 29.0948 Intercept, b = 2.7348  
 Correlation Coefficient\* = 0.9963  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau Checked by : Chan Ka Chun  
 Date : 19-Dec-18 Date : 19-Dec-18



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA2a Calibration Date : 18-Feb-19  
 Equipment no. : HVS002 Calibration Due Date : 20-Apr-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 291 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1015 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | Ori0005   | Slope, m <sub>c</sub>  | 1.99861 | Intercept, b <sub>c</sub> | -0.00882 |
| Last Calibration Date                 | 11-Jan-19 | $\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 11-Jan-20 |  |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.7               | 1.7    | 3.4          | 0.9388  | 24                                   | 24.3073   |
| 2                  | 2.4               | 2.4    | 4.8          | 1.1147  | 33                                   | 33.4225   |
| 3                  | 4.0               | 4.0    | 8.0          | 1.4377  | 42                                   | 42.5378   |
| 4                  | 5.1               | 5.1    | 10.2         | 1.6229  | 50                                   | 50.6402   |
| 5                  | 6.2               | 6.2    | 12.4         | 1.7889  | 58                                   | 58.7427   |

By Linear Regression of Y on X

Slope, m = 38.5348 Intercept, b = -11.2706  
 Correlation Coefficient\* = 0.9949  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau Checked by : Chan Ka Chun  
 Date : 18-Feb-19 Date : 18-Feb-19



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA3a Calibration Date : 19-Dec-18  
 Equipment no. : HVS012 Calibration Due Date : 18-Feb-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 293 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1020 mmHg                |

| Orifice Transfer Standard Information |           |  |         |               |          |
|---------------------------------------|-----------|--|---------|---------------|----------|
| Equipment No.                         | Ori3166   | Slope, m <sub>c</sub>  | 2.12231 | Intercept, bc | -0.06016 |
| Last Calibration Date                 | 24-Jan-18 | $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$<br>$= m_c \times Q_{std} + b_c$ |         |               |          |
| Next Calibration Date                 | 24-Jan-19 |  |         |               |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.2               | 1.2    | 2.4          | 0.7669  | 20                                   | 20.2365   |
| 2                  | 2.0               | 2.0    | 4.0          | 0.9819  | 28                                   | 28.3311   |
| 3                  | 3.5               | 3.5    | 7.0          | 1.2897  | 37                                   | 37.4375   |
| 4                  | 4.5               | 4.5    | 9.0          | 1.4586  | 41                                   | 41.4848   |
| 5                  | 5.5               | 5.5    | 11.0         | 1.6096  | 50                                   | 50.5912   |

By Linear Regression of Y on X

Slope, m = 33.7811 Intercept, b = -5.6420  
 Correlation Coefficient\* = 0.9918  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau Checked by : Chan Ka Chun  
 Date : 19-Dec-18 Date : 19-Dec-18



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA3a  
 Equipment no. : HVS012

Calibration Date : 18-Feb-19  
 Calibration Due Date : 20-Apr-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 291 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1015 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | Ori0005   | Slope, m <sub>c</sub>  | 1.99861 | Intercept, b <sub>c</sub> | -0.00882 |
| Last Calibration Date                 | 11-Jan-19 | $\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 11-Jan-20 |  |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.3               | 1.3    | 2.6          | 0.8215  | 30                                   | 30.3841   |
| 2                  | 2.0               | 2.0    | 4.0          | 1.0179  | 38                                   | 38.4866   |
| 3                  | 3.1               | 3.1    | 6.2          | 1.2662  | 44                                   | 44.5634   |
| 4                  | 4.0               | 4.0    | 8.0          | 1.4377  | 49                                   | 49.6274   |
| 5                  | 5.0               | 5.0    | 10.0         | 1.6069  | 54                                   | 54.6914   |

By Linear Regression of Y on X

Slope, m = 29.9992      Intercept, b = 6.6497  
 Correlation Coefficient\* = 0.9964  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau  
 Date : 18-Feb-19

