



TISCH ENVIRONMENTAL, INC.  
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ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jun 30, 2015 Rootmeter S/N 0438320 Ta (K) - 296  
 Operator Tisch Orifice I.D. - 0005 Pa (mm) - 749.3

| PLATE<br>OR<br>Run # | VOLUME<br>START<br>(m3) | VOLUME<br>STOP<br>(m3) | DIFF<br>VOLUME<br>(m3) | DIFF<br>TIME<br>(min) | METER              | ORFICE               |
|----------------------|-------------------------|------------------------|------------------------|-----------------------|--------------------|----------------------|
|                      |                         |                        |                        |                       | DIFF<br>Hg<br>(mm) | DIFF<br>H2O<br>(in.) |
| 1                    | NA                      | NA                     | 1.00                   | 1.3930                | 3.2                | 2.00                 |
| 2                    | NA                      | NA                     | 1.00                   | 0.9800                | 6.4                | 4.00                 |
| 3                    | NA                      | NA                     | 1.00                   | 0.8790                | 7.9                | 5.00                 |
| 4                    | NA                      | NA                     | 1.00                   | 0.8350                | 8.7                | 5.50                 |
| 5                    | NA                      | NA                     | 1.00                   | 0.6900                | 12.7               | 8.00                 |

DATA TABULATION

| Vstd                                | (x axis)<br>Qstd | (y axis) | Va                        | (x axis)<br>Qa | (y axis) |
|-------------------------------------|------------------|----------|---------------------------|----------------|----------|
| 0.9883                              | 0.7095           | 1.4090   | 0.9957                    | 0.7148         | 0.8889   |
| 0.9841                              | 1.0042           | 1.9926   | 0.9915                    | 1.0117         | 1.2570   |
| 0.9820                              | 1.1172           | 2.2278   | 0.9894                    | 1.1256         | 1.4054   |
| 0.9810                              | 1.1749           | 2.3365   | 0.9884                    | 1.1837         | 1.4740   |
| 0.9757                              | 1.4141           | 2.8179   | 0.9830                    | 1.4247         | 1.7777   |
| Qstd slope (m) = 2.00072            |                  |          | Qa slope (m) = 1.25282    |                |          |
| intercept (b) = -0.01209            |                  |          | intercept (b) = -0.00763  |                |          |
| coefficient (r) = 0.99995           |                  |          | coefficient (r) = 0.99995 |                |          |
| y axis = SQRT[H2O(Pa/760) (298/Ta)] |                  |          | y axis = SQRT[H2O(Ta/Pa)] |                |          |

CALCULATIONS

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

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

For subsequent flow rate calculations:

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



Lam Geotechnics Limited

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

Location : ACL1 Calibration Date : 30-Jan-16  
 Equipment no. : EL380 Calibration Due Date : 30-Mar-16

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 290 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1018 mmHg                |

| Orifice Transfer Standard Information |           |  |         |                           |          |
|---------------------------------------|-----------|--|---------|---------------------------|----------|
| Equipment No.                         | EL086     | Slope, m <sub>c</sub>  | 2.00072 | Intercept, b <sub>c</sub> | -0.01209 |
| Last Calibration Date                 | 30-Jun-15 | $\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 30-Jun-16 |  |         |                           |          |

| 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                  | 6.9               | 6.9    | 13.8         | 1.8926  | 55                                   | 55.8826   |
| 2                  | 5.5               | 5.5    | 11.0         | 1.6904  | 48                                   | 48.7703   |
| 3                  | 4.2               | 4.2    | 8.4          | 1.4779  | 42                                   | 42.6740   |
| 4                  | 2.8               | 2.8    | 5.6          | 1.2078  | 33                                   | 33.5296   |
| 5                  | 1.6               | 1.6    | 3.2          | 0.9145  | 22                                   | 22.3530   |

By Linear Regression of Y on X

Slope, m = 33.8454 Intercept, b = -7.9815

Correlation Coefficient\* = 0.9990

Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient < 0.990, check and recalibration again.

\*\* Delete as appropriate.

