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Tel: (852) 2873 6860 Fax: (852) 2555 7533



CERTIFICATE OF CALIBRATION

Certificate No.:

15CA1203 04-01

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Item tested

Description:

Sound Level Meter (Type 1)

Microphone

Expiry Date:

Manufacturer:

B&K

B&K

Type/Model No .:

2236

4188

Serial/Equipment No.:

2100736

2288941

Adaptors used:

Item submitted by

Customer Name:

Lam Geotechnics Limited

Address of Customer:

Request No.

Date of receipt:

03-Dec-2015

Date of test:

04-Dec-2015

Reference equipment used in the calibration

Description:

Signal generator

Signal generator

Multi function sound calibrator

Model: B&K 4226

DS 360

DS 360

Serial No. 2288444 33873

61227

19-Jun-2016 16-Apr-2016 16-Apr-2016

Traceable to:

CIGISMEC CEPREI CEPRE

Ambient conditions

Temperature:

Relative humidity: Air pressure:

22 ± 1 °C 50 ± 10 %

1010 ± 10 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

The electrical tests were performed using an electrical signal substituted for the microphone which was removed and 2, 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 3, between the free-field and pressure responsess of the Sound Level Meter.

Test results

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

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

Huang Jian Min/Feng Jun Qi

Actual Measurement data are documented on worksheets.

Approved Signatory:

Date:

05-Dec-2015

Company Chop:

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.

C Soils & Materials Engineering Co., Ltd.

Form No.CARP152-1/Issue 1/Rev.C/01/02/2007



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CERTIFICATE OF CALIBRATION

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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 Uncertanity (dB) | Coverage Factor |
|-------------------------|--|---------|------------------------------|--------------------|
| Self-generated noise | A | Pass | 0.3 | |
| 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 | 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 1/103 at 4kHz | Pass | 0.3 | |
| | 1 ms burst duty factor 1/104 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 Uncertanity (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 04-Dec-2015 End

Checked by:

Date:

Lam Tze Wai 05-Dec-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.

Soils & Materials Engineering Co., Ltd.

Form No.CARP152-2/Issue 1/Rev.C/01/02/2007



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CERTIFICATE OF CALIBRATION

Certificate No.:

16CA0413 02

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Item tested

Description:
Manufacturer:
Type/Model No.:

Sound Level Meter (Type 1)

Microphone B & K 4950 Preamp B & K ZC0032

Serial/Equipment No.: Adaptors used:

2250-L 2722310

2698702

13318

Item submitted by

Customer Name:

Lam Geotechnics Limited

Address of Customer:

Request No.:

42 4-- 0040

Date of receipt:

13-Apr-2016

Date of test:

09-May-2016

Reference equipment used in the calibration

Description:

Multi function sound calibrator

Model: B&K 4226 Serial No. 2288444 Expiry Date: 19-Jun-2016

Traceable to: CIGISMEC

Signal generator Signal generator

DS 360 DS 360 33873 61227 18-Apr-2017 18-Apr-2017 CEPREI

Ambient conditions

Temperature:

21 ± 1 °C

Relative humidity: Air pressure:

60 ± 10 % 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 responsess of the Sound Level Meter.

Test results

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

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

in/Fena Jun Qi

Actual Measurement data are documented on worksheets.

Huand

Approved Signatory:

Date:

10-May-2016

Company Chor

SENGMESSES COLLEGE STOS * OLL SENGM

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.

Soils & Materials Engineering Co. Ltd

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CERTIFICATE OF CALIBRATION

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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 Uncertanity (dB) | Coverage Factor |
|-------------------------|--|---------|------------------------------|--------------------|
| 1000. | Gubicot. | otatus. | oncortainty (ab) | , actor |
| Self-generated noise | Α | 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 | Α | 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 1/103 at 4kHz | Pass | 0.3 | |
| | 1 ms burst duty factor 1/104 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 Uncertanity (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 09-May-2016 End

Checked by:

Date:

J.Q. Feng 10-May-2016

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.

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CERTIFICATE OF CALIBRATION

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Item tested

Description: Manufacturer: Type/Model No.: Sound Level Meter (Type 1) B & K 2250-L

2722311

B & K 4950 2698703

Microphone

Preamp B & K ZC0032 13321

Serial/Equipment No.: Adaptors used:

Item submitted by

Lam Geotechnics Limited

Customer Name: Address of Customer:

Request No.:

Date of receipt:

19-May-2016

Date of test:

21-May-2016

Reference equipment used in the calibration

Description:

or

Serial No.

Expiry Date: 19-Jun-2016

Traceable to: CIGISMEC CEPREI

CEPRE

Multi function sound calibrator Signal generator Signal generator B&K 4226 DS 360 DS 360

Model:

2288444 33873 61227

73 18-Apr-2017 27 18-Apr-2017

Ambient conditions

Temperature: Relative humidity:

Air pressure:

21 ± 1 °C 55 ± 10 % 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.

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%.