Checked by : Chan Ka Chun  
 Date : 18-Feb-19





Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA4a Calibration Date : 19-Dec-18  
 Equipment no. : HVS004 Calibration Due Date : 18-Feb-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 293 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1020 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | Ori3166   | Slope, m <sub>c</sub>  | 2.12231 | Intercept, b <sub>c</sub> | -0.06016 |
| Last Calibration Date                 | 24-Jan-18 | $\left( \frac{H \times P_a}{1013.3 \times 298 / T_a} \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 24-Jan-19 |  |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.5               | 1.5    | 3.0          | 0.8541  | 24                                   | 24.2838   |
| 2                  | 2.0               | 2.0    | 4.0          | 0.9819  | 31                                   | 31.3666   |
| 3                  | 3.6               | 3.6    | 7.2          | 1.3076  | 40                                   | 40.4730   |
| 4                  | 4.2               | 4.2    | 8.4          | 1.4101  | 47                                   | 47.5558   |
| 5                  | 5.7               | 5.7    | 11.4         | 1.6381  | 56                                   | 56.6622   |

By Linear Regression of Y on X

Slope, m = 39.8624 Intercept, b = -9.2955  
 Correlation Coefficient\* = 0.9932  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau Checked by : Chan Ka Chun  
 Date : 19-Dec-18 Date : 19-Dec-18



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA4a  
 Equipment no. : HVS004

Calibration Date : 18-Feb-19  
 Calibration Due Date : 20-Apr-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 291 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1015 mmHg                |

| Orifice Transfer Standard Information |           |   |         |                           |          |
|---------------------------------------|-----------|---|---------|---------------------------|----------|
| Equipment No.                         | Ori0005   | Slope, m <sub>c</sub>   | 1.99861 | Intercept, b <sub>c</sub> | -0.00882 |
| Last Calibration Date                 | 11-Jan-19 | $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 11-Jan-20 |   |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.4               | 1.4    | 2.8          | 0.8524  | 22                                   | 22.2817   |
| 2                  | 2.2               | 2.2    | 4.4          | 1.0674  | 33                                   | 33.4225   |
| 3                  | 2.9               | 2.9    | 5.8          | 1.2248  | 40                                   | 40.5122   |
| 4                  | 4.1               | 4.1    | 8.2          | 1.4555  | 47                                   | 47.6018   |
| 5                  | 5.8               | 5.8    | 11.6         | 1.7304  | 58                                   | 58.7427   |

By Linear Regression of Y on X

Slope, m = 40.4458      Intercept, b = -10.6963  
 Correlation Coefficient\* = 0.9957  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau  
 Date : 18-Feb-19

Checked by : Chan Ka Chun  
 Date : 18-Feb-19





Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA5b Calibration Date : 18-Feb-19  
 Equipment no. : HVS010 Calibration Due Date : 20-Apr-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 291 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1015 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | Ori0005   | Slope, m <sub>c</sub>  | 1.99861 | Intercept, b <sub>c</sub> | -0.00882 |
| Last Calibration Date                 | 11-Jan-19 | $\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 11-Jan-20 |  |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.2               | 1.2    | 2.4          | 0.7895  | 37                                   | 37.4738   |
| 2                  | 2.0               | 2.0    | 4.0          | 1.0179  | 42                                   | 42.5378   |
| 3                  | 3.1               | 3.1    | 6.2          | 1.2662  | 50                                   | 50.6402   |
| 4                  | 4.0               | 4.0    | 8.0          | 1.4377  | 56                                   | 56.7171   |
| 5                  | 5.0               | 5.0    | 10.0         | 1.6069  | 61                                   | 61.7811   |

By Linear Regression of Y on X

Slope, m = 30.4544 Intercept, b = 12.5644  
 Correlation Coefficient\* = 0.9972  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau Checked by : Chan Ka Chun  
 Date : 18-Feb-19 Date : 18-Feb-19



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : MA1e  
 Equipment no. : HVS007

Calibration Date : 19-Dec-18  
 Calibration Due Date : 18-Feb-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 293 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1020 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | Ori3166   | Slope, m <sub>c</sub>  | 2.12231 | Intercept, b <sub>c</sub> | -0.06016 |
| Last Calibration Date                 | 24-Jan-18 | $\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 24-Jan-19 |  |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.8               | 1.8    | 3.6          | 0.9329  | 24                                   | 24.2838   |
| 2                  | 2.5               | 2.5    | 5.0          | 1.0944  | 33                                   | 33.3902   |
| 3                  | 4.0               | 4.0    | 8.0          | 1.3768  | 43                                   | 43.5085   |
| 4                  | 5.2               | 5.2    | 10.4         | 1.5658  | 50                                   | 50.5912   |
| 5                  | 6.5               | 6.5    | 13.0         | 1.7473  | 57                                   | 57.6740   |