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

Calibrated by : LuLu Mar Checked by : Derek Lo  
 Date : 30-Jan-16 Date : 30-Jan-16



Lam Geotechnics Limited

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

Location : ACL2a Calibration Date : 30-Jan-16  
 Equipment no. : EL111 Calibration Due Date : 30-Mar-16

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

| Ambient Condition           |     |        |                          |
|-----------------------------|-----|--------|--------------------------|
| Temperature, T <sub>a</sub> | 290 | Kelvin | Pressure, P <sub>a</sub> |
|                             |     |        | 1018 mmHg                |

| Orifice Transfer Standard Information |           |   |         |                           |          |
|---------------------------------------|-----------|---|---------|---------------------------|----------|
| Equipment No.                         | EL086     | Slope, m <sub>c</sub>   | 2.00072 | Intercept, b <sub>c</sub> | -0.01209 |
| Last Calibration Date                 | 30-Jun-15 | $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$ |         |                           |          |
| Next Calibration Date                 | 30-Jun-16 |   |         |                           |          |

| 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                  | 6.5               | 6.5    | 13.0         | 1.8371  | 62                                   | 62.9949   |
| 2                  | 5.3               | 5.3    | 10.6         | 1.6595  | 56                                   | 56.8987   |
| 3                  | 3.9               | 3.9    | 7.8          | 1.4244  | 50                                   | 50.8024   |
| 4                  | 2.1               | 2.1    | 4.2          | 1.0468  | 40                                   | 40.6419   |
| 5                  | 1.6               | 1.6    | 3.2          | 0.9145  | 32                                   | 32.5135   |

By Linear Regression of Y on X

Slope, m = 31.0383 Intercept, b = 6.0478

Correlation Coefficient\* = 0.9926

Calibration Accepted = Yes/No\*\*

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

\*\* Delete as appropriate.

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

Calibrated by : LuLu Mar Checked by : Derek Lo  
 Date : 30-Jan-16 Date : 30-Jan-16



## CERTIFICATE OF CALIBRATION

Certificate No.: 15CA0302 01 Page 1 of 2

### Item tested

|                       |                             |            |
|-----------------------|-----------------------------|------------|
| Description:          | Sound Level Meter (Class 1) | Microphone |
| Manufacturer:         | Larson Davis                | -          |
| Type/Model No.:       | Model 831                   | 377B02     |
| Serial/Equipment No.: | 0003227                     | SNLW135892 |
| Adaptors used:        | -                           | -          |

### Item submitted by

|                      |                         |
|----------------------|-------------------------|
| Customer Name:       | Lam Geotechnics Limited |
| Address of Customer: | -                       |
| Request No.:         | -                       |
| Date of receipt:     | 02-Mar-2015             |

Date of test: 02-Mar-2015

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444    | 20-Jun-2015  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 09-Apr-2015  | CEPREI        |
| Signal generator                | DS 360   | 61227      | 09-Apr-2015  | CEPREI        |

### Ambient conditions

|                    |              |
|--------------------|--------------|
| Temperature:       | 21 ± 1 °C    |
| Relative humidity: | 60 ± 10 %    |
| Air pressure:      | 1010 ± 5 hPa |

### Test specifications

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

### Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Huang Jian Min/Feng Jun Qi

Date: 03-Mar-2015

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.: 15CA0302 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   | 2.1 |
|                         | Lin  | Pass    | 1.6   | 2.2 |
| Linearity range for Leq | At reference range , Step 5 dB at 4 kHz          | Pass    | 0.3   |     |
|                         | Reference SPL on all other ranges                | Pass    | 0.3   |     |
|                         | 2 dB below upper limit of each range             | Pass    | 0.3   |     |
|                         | 2 dB above lower limit of each range             | Pass    | 0.3   |     |
| Linearity range for SPL | At reference range , Step 5 dB at 4 kHz          | Pass    | 0.3   |     |
|                         | Frequency weightings                             |         |   |     |
| Time weightings         | A  | Pass    | 0.3   |     |
|                         | C  | Pass    | 0.3   |     |
|                         | Lin  | Pass    | 0.3   |     |
| Peak response           | Single Burst Fast                                | Pass    | 0.3   |     |
|                         | Single Burst Slow                                | Pass    | 0.3   |     |
| R.M.S. accuracy         | Single 100µs rectangular pulse                   | N/A     | N/A   |     |
| Time weighting I        | Crest factor of 3                                | Pass    | 0.3   |     |
|                         | 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: 02-Mar-2015