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

Test results

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

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

Ain/Feng Jun Qi

Actual Measurement data are documented on worksheets.

Huang Jian

Approved Signatory:

Date:

23-May-2016

Company Chop:

SPOS ***OIT

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.

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CERTIFICATE OF CALIBRATION

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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 Uncertanity (dB) | Coverage Factor |
|---|--|---------|------------------------------|--------------------|
| Self-generated noise | Α | Pass | 0.3 | |
| 2 1 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | С | Pass | 0.8 | |
| | Lin | Pass | 1.6 | |
| Linearity range for Leg | At reference range, Step 5 dB at 4 kHz | Pass | 0.3 | |
| ALTERNATION OF STREET | 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 | Α | Pass | 0.3 | |
| | С | 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 1/103 at 4kHz | Pass | 0.3 | |
| 3.0 | 1 ms burst duty factor 1/104 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 Uncertanity (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:

Fung Chi Yip

Date: 21-May-2016

- End

Checked by:

Date:

Lam Tze Wai 23-May-2016

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.

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CERTIFICATE OF CALIBRATION

Certificate No.:

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Item tested

Description: Manufacturer: Sound Level Meter (Type 1)

Microphone B & K Preamp B & K

Type/Model No.: Serial/Equipment No.: 2250-L 2701778

4950 2755097 ZC0032 19556

Adaptors used:

Item submitted by

Lam Geotechnics Ltd.

Customer Name: Address of Customer:

Request No.: Date of receipt:

-07-Mar-2016

Date of test:

08-Mar-2016

Reference equipment used in the calibration

Description:

Model:

Serial No. 2288444 Expiry Date: 19-Jun-2016 Traceable to: CIGISMEC

Multi function sound calibrator Signal generator Signal generator B&K 4226 DS 360 DS 360

33873 61227

16-Apr-2016 16-Apr-2016 CEPREI CEPREI

Ambient conditions

Temperature:

21 ± 1 °C 50 ± 10 %

Relative humidity: Air pressure:

1010 ± 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 responsess of the Sound Level Meter.

Test results

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

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

Huang Jian Min/Feng Jun Qi

Actual Measurement data are documented on worksheets

Approved Signatory:

Date:

09-Mar-2016

Company Chop:

SENGINEERING COMPANY STORY OF THE STORY OF

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.

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CERTIFICATE OF CALIBRATION

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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 Uncertanity (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 | 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 1/103 at 4kHz | Pass | 0.3 | |
| | 1 ms burst duty factor 1/104 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 Uncertanity (dB) | Coverage Factor |
|-------------------|---|--------------|------------------------------|--------------------|
| Acoustic response | Weighting A at 125 Hz Weighting A at 8000 Hz | Pass Pass | 0,3 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:

Fung Chi Yip Date: 08-Mar-2016

Checked by:

Date:

Lam Tze Wai 09-Mar-2016

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.

Soils & Materials Engineering Co . Ltd.

Form No CARP152-2/Issue 1/Rev C/01/02/2007



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CERTIFICATE OF CALIBRATION

Certificate No.:

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Tel: (852) 2873 6860

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Item tested

Description:

Sound Level Meter (Type 1)

Microphone

Manufacturer:

B&K

B&K

Preamp B&K

Type/Model No.: Serial/Equipment No .: 2250-L 3002695

4950 2940839 ZC0032

Adaptors used:

18582

Item submitted by

Customer Name:

Lam Geoechnics Ltd

Address of Customer:

Request No.

Date of receipt:

27-Jan-2016

Date of test:

28-Jan-2016

Reference equipment used in the calibration

Description:

Multi function sound calibrator

Model: B&K 4226 Serial No.

Expiry Date: 19-Jun-2016

Traceable to:

Signal generator Signal generator DS 360 DS 360 2288444 33873 61227

16-Apr-2016 16-Apr-2016 CIGISMEC CEPREI 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 responsess of the Sound Level Meter.

Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:

Date:

29-Jan-2016

Company Chop:

Huang-Jian-Nin/Feng Jun Qi

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.

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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 Uncertanity (dB) | Coverage Factor |
|-------------------------|---|---------|------------------------------|--------------------|
| Self-generated noise | Α | Pass | 0.3 | |
| | С | 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 | Α | 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 1/103 at 4kHz | Pass | 0.3 | |
| | 1 ms burst duty factor 1/104 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 Uncertanity (dB) | Coverage Factor |
|-------------------|---|--------------|------------------------------|--------------------|
| Acoustic response | Weighting A at 125 Hz Weighting A at 8000 Hz | Pass Pass | 0.3 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:

Checked by:

Fung Chi Yip

28-Jan-2016

Date: 29-Jan-2016

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.

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Form No CARP152-2/Issue 1/Rev C/01/02/2007



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Tel: (852) 2873 6860 Fax: (852) 2555 7533



CERTIFICATE OF CALIBRATION

Certificate No.:

16CA0513 01-02

Page:

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Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer: Type/Model No.: Rion Co., Ltd.