By Linear Regression of Y on X

Slope, m = 39.8628      Intercept, b = -11.6647  
 Correlation Coefficient\* = 0.9973  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau  
 Date : 19-Dec-18

Checked by : Chan Ka Chun  
 Date : 19-Dec-18



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : MA1e  
 Equipment no. : HVS007

Calibration Date : 18-Feb-19  
 Calibration Due Date : 20-Apr-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 291 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1015 mmHg                |

| Orifice Transfer Standard Information |           |   |         |                           |          |
|---------------------------------------|-----------|---|---------|---------------------------|----------|
| Equipment No.                         | Ori0005   | Slope, m <sub>c</sub>   | 1.99861 | Intercept, b <sub>c</sub> | -0.00882 |
| Last Calibration Date                 | 11-Jan-19 | $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 11-Jan-20 |   |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.8               | 1.8    | 3.6          | 0.9659  | 22                                   | 22.2817   |
| 2                  | 2.4               | 2.4    | 4.8          | 1.1147  | 31                                   | 31.3969   |
| 3                  | 3.8               | 3.8    | 7.6          | 1.4014  | 41                                   | 41.5250   |
| 4                  | 5.0               | 5.0    | 10.0         | 1.6069  | 50                                   | 50.6402   |
| 5                  | 6.1               | 6.1    | 12.2         | 1.7744  | 56                                   | 56.7171   |

By Linear Regression of Y on X

Slope, m = 41.5898      Intercept, b = -16.5769  
 Correlation Coefficient\* = 0.9969  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau  
 Date : 18-Feb-19

Checked by : Chan Ka Chun  
 Date : 18-Feb-19



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : MA1w  
 Equipment no. : HVS008

Calibration Date : 19-Dec-18  
 Calibration Due Date : 18-Feb-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 293 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1020 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | Ori3166   | Slope, m <sub>c</sub>  | 2.12231 | Intercept, b <sub>c</sub> | -0.06016 |
| Last Calibration Date                 | 24-Jan-18 | $\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 24-Jan-19 |  |         |                           |          |

| Calibration of TSP |                   |        |              |   |                                      |   |
|--------------------|-------------------|--------|--------------|---|--------------------------------------|---|
| Calibration Point  | Manometer Reading |        |              | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                    | (up)              | (down) | (difference) |   |                                      |   |
| 1                  | 1.7               | 1.7    | 3.4          | 0.9074  | 24                                   | 24.2838   |
| 2                  | 2.6               | 2.6    | 5.2          | 1.1155  | 33                                   | 33.3902   |
| 3                  | 4.2               | 4.2    | 8.4          | 1.4101  | 43                                   | 43.5085   |
| 4                  | 5.3               | 5.3    | 10.6         | 1.5806  | 50                                   | 50.5912   |
| 5                  | 6.6               | 6.6    | 13.2         | 1.7605  | 57                                   | 57.6740   |

By Linear Regression of Y on X

Slope, m = 38.5875      Intercept, b = -10.3897  
 Correlation Coefficient\* = 0.9993  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau  
 Date : 19-Dec-18