Fung Chi Yip

- End -

Checked by:

Date: 03-Mar-2015

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.: 15CA0528 04-03

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: Rion Co., Ltd.  
Type/Model No.: NC-73  
Serial/Equipment No.: 10465798  
Adaptors used: -

### Item submitted by

Customer: Lam Geotechnics Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 28-May-2015

Date of test: 30-May-2015

### Reference equipment used in the calibration

| Description:            | Model:   | Serial No. | Expiry Date: | Traceable to: |
|-------------------------|----------|------------|--------------|---------------|
| Lab standard microphone | B&K 4180 | 2341427    | 15-Apr-2016  | SCL           |
| Preamplifier            | B&K 2673 | 2239857    | 22-Apr-2016  | CEPREI        |
| Measuring amplifier     | B&K 2610 | 2346941    | 22-Apr-2016  | CEPREI        |
| Signal generator        | DS 360   | 61227      | 16-Apr-2016  | CEPREI        |
| Digital multi-meter     | 34401A   | US36087050 | 17-Apr-2016  | CEPREI        |
| Audio analyzer          | 8903B    | GB41300350 | 17-Apr-2016  | CEPREI        |
| Universal counter       | 53132A   | MY40003662 | 16-Apr-2016  | CEPREI        |

### Ambient conditions

Temperature:  $21 \pm 1$  °C  
Relative humidity:  $60 \pm 10$  %  
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:

  
Huang Jian Min/Feng Jun Qi

Date: 01-Jun-2015

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.: 15CA0528 04-03 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 | (Output level in dB re 20 µPa)       |
|-----------------------|---|--|--------------------------------------|
|                       |   |  | Estimated Expanded Uncertainty<br>dB |
| 1000                  | 94.00                                     | 94.06                                      | 0.10                                 |

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

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

At 1000 Hz **STF = 0.002 dB**  
Estimated 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 = 966.3 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 = 0.5 %**  
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.

- End -

Calibrated by:   
Date: 30-May-2015

Checked by:   
Date: 01-Jun-2015

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.



**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

**Information supplied by customer:**

**CONTACT:** MR. SAM LAM **WORK ORDER:** HK1610019  
**CLIENT:** LAM GEOTECHNICS LIMITED  
**DATE RECEIVED:** 07/01/2016  
**DATE OF ISSUE:** 14/01/2016  
**ADDRESS:** 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,  
WANCHAI, HONG KONG  
**PROJECT:** ---

**METHOD OF PERFORMANCE CHECK/ CALIBRATION:**

Ref: APHA22nd ed 2130B

**COMMENTS**


It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

|                             |              |
|-----------------------------|--------------|
| <b>Scope of Test:</b>       | Turbidity    |
| <b>Equipment Type:</b>      | Turbidimeter |
| <b>Brand Name:</b>          | Xin Rui      |
| <b>Model No.:</b>           | WGZ-3B       |
| <b>Serial No.:</b>          | 1309192      |
| <b>Equipment No.:</b>       | ---          |
| <b>Date of Calibration:</b> | 08/01/2016   |

**Remarks:**

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Approved Signatory:   
Ms. Wong Po Yan, Pauline  
Testing Engineer

Issue Date: 14/01/2016

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Phone +852 2527 6691 | Email info@pilot-testing.com



**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

**WORK ORDER:** HK1610019  
**DATE OF ISSUE:** 14/01/2016  
**CLIENT:** LAM GEOTECHNICS LIMITED

|                                  |              |
|----------------------------------|--------------|
| <b>Equipment Type:</b>           | Turbidimeter |
| <b>Brand Name:</b>               | Xin Rui      |
| <b>Model No.:</b>                | WGZ-3B       |
| <b>Serial No.:</b>               | 1309192      |
| <b>Equipment No.:</b>            | ---          |
| <b>Date of Calibration:</b>      | 08/01/2016   |
| <b>Date of next Calibration:</b> | 08/04/2016   |

**Parameters:****Turbidity**Method Ref: APHA 22<sup>nd</sup> ed. 2130B

| Expected Reading (NTU) | Display Reading (NTU)       | Tolerance (%) |
|------------------------|-----------------------------|---------------|
| 0                      | 0.00                        | ---           |
| 4                      | 4.09                        | 2.3           |
| 10                     | 10.1                        | 1.0           |
| 40                     | 38.7                        | -3.3          |
| 100                    | 104                         | 4.0           |
| 400                    | 389                         | -2.8          |
| 1000                   | 991                         | -0.9          |
|                        | <b>Tolerance Limit (±%)</b> | <b>10.0</b>   |

Remark: "Displayed Reading" presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.