Checked by : Chan Ka Chun  
 Date : 19-Dec-18



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : MA1w Calibration Date : 18-Feb-19  
 Equipment no. : HVS008 Calibration Due Date : 20-Apr-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition                     |                   |  |                          |   |                                      |   |
|---------------------------------------|-------------------|--|--------------------------|---|--------------------------------------|---|
| Temperature, T <sub>a</sub>           | 291               | Kelvin   | Pressure, P <sub>a</sub> | 1015  | mmHg                                 |   |
| Orifice Transfer Standard Information |                   |  |                          |   |                                      |   |
| Equipment No.                         | Ori0005           | Slope, m <sub>c</sub>  | 1.99861                  | Intercept, b <sub>c</sub>                             | -0.00882                             |   |
| Last Calibration Date                 | 11-Jan-19         | $\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |                          |   |                                      |   |
| Next Calibration Date                 | 11-Jan-20         |  |                          |   |                                      |   |
| Calibration of TSP                    |                   |  |                          |   |                                      |   |
| Calibration Point                     | Manometer Reading |  |                          | Q <sub>std</sub><br>(m <sup>3</sup> / min.)<br>X-axis | Continuous Flow Recorder, W<br>(CFM) | IC<br>(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)<br>Y-axis |
|                                       | (up)              | (down)   | (difference)             |   |                                      |   |
| 1                                     | 1.8               | 1.8  | 3.6                      | 0.9659  | 24                                   | 24.3073   |
| 2                                     | 2.6               | 2.6  | 5.2                      | 1.1600  | 34                                   | 34.4354   |
| 3                                     | 4.0               | 4.0  | 8.0                      | 1.4377  | 42                                   | 42.5378   |
| 4                                     | 5.2               | 5.2  | 10.4                     | 1.6386  | 50                                   | 50.6402   |
| 5                                     | 6.4               | 6.4  | 12.8                     | 1.8174  | 54                                   | 54.6914   |
| By Linear Regression of Y on X        |                   |  |                          |   |                                      |   |
| Slope, m                              |                   | =  | 35.2899                  | Intercept, b  |                                      | = -8.2225   |
| Correlation Coefficient*              |                   | =  | 0.9934                   |   |                                      |   |
| Calibration Accepted                  |                   | =  | Yes/No**                 |   |                                      |   |

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : Henry Lau Checked by : Chan Ka Chun  
 Date : 18-Feb-19 Date : 18-Feb-19





## CERTIFICATE OF CALIBRATION

Certificate No.: 18CA1114 02 Page 1 of 2

### Item tested

|                       |                            |            |
|-----------------------|----------------------------|------------|
| Description:          | Sound Level Meter (Type 1) | Microphone |
| Manufacturer:         | B & K                      | B & K      |
| Type/Model No.:       | 2236                       | 4188       |
| Serial/Equipment No.: | 2100736                    | 2288941    |
| Adaptors used:        | -                          | -          |

### Item submitted by

Customer Name: Lam Environmental Service Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 14-Nov-2018

Date of test: 15-Nov-2018

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4228 | 2288444    | 23-Aug-2019  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 24-Apr-2019  | CEPREI        |
| Signal generator                | DS 360   | 61227      | 23-Apr-2019  | CEPREI        |

### Ambient conditions

Temperature:  $20 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1000 \pm 5$  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  $\pm 20\%$ .
- The acoustic calibration was performed using an B&K 4228 sound calibrator and corrections was applied for the difference between the free-field and pressure response of the Sound Level Meter.

### Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:  Date: 15-Nov-2018 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.: 18CA1114 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: | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|---------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass    | 0.3                       |                 |
|                         | C  | Pass    | 1.0                       | 2.1             |
|                         | Lin  | Pass    | 2.0                       | 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                     | Pass    | 0.3                       |                 |
| Time averaging          | Repeated at frequency of 100 Hz                  | Pass    | 0.3                       |                 |
|                         | 1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz | Pass    | 0.3                       |                 |
| Pulse range             | 1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz | Pass    | 0.3                       |                 |
|                         | 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 | Expanded 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 expanded 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:

Fung Chi Yip  
Date: 15-Nov-2018

Checked by:

Shek Kwong Tot  
Date: 15-Nov-2018

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.: 18CA0213 02 Page 1 of 2

### Item tested

|                       |                            |            |        |
|-----------------------|----------------------------|------------|--------|
| Description:          | Sound Level Meter (Type 1) | Microphone | Preamp |
| Manufacturer:         | B & K                      | B & K      | B & K  |
| Type/Model No.:       | 2250                       | 4950       | ZC0032 |
| Serial/Equipment No.: | 2701778                    | 2755097    | 19223  |
| Adaptors used:        | -                          | -          | -      |

### Item submitted by

Customer Name: Lam Geotechnics Limited.  
Address of Customer: -  
Request No.: -  
Date of receipt: 13-Feb-2018

Date of test: 21-Feb-2018

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2268444    | 08-Sep-2018  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 25-Apr-2018  | CEPREI        |
| Signal generator                | DS 360   | 61227      | 01-Apr-2018  | CEPREI        |

### Ambient conditions

Temperature: 20 ± 1 °C  
Relative humidity: 50 ± 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 response of the Sound Level Meter.

### Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:



Feng Jun Qi

Date: 21-Feb-2018

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.: 18CA0213 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:                     | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|-----------------------------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass                        | 0.3                       |                 |
|                         | C  | Pass                        | 0.8                       |                 |
|                         | Lin  | Pass                        | 1.6                       |                 |
| 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                       |                 |
|                         | A  | Pass                        | 0.3                       |                 |
|                         | C  | Pass                        | 0.3                       |                 |
| Frequency weightings    | Lin  | Pass                        | 0.3                       |                 |
|                         | Single Burst Fast                                | Pass                        | 0.3                       |                 |
|                         | Single Burst Slow                                | Pass                        | 0.3                       |                 |
| Peak response           | Single 100µs rectangular pulse                   | Pass                        | 0.3                       |                 |
|                         | R.M.S. accuracy                                  | Crest factor of 3           | Pass                      | 0.3             |
| Time weighting I        | Single burst 5 ms at 2000 Hz                     | Pass                        | 0.3                       |                 |
|                         | Repeated at frequency of 100 Hz                  | Pass                        | 0.3                       |                 |
| 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 | Expanded 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 expanded 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-Feb-2018

Checked by:

Date:

Lam Tze Wai  
21-Feb-2018

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.: 19CA0222 02 Page 1 of 2

### Item tested

|                       |                            |            |        |
|-----------------------|----------------------------|------------|--------|
| Description:          | Sound Level Meter (Type 1) | Microphone | Preamp |
| Manufacturer:         | B & K                      | B & K      | B & K  |
| Type/Model No.:       | 2250                       | 4950       | ZC0032 |
| Serial/Equipment No.: | 2701778                    | 2755097    | 19223  |
| Adaptors used:        | -                          | -          | -      |

### Item submitted by

Customer Name: Lam Geotechnics Limited.  
Address of Customer: -  
Request No.: -  
Date of receipt: 22-Feb-2019

Date of test: 25-Feb-2019

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444    | 23-Aug-2019  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 24-Apr-2019  | CEPREI        |
| Signal generator                | DS 360   | 61227      | 26-Dec-2019  | CEPREI        |

### Ambient conditions

Temperature:  $21 \pm 1$  °C  
Relative humidity:  $55 \pm 10$  %  
Air pressure:  $1005 \pm 5$  hPa

### Test specifications

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

### Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:

Feng Junqi

Date: 26-Feb-2019

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.: 19CA0222 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:           | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|-------------------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass              | 0.3                       |                 |
|                         | C  | Pass              | 0.8                       |                 |
|                         | Lin  | Pass              | 1.6                       |                 |
| 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                       |                 |
|                         | A  | Pass              | 0.3                       |                 |
|                         | C  | Pass              | 0.3                       |                 |
| Frequency weightings    | Lin  | Pass              | 0.3                       |                 |
|                         | Time weightings                                  | Single Burst Fast | Pass                      | 0.3             |
|                         | Single Burst Slow                                | Pass              | 0.3                       |                 |
| Peak response           | Single 100µs rectangular pulse                   | Pass              | 0.3                       |                 |
|                         | R.M.S. accuracy                                  | Crest factor of 3 | Pass                      | 0.3             |
| Time weighting I        | Single burst 5 ms at 2000 Hz                     | Pass              | 0.3                       |                 |
|                         | Repeated at frequency of 100 Hz                  | Pass              | 0.3                       |                 |
| 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 | Expanded 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 expanded 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:

Fong Chun Wai

Date: 25-Feb-2019

Checked by:

Fung Chi Yip

Date: 26-Feb-2019

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.: 18CA0309 01 Page 1 of 2

### Item tested

|                       |                            |            |        |
|-----------------------|----------------------------|------------|--------|
| Description:          | Sound Level Meter (Type 1) | Microphone | Preamp |
| Manufacturer:         | B & K                      | B & K      | B & K  |
| Type/Model No.:       | 2250-L                     | 4950       | ZC0032 |
| Serial/Equipment No.: | 2722310                    | 2698702    | 13318  |
| Adaptors used:        | -                          | -          | -      |

### Item submitted by

Customer Name: Lam Geotechnics Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 09-Mar-2018

Date of test: 10-Mar-2018

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444    | 08-Sep-2018  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 25-Apr-2018  | CEPREI        |
| Signal generator                | DS 360   | 61227      | 01-Apr-2018  | CEPREI        |

### Ambient conditions

Temperature:  $21 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1000 \pm 5$  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  $\pm 20\%$ .
- 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 responsiveness of the Sound Level Meter.

### Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:

Feng Jun Q

Date: 12-Mar-2018

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.: 18CA0309 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:                      | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|------------------------------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass                         | 0.3                       |                 |
|                         | C  | Pass                         | 0.8                       |                 |
|                         | Lin  | Pass                         | 1.6                       |                 |
| 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                       |                 |
|                         | A  | Pass                         | 0.3                       |                 |
| Frequency weightings    | C  | Pass                         | 0.3                       |                 |
|                         | Lin  | Pass                         | 0.3                       |                 |
|                         | Time weightings                                  | 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 I                                 | Single burst 5 ms at 2000 Hz | Pass                      | 0.3             |
| Time averaging          | Repeated at frequency of 100 Hz                  | Pass                         | 0.3                       |                 |
|                         | 1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz | Pass                         | 0.3                       |                 |
| Pulse range             | 1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz | Pass                         | 0.3                       |                 |
|                         | 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 | Expanded 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 expanded 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: 10-Mar-2018

Fung Chi Yip

- End -

Checked by:

Date: 12-Mar-2018

Lam Tze Wai

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.: 18CA0413 02 Page 1 of 2

### Item tested

|                       |                            |            |        |
|-----------------------|----------------------------|------------|--------|
| Description:          | Sound Level Meter (Type 1) | Microphone | Preamp |
| Manufacturer:         | B & K                      | B & K      | B & K  |
| Type/Model No.:       | 2250-L                     | 4950       | ZC0032 |
| Serial/Equipment No.: | 2722311                    | 2698703    | 13321  |
| Adaptors used:        | -                          | -          | -      |

### Item submitted by

Customer Name: Lam Geotechnics Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 13-Apr-2018

Date of test: 18-Apr-2018

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444    | 08-Sep-2018  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 25-Apr-2018  | CEPREI        |

### Ambient conditions

Temperature: 20 ± 1 °C  
Relative humidity: 50 ± 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 responsiveness of the Sound Level Meter.

### Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:  Date: 18-Apr-2018 Company Chop:

Feng Junqi



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.: 18CA0413 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:                     | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|-----------------------------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass                        | 0.3                       |                 |
|                         | C  | Pass                        | 0.8                       |                 |
|                         | Lin  | Pass                        | 1.6                       |                 |
| 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                       |                 |
|                         | Crest factor of 3                                | Pass                        | 0.3                       |                 |
| Time weighting I        | Single burst 5 ms at 2000 Hz                     | Pass                        | 0.3                       |                 |
|                         | Repeated at frequency of 100 Hz                  | Pass                        | 0.3                       |                 |
| 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 | Expanded 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 expanded 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:

Fung Chi Yip  
18-Apr-2018

Checked by:

Date:

Lam Tze Wai  
18-Apr-2018

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.: 19CA0116 02 Page 1 of 2

### Item tested

|                       |                            |            |        |
|-----------------------|----------------------------|------------|--------|
| Description:          | Sound Level Meter (Type 1) | Microphone | Preamp |
| Manufacturer:         | B & K                      | B & K      | B & K  |
| Type/Model No.:       | 2250L                      | 4950       | ZC0032 |
| Serial/Equipment No.: | 3002695                    | 2940839    | 18562  |
| Adaptors used:        | -                          | -          | -      |

### Item submitted by

Customer Name: Lam Geotechnics Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 16-Jan-2019

Date of test: 17-Jan-2019

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444    | 23-Aug-2019  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 24-Apr-2019  | CEPREI        |
| Signal generator                | DS 360   | 41227      | 26-Dec-2019  | CEPREI        |

### Ambient conditions

Temperature: 21 ± 1 °C  
Relative humidity: 50 ± 10 %  
Air pressure: 1005 ± 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:



Feng Jungi

Date: 19-Jan-2019

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.: 19CA0116 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: | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|---------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass    | 0.3                       |                 |
|                         | C  | Pass    | 0.8                       |                 |
|                         | Lin  | Pass    | 1.6                       |                 |
| 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                       |                 |
|                         | A  | Pass    | 0.3                       |                 |
|                         | C  | Pass    | 0.3                       |                 |
| Frequency weightings    | Lin  | Pass    | 0.3                       |                 |
|                         | Single Burst Fast                                | Pass    | 0.3                       |                 |
|                         | Single Burst Slow                                | Pass    | 0.3                       |                 |
| Peak response           | Single 100µs rectangular pulse                   | Pass    | 0.3                       |                 |
| R.M.S. accuracy         | Crest factor of 3                                | Pass    | 0.3                       |                 |
| Time weighting I        | Single burst 5 ms at 2000 Hz                     | Pass    | 0.3                       |                 |
|                         | Repeated at frequency of 100 Hz                  | Pass    | 0.3                       |                 |
| 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>6</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 | Expanded 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 expanded 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:

Fung Chi Yip  
17-Jan-2019

Checked by:

Date:

Shak Kwong Tat  
19-Jan-2019

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.: 18CA0907 02 Page 1 of 2

### Item tested

|                       |                            |            |        |
|-----------------------|----------------------------|------------|--------|
| Description:          | Sound Level Meter (Type 1) | Microphone | Preamp |
| Manufacturer:         | B & K                      | B & K      | B & K  |
| Type/Model No.:       | 2250-L                     | 4950       | ZC0032 |
| Serial/Equipment No.: | 3006790                    | 2827240    | 21213  |
| Adaptors used:        | -                          | -          | -      |

### Item submitted by

Customer Name: Lam Geotechnics Limited  
 Address of Customer: -  
 Request No.: -  
 Date of receipt: 07-Sep-2018

Date of test: 10-Sep-2018

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444    | 23-Aug-2019  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 24-Apr-2019  | CEPREI        |
| Signal generator                | DS 360   | 61227      | 23-Apr-2019  | CEPREI        |

### Ambient conditions

Temperature: 21 ± 1 °C  
 Relative humidity: 50 ± 10 %  
 Air pressure: 1005 ± 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 response of the Sound Level Meter.

### Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:

  
 Feng Junq

Date: 10-Sep-2018

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.: 18CA0907 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: | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|---------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass    | 0.3                       |                 |
|                         | C  | Pass    | 0.8                       |                 |
|                         | Lin  | Pass    | 1.6                       |                 |
| 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                       |                 |
|                         | Crest factor of 3                                | Pass    | 0.3                       |                 |
| Time weighting I        | Single burst 5 ms at 2000 Hz                     | Pass    | 0.3                       |                 |
|                         | Repeated at frequency of 100 Hz                  | Pass    | 0.3                       |                 |
| 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 | Expanded 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 expanded 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: 10-Sep-2018

Fung Chi Yip

- End -

Checked by:

Date: 10-Sep-2018

Shek Kwong Tat

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.: 18CA0510 04 Page 1 of 2

### Item tested

|                       |                            |             |          |
|-----------------------|----------------------------|-------------|----------|
| Description:          | Sound Level Meter (Type 1) | Microphone: | Preamp:  |
| Manufacturer:         | Larson Davis               | PCB         | PCB      |
| Type/Model No.:       | LxT1                       | 377B02      | PRMLxT1L |
| Serial/Equipment No.: | 0004796                    | 155507      | 042621   |
| Adaptors used:        | -                          | -           | -        |

### Item submitted by

Customer Name: Lam Geotechnics Ltd  
Address of Customer: -  
Request No.: -  
Date of receipt: 10-May-2018

Date of test: 11-May-2018

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2268444    | 08-Sep-2018  | CIGISMEC      |
| Signal generator                | DS 360   | 61227      | 23-Apr-2019  | CEPREI        |

### Ambient conditions

Temperature: 21 ± 1 °C  
Relative humidity: 50 ± 10 %  
Air pressure: 1005 ± 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:



Feng Junqi

Date: 11-May-2018

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.: 18CA0510 04

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: | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|---------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass    | 0.3                       | 2.1             |
|                         | C  | Pass    | 0.8                       |                 |
|                         | 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                       |                 |
|                         | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                       |                 |
| Linearity range for SPL | A  | Pass    | 0.3                       |                 |
|                         | C  | Pass    | 0.3                       |                 |
|                         | Lin  | Pass    | 0.3                       |                 |
| Time weightings         | Single Burst Fast                                | Pass    | 0.3                       |                 |
|                         | Single Burst Slow                                | Pass    | 0.3                       |                 |
| Peak response           | Single 100µs rectangular pulse                   | Pass    | 0.3                       |                 |
| R.M.S. accuracy         | Crest factor of 3                                | Pass    | 0.3                       |                 |
| Time weighting I        | Single burst 5 ms at 2000 Hz                     | Pass    | 0.3                       |                 |
|                         | Repeated at frequency of 100 Hz                  | Pass    | 0.3                       |                 |
| 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 | Expanded 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 expanded 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: 11-May-2018

Fung Chi Yip

Checked by:

Date: 11-May-2018

Shek Kwong Tai

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.