**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

**Information supplied by customer:**

**CONTACT:** MR. SAM LAM **WORK ORDER:** HK1610018  
**CLIENT:** LAM GEOTECHNICS LIMITED  
**DATE RECEIVED:** 07/01/2016  
**DATE OF ISSUE:** 14/01/2016  
**ADDRESS:** 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,  
WANCHAI, HONG KONG  
**PROJECT:** ---

**METHOD OF PERFORMANCE CHECK/ CALIBRATION:**

Ref: APHA22nd ed 2130B

**COMMENTS**


It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

|                             |              |
|-----------------------------|--------------|
| <b>Scope of Test:</b>       | Turbidity    |
| <b>Equipment Type:</b>      | Turbidimeter |
| <b>Brand Name:</b>          | Xin Rui      |
| <b>Model No.:</b>           | WGZ-3B       |
| <b>Serial No.:</b>          | 1203015      |
| <b>Equipment No.:</b>       | ---          |
| <b>Date of Calibration:</b> | 08/01/2016   |

**Remarks:**

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Approved Signatory:   
Ms. Wong Po Yan, Pauline  
Testing Engineer

Issue Date: 14/01/2016

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**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

**WORK ORDER:** HK1610018  
**DATE OF ISSUE:** 14/01/2016  
**CLIENT:** LAM GEOTECHNICS LIMITED

|                                  |              |
|----------------------------------|--------------|
| <b>Equipment Type:</b>           | Turbidimeter |
| <b>Brand Name:</b>               | Xin Rui      |
| <b>Model No.:</b>                | WGZ-3B       |
| <b>Serial No.:</b>               | 1203015      |
| <b>Equipment No.:</b>            | ---          |
| <b>Date of Calibration:</b>      | 08/01/2016   |
| <b>Date of next Calibration:</b> | 08/04/2016   |

**Parameters:****Turbidity**Method Ref: APHA 22<sup>nd</sup> ed. 2130B

| Expected Reading (NTU) | Display Reading (NTU)                       | Tolerance (%) |
|------------------------|---|---------------|
| 0                      | 0.00  | ---           |
| 4                      | 3.87  | -3.3          |
| 10                     | 10.6  | 6.0           |
| 40                     | 41.4  | 3.5           |
| 100                    | 98.4  | -1.6          |
| 400                    | 387   | -3.3          |
| 1000                   | 976   | -2.4          |
|                        | <b>Tolerance Limit (<math>\pm\%</math>)</b> | <b>10.0</b>   |

Remark: "Displayed Reading" presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.

**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION****Information supplied by customer:**

**CONTACT:** SAM LAM **WORK ORDER:** HK1510427  
**CLIENT:** LAM GEOTECHNICS LIMITED  
**DATE RECEIVED:** 2015-11-06  
**DATE OF ISSUE:** 2015-11-13  
**ADDRESS:** 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,  
WANCHAI, HONG KONG  
**PROJECT:** ---

**METHOD OF PERFORMANCE CHECK/ CALIBRATION:**

Ref: APHA22nd ed 2130B

**COMMENTS**

It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

|                             |              |
|-----------------------------|--------------|
| <b>Scope of Test:</b>       | Turbidity    |
| <b>Equipment Type:</b>      | Turbidimeter |
| <b>Brand Name:</b>          | Xin Rui      |
| <b>Model No.:</b>           | WGZ-3B       |
| <b>Serial No.:</b>          | 1408039      |
| <b>Equipment No.:</b>       | ---          |
| <b>Date of Calibration:</b> | 06-Nov-15    |

## Remarks:

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr. Peter Lee  
Director

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**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