# Calibration Certificate

Certificate Number 2018010851

**Customer:**

LAM Environmental Services Ltd  
11/F Centre Point  
181-185 Gloucester Road  
Wanchai, , Hong Kong

**Model Number** CAL200  
**Serial Number** 13098  
**Test Results** Pass

**Initial Condition** Inoperable

**Description** Larson Davis CAL200 Acoustic Calibrator

**Procedure Number** D0001.8386  
**Technician** Scott Montgomery  
**Calibration Date** 29 Oct 2018  
**Calibration Due**  
**Temperature** 23 °C ± 0.3 °C  
**Humidity** 34 %RH ± 3 %RH  
**Static Pressure** 101.2 kPa ± 1 kPa

**Evaluation Method** The data is acquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

**Compliance Standards** Compliant to Manufacturer Specifications per D0001.8190 and the following standards:  
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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## Standards Used

| Description                                | Cal Date   | Cal Due    | Cal Standard |
|--|------------|------------|--------------|
| Agilent 34401A DMM                         | 09/06/2018 | 09/06/2019 | 001021       |
| Larson Davis Model 2900 Real Time Analyzer | 04/10/2018 | 04/10/2019 | 001051       |
| Microphone Calibration System              | 03/07/2018 | 03/07/2019 | 005446       |
| 1/2" Preamplifier                          | 09/20/2018 | 09/20/2019 | 006506       |
| Larson Davis 1/2" Preamplifier 7-pin LEMO  | 08/07/2018 | 08/07/2019 | 006507       |
| 1/2 inch Microphone - RI - 200V            | 05/10/2018 | 05/10/2019 | 006510       |
| Pressure Transducer                        | 07/18/2018 | 07/18/2019 | 007368       |

Larson Davis, a division of PCB Piezotronics, Inc  
1681 West 820 North  
Provo, UT 84601, United States  
716-684-0001



**LARSON DAVIS**  
A PCB PIEZOTRONICS DIV.



## CERTIFICATE OF CALIBRATION

Certificate No.: 18CA1220 02

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: Larson Davis  
Type/Model No.: CAL200  
Serial/Equipment No.: 13128  
Adaptors used: -

### Item submitted by

Customer: Lam Environmental Service Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 20-Dec-2018

Date of test: 28-Dec-2018

### Reference equipment used in the calibration

| Description:            | Model:   | Serial No. | Expiry Date: | Traceable to: |
|-------------------------|----------|------------|--------------|---------------|
| Lab standard microphone | B&K 4180 | 2412857    | 20-Apr-2019  | SCL           |
| Preamplifier            | B&K 2673 | 2239857    | 27-Apr-2019  | CEPREI        |
| Measuring amplifier     | B&K 2610 | 2346941    | 08-May-2019  | CEPREI        |
| Signal generator        | DS 360   | 33873      | 24-Apr-2019  | CEPREI        |
| Digital multi-meter     | 34401A   | US36087050 | 23-Apr-2019  | CEPREI        |
| Audio analyzer          | 8903B    | GB41300350 | 23-Apr-2019  | CEPREI        |
| Universal counter       | 53132A   | MY40003662 | 24-Apr-2019  | CEPREI        |

### Ambient conditions

Temperature:  $20 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1000 \pm 5$  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:

  
Feng Junqi

Date: 29-Dec-2018

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.: 18CA1220 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 Expanded Uncertainty<br>dB |
|-----------------------|---|--|--------------------------------------|
| 1000                  | 94.00                                     | 93.84                                      | 0.10                                 |

(Output level in dB re 20 µPa)

### 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 = 0.006 dB

Estimated expanded 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 = 999.4 Hz

Estimated expanded uncertainty 0.1 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 = 0.4%

Estimated expanded uncertainty 0.7 %

The expanded 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  
28-Dec-2018

- End -

Checked by:

Date:

Shek Kwong Tai  
29-Dec-2018

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.