**WORK ORDER:** HK1510427  
**DATE OF ISSUE:** 2015-11-13  
**CLIENT:** LAM GEOTECHNICS LIMITED

|                                  |              |
|----------------------------------|--------------|
| <b>Equipment Type:</b>           | Turbidimeter |
| <b>Brand Name:</b>               | Xin Rui      |
| <b>Model No.:</b>                | WGZ-3B       |
| <b>Serial No.:</b>               | 1408039      |
| <b>Equipment No.:</b>            | ---          |
| <b>Date of Calibration:</b>      | 06-Nov-15    |
| <b>Date of next Calibration:</b> | 06-Feb-16    |

**Parameters:****Turbidity**Method Ref: APHA 22<sup>nd</sup> ed. 2130B

| Expected Reading (NTU) | Display Reading (NTU)       | Tolerance (%) |
|------------------------|-----------------------------|---------------|
| 0                      | 0.00                        | ---           |
| 4                      | 4.12                        | 3.0           |
| 10                     | 9.87                        | -1.3          |
| 40                     | 39.5                        | -1.3          |
| 100                    | 104.0                       | 4.0           |
| 400                    | 402                         | 0.5           |
| 1000                   | 994                         | -0.6          |
|                        | Tolerance Limit ( $\pm\%$ ) | 10.0          |

Remark: "Displayed Reading" presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.

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**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

**Information supplied by customer:**

CONTACT: MR. SAM LAM WORK ORDER: HK1610083  
 CLIENT: LAM GEOTECHNICS LIMITED  
 DATE RECEIVED: 05/02/2016  
 DATE OF ISSUE: 17/02/2016  
 ADDRESS: 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,  
 WANCHAI, HONG KONG  
 PROJECT: ---

**METHOD OF PERFORMANCE CHECK/ CALIBRATION:**

Ref: APHA22nd ed 2130B

**COMMENTS**

It is certified that the item under performance check/calibration has been calibrated/checked by corresponding calibrated equipment in the laboratory.  
 Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.

|                             |              |
|-----------------------------|--------------|
| <b>Scope of Test:</b>       | Turbidity    |
| <b>Equipment Type:</b>      | Turbidimeter |
| <b>Brand Name:</b>          | Xin Rui      |
| <b>Model No.:</b>           | WGZ-3B       |
| <b>Serial No.:</b>          | 1408039      |
| <b>Equipment No.:</b>       | ---          |
| <b>Date of Calibration:</b> | 05-Feb-16    |

Remarks:

This is the Final Report. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Approved Signatory: \_\_\_\_\_  
 Ms. Wong Po Yan, Pauline  
 Testing Engineer

Issue Date: 05/02/2016

This report may not be reproduced except with prior written approval from Pilot Testing Limited.

**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

**WORK ORDER:** HK1610083  
**DATE OF ISSUE:** 17/02/2016  
**CLIENT:** LAM GEOTECHNICS LIMITED

|                                  |              |
|----------------------------------|--------------|
| <b>Equipment Type:</b>           | Turbidimeter |
| <b>Brand Name:</b>               | Xin Rui      |
| <b>Model No.:</b>                | WGZ-3B       |
| <b>Serial No.:</b>               | 1408039      |
| <b>Equipment No.:</b>            | ---          |
| <b>Date of Calibration:</b>      | 05-Feb-16    |
| <b>Date of next Calibration:</b> | 05-May-16    |

**Parameters:****Turbidity**Method Ref: APHA 22<sup>nd</sup> ed. 2130B

| Expected Reading (NTU) | Display Reading (NTU)       | Tolerance (%) |
|------------------------|-----------------------------|---------------|
| 0                      | 0.00                        | ---           |
| 4                      | 4.20                        | 5.0           |
| 10                     | 10.2                        | 2.0           |
| 40                     | 38.7                        | -3.3          |
| 100                    | 106                         | 6.0           |
| 400                    | 406                         | 1.5           |
| 1000                   | 993                         | -0.7          |
|                        | Tolerance Limit ( $\pm\%$ ) | 10.0          |

Remark: "Displayed Reading" presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.

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## EQUIPMENT PERFORMANCE CHECK / CALIBRATION REPORT

**Report No.** : HK1610021  
**Project Name** : EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT  
**Date of Issue** : 21/01/2016  
  
**Customer** : LAM GEOTECHNICS LIMITED  
**Address** : 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG

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**Calibration Job No.** : HK1610021  
**Test Item No.** : HK1610021-01  
**Test Item Details**  
**Test Item Description** : Multifunctional Meter  
**Manufacturer** : YSI  
**Model No.** : Professional Plus  
**Serial No.** : 14E100105  
**Performance Method** : Checked according to in-house method CAL005  
 (References: Temperature (Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure), pH value (APHA 21e 4500H:B), Salinity (Refer to Conductivity APHA 19e 2510B ) , Dissolved oxygen (APHA 19e 4500-O,C))  
  
**Test Item Receipt Date** : 14-Jan-16  
**Test Item Calibration Date** : 15-Jan-16

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- Notes :
1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
  2. Results relate to item(s) as received.
  3.  $\pm$  indicates the tolerance limit
  4. N/A = Not applicable
  5. APHA - American Public Health Association, American Water Works Association and Water Environment Federation, Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WEF. USA
  6. DO, pH, salinity and temperature performance check was conducted by Pilot Testing Limited.
  7. Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

Approved Signatory

Ms. Wong Po Yan, Pauline  
(Testing Engineer)

Issue Date:

21/01/2016




**REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION**

**WORK ORDER:** HK1610021  
**DATE OF ISSUE:** 21/01/2016  
**CLIENT:** LAM GEOTECHNICS LIMITED

|                                 |                       |
|---------------------------------|-----------------------|
| <b>Equipment Type</b>           | Multifunctional Meter |
| <b>Manufacturer</b>             | YSI                   |
| <b>Model No.</b>                | Professional Plus     |
| <b>Serial No.</b>               | 14E100105             |
| <b>Date of Calibration</b>      | 15-Jan-16             |
| <b>Date of next Calibration</b> | 15-Apr-16             |

**Parameters:**

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

| Reference Reading (°C) | Display Reading (°C) | Deviation (°C) |
|------------------------|----------------------|----------------|
| 9.8                    | 10.1                 | +0.3           |
| 20.6                   | 20.4                 | -0.2           |
| 30.3                   | 30.4                 | +0.1           |
| Tolerance Limit        |                      | ±2.0           |

**pH Value (Method Ref: APHA21e, 4500H:B)**

| Expected Reading (pH unit) | Reference Reading (pH unit) | Display Reading (pH unit) | Deviation (pH unit) |
|----------------------------|-----------------------------|---------------------------|---------------------|
| 4.0                        | 3.98                        | 4.03                      | +0.05               |
| 7.0                        | 7.11                        | 7.08                      | -0.03               |
| 10.0                       | 10.32                       | 10.24                     | -0.08               |
| Tolerance Limit            |                             |                           | ±0.20               |

**Conductivity (Method Ref: APHA 19e, 2510)**

| KCl concentration (mol/L) | Reference Reading (ms/cm) | Display Reading (ms/cm) | Deviation (%) |
|---------------------------|---------------------------|-------------------------|---------------|
| 0.0000                    | 0.00                      | 0.00                    | --            |
| 0.1000                    | 12.89                     | 12.71                   | -1.40         |
| 0.2000                    | 24.80                     | 24.97                   | +0.69         |
| 0.5000                    | 58.67                     | 58.34                   | -0.56         |
| Tolerance Limit           |                           |                         | ±2.0          |

**Dissolved Oxygen (DO) (Method Ref: APHA 19e, 4500-O, C)**

| Reference DO reading (mg/L) | DO reading od DO probe (mg/L) | Deviation (mg/L) |
|-----------------------------|-------------------------------|------------------|
| 8.55                        | 8.64                          | +0.09            |
| 5.47                        | 5.34                          | -0.13            |
| 2.94                        | 3.01                          | +0.07            |
| Tolerance Limit             |                               | ±0.20            |

- Remarks:
- (1) Maximum tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.
  - (2) Displayed reading presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.
  - (3) Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

- End of Report -



## EQUIPMENT PERFORMANCE CHECK / CALIBRATION REPORT

**Report No.** : HK1610022  
**Project Name** : EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT  
**Date of Issue** : 21/01/2016  
  
**Customer** : LAM GEOTECHNICS LIMITED  
**Address** : 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG

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**Calibration Job No.** : HK1610022  
**Test Item No.** : HK1610022-01  
**Test Item Details**  
**Test Item Description** : Multifunctional Meter  
**Manufacturer** : YSI  
**Model No.** : Professional Plus  
**Serial No.** : 14M100277  
**Performance Method** : Checked according to in-house method CAL005  
 (References: Temperature (Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure), pH value (APHA 21e 4500H:B), Salinity (Refer to Conductivity APHA 19e 2510B ) , Dissolved oxygen (APHA 19e 4500-O,C))  
  
**Test Item Receipt Date** : 14-Jan-16  
**Test Item Calibration Date** : 15-Jan-16

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- Notes :
1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
  2. Results relate to item(s) as received.
  3.  $\pm$  indicates the tolerance limit
  4. N/A = Not applicable
  5. APHA - American Public Health Association, American Water Works Association and Water Environment Federation, Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WEF. USA
  6. DO, pH, salinity and temperature performance check was conducted by Pilot Testing Limited.
  7. Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

Approved Signatory :

Ms. Wong Po Yan, Pauline  
(Testing Engineer)

Issue Date:

21/01/2016


**REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION**

**WORK ORDER:** HK1610022  
**DATE OF ISSUE:** 21/01/2016  
**CLIENT:** LAM GEOTECHNICS LIMITED

|                                 |                       |
|---------------------------------|-----------------------|
| <b>Equipment Type</b>           | Multifunctional Meter |
| <b>Manufacturer</b>             | YSI                   |
| <b>Model No.</b>                | Professional Plus     |
| <b>Serial No.</b>               | 14M100277             |
| <b>Date of Calibration</b>      | 15-Jan-16             |
| <b>Date of next Calibration</b> | 15-Apr-16             |

**Parameters:**

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

| Reference Reading (°C) | Display Reading (°C)   | Deviation (°C) |
|------------------------|------------------------|----------------|
| 10.3                   | 10.7                   | +0.4           |
| 20.9                   | 20.4                   | -0.5           |
| 30.1                   | 30.3                   | +0.2           |
|                        | <b>Tolerance Limit</b> | <b>±2.0</b>    |

**pH Value (Method Ref: APHA21e, 4500H:B)**

| Expected Reading (pH unit) | Reference Reading (pH unit) | Display Reading (pH unit) | Deviation (pH unit) |
|----------------------------|-----------------------------|---------------------------|---------------------|
| 4.0                        | 4.06                        | 3.98                      | -0.08               |
| 7.0                        | 7.05                        | 7.16                      | +0.11               |
| 10.0                       | 10.13                       | 10.06                     | -0.07               |
|                            | <b>Tolerance Limit</b>      |                           | <b>±0.20</b>        |

**Conductivity (Method Ref: APHA 19e, 2510)**

| KCl concentration (mol/L) | Reference Reading (ms/cm) | Display Reading (ms/cm) | Deviation (%) |
|---------------------------|---------------------------|-------------------------|---------------|
| 0.0000                    | 0.00                      | 0.00                    | --            |
| 0.1000                    | 12.89                     | 12.69                   | -1.55         |
| 0.2000                    | 24.80                     | 25.04                   | +0.97         |
| 0.5000                    | 58.67                     | 59.13                   | +0.78         |
|                           | <b>Tolerance Limit</b>    |                         | <b>±2.0</b>   |

**Dissolved Oxygen (DO) (Method Ref: APHA 19e, 4500-O, C)**

| Reference DO reading (mg/L) | DO reading od DO probe (mg/L) | Deviation (mg/L) |
|-----------------------------|-------------------------------|------------------|
| 8.86                        | 8.71                          | -0.15            |
| 4.59                        | 4.46                          | -0.13            |
| 2.11                        | 2.21                          | +0.10            |
|                             | <b>Tolerance Limit</b>        | <b>±0.20</b>     |

- Remarks:
- (1) Maximum tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.
  - (2) Displayed reading presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.
  - (3) Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

- End of Report -



## EQUIPMENT PERFORMANCE CHECK / CALIBRATION REPORT

**Report No.** : HK1610020  
**Project Name** : EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT  
**Date of Issue** : 21/01/2016  
  
**Customer** : LAM GEOTECHNICS LIMITED  
**Address** : 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG

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**Calibration Job No.** : HK1610020  
**Test Item No.** : HK1610020-01  
**Test Item Details**  
**Test Item Description** : Multifunctional Meter  
**Manufacturer** : YSI  
**Model No.** : Professional Plus  
**Serial No.** : 11F100420  
**Performance Method** : Checked according to in-house method CAL005  
 (References: Temperature (Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure), pH value (APHA 21e 4500H:B), Salinity (Refer to Conductivity APHA 19e 2510B ) , Dissolved oxygen (APHA 19e 4500-O,C))  
  
**Test Item Receipt Date** : 14-Jan-16  
**Test Item Calibration Date** : 15-Jan-16

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- Notes :
1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
  2. Results relate to item(s) as received.
  3.  $\pm$  indicates the tolerance limit
  4. N/A = Not applicable
  5. APHA - American Public Health Association, American Water Works Association and Water Environment Federation, Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WEF. USA
  6. DO, pH, salinity and temperature performance check was conducted by Pilot Testing Limited.
  7. Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

Approved Signatory :

Ms. Wong Po Yan, Pauline  
(Testing Engineer)

Issue Date:

21/01/2016


**REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION**

**WORK ORDER:** HK1610020  
**DATE OF ISSUE:** 21/01/2016  
**CLIENT:** LAM GEOTECHNICS LIMITED

|                                 |                       |
|---------------------------------|-----------------------|
| <b>Equipment Type</b>           | Multifunctional Meter |
| <b>Manufacturer</b>             | YSI                   |
| <b>Model No.</b>                | Professional Plus     |
| <b>Serial No.</b>               | 11F100420             |
| <b>Date of Calibration</b>      | 15-Jan-16             |
| <b>Date of next Calibration</b> | 15-Apr-16             |

**Parameters:**

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

| Reference Reading (°C) | Display Reading (°C) | Deviation (°C) |
|------------------------|----------------------|----------------|
| 10.1                   | 10.4                 | +0.3           |
| 19.8                   | 20.3                 | +0.5           |
| 30.4                   | 30.9                 | +0.5           |
| Tolerance Limit        |                      | ±2.0           |

**pH Value (Method Ref: APHA21e, 4500H:B)**

| Expected Reading (pH unit) | Reference Reading (pH unit) | Display Reading (pH unit) | Deviation (pH unit) |
|----------------------------|-----------------------------|---------------------------|---------------------|
| 4.0                        | 3.97                        | 4.02                      | +0.05               |
| 7.0                        | 7.15                        | 7.08                      | -0.07               |
| 10.0                       | 10.06                       | 9.98                      | -0.08               |
| Tolerance Limit            |                             |                           | ±0.20               |

**Conductivity (Method Ref: APHA 19e, 2510)**

| KCl concentration (mol/L) | Reference Reading (ms/cm) | Display Reading (ms/cm) | Deviation (%) |
|---------------------------|---------------------------|-------------------------|---------------|
| 0.0000                    | 0.00                      | 0.00                    | --            |
| 0.1000                    | 12.89                     | 12.74                   | -1.16         |
| 0.2000                    | 24.80                     | 24.42                   | -1.53         |
| 0.5000                    | 58.67                     | 58.94                   | +0.46         |
| Tolerance Limit           |                           |                         | ±2.0          |

**Dissolved Oxygen (DO) (Method Ref: APHA 19e, 4500-O, C)**

| Reference DO reading (mg/L) | DO reading od DO probe (mg/L) | Deviation (mg/L) |
|-----------------------------|-------------------------------|------------------|
| 8.43                        | 8.51                          | +0.08            |
| 4.44                        | 4.38                          | -0.06            |
| 2.13                        | 2.02                          | -0.11            |
| Tolerance Limit             |                               | ±0.20            |

- Remarks:
- (1) Maximum tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.
  - (2) Displayed reading presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.
  - (3) Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

- End of Report -