Serial/Equipment No.:

NC-73 10465798

Adaptors used:

-

Item submitted by

Curstomer:

Lam Geotechnics Ltd.

Address of Customer:

Request No.:

Date of receipt:

13-May-2016

Date of test:

17-May-2016

Reference equipment used in the calibration

| Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter Audio analyzer | Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B | Serial No. 2412857 2239857 2346941 61227 US36087050 GB41300350 | Expiry Date: 14-Apr-2017 28-Apr-2017 26-Apr-2017 18-Apr-2017 19-Apr-2017 | Traceable to: SCL CEPREI CEPREI CEPREI CEPREI |
|---|---|--|---|--|
| Universal counter | 53132A | MY40003662 | 19-Apr-2017 19-Apr-2017 | CEPREI CEPREI |

Ambient conditions

Temperature: Relative humidity: 22 ± 1 °C 55 ± 10 %

Air pressure:

1010 ± 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.
- 2. 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:

Date:

18-May-2016

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.

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Form No CARP156-1/Issue 1 Rev D/01/03/2007



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Tel: (852) 2873 6860 Fax: (852) 2555 7533



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

16CA0513 01-02

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of

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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.

| Factor of the second | | | (Output level in dB re 20 µPa) |
|--------------------------|--|---|-----------------------------------|
| Frequency Shown Hz | Output Sound Pressure Level Setting dB | Measured Output Sound Pressure Level dB | Estimated Expanded Uncertainty dB |
| 1000 | 94.00 | 93.96 | 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 = 0.001 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 = 967.3 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 = 0.8 %

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:

End

Date:

Fung Chi Yip \ 17-May-2016 Checked by:

Date:

Lam Tze Wai 18-May-2016

17-Way-2016

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.

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Form No CARP156-2/Issue 1/Rev C/01/05/2005

Calibration Certificate

Certificate Number 2016004065

Customer:

LAM Environmental Services Ltd

Model Number Serial Number

CAL200 13098 **Pass**

Test Results Initial Condition

As Manufactured

Description

Larson Davis CAL200 Acoustic Calibrator

Procedure Number Technician

D0001.8386 Scott Montgomery Calibration Date 6 May 2016

Calibration Due

Temperature Humidity

24 °C ± 0.3 °C 37 %RH ± 3 %RH

Static Pressure

101.0 kPa ± 1 kPa

Evaluation Method

The data is aquired 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 60942:2003

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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| Date /04/2015 /07/2016 | Cal Due 09/04/2016 04/07/2017 | Cal Standard 001021 001051 |
|------------------------------|---|--|
| | ADVITAGO SANDON LOS CARROS PROCESOS DE CONTROLES. | |
| /07/2016 | 04/07/2017 | 001051 |
| | | |
| /20/2015 | 08/20/2016 | 005446 |
| /09/2015 | 10/09/2016 | 006506 |
| /20/2015 | 08/20/2016 | 006507 |
| /17/2015 | 08/17/2016 | 006511 |
| /07/2015 | 05/07/2016 | 007310 |
| | 09/2015 20/2015 17/2015 | 09/2015 10/09/2016 (20/2015 08/20/2016 (17/2015 08/17/2016 |









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CERTIFICATE OF CALIBRATION

Certificate No.:

16CA0805 02

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of

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Item tested

Description:
Manufacturer:
Type/Model No.:

Sound Level Meter (Type 1) B & K 2250-L 3006790 Microphone B & K 4950 2827240

B & K ZC0032 21213

Adaptors used:

Item submitted by

Serial/Equipment No.:

Customer Name:

Lam Geotechnics Ltd.

Address of Customer:

Request No.:

.

Date of receipt:

05-Aug-2016

Date of test:

08-Aug-2016

Reference equipment used in the calibration

Description:

Multi function sound calibrator

Signal generator Signal generator Model: B&K 4226 DS 360

DS 360

Serial No. 2288444

33873 61227 Expiry Date:

18-Jun-2017 18-Apr-2017 18-Apr-2017 Traceable to: CIGISMEC

CEPREI CEPREI

Ambient conditions

Temperature:

Relative humidity: Air pressure: 21 ± 1 °C 60 ± 10 %

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

Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:

Huang Jian Ma/Feng Jun Qi

Date: 09-Aug-2016

Company Chop:

ENGINE CHARGE STATE OF THE STA

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.

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Form No.CARP152-1/Issue 1/Rev.C/01/02/2007



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CERTIFICATE OF CALIBRATION

(Continuation Page)

16CA0805 02

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(

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 Uncertanity (dB) | Coverage Factor |
|-------------------------|---|---------|--|--------------------|
| 1691. | Juniest. | otatus. | and the state of t | |
| Self-generated noise | Α | Pass | 0.3 | |
| | С | Pass | 0.8 | |
| | Lin | Pass | 1.6 | |
| Linearity range for Leg | 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 | Α | Pass | 0.3 | |
| . , , , | С | 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 1/103 at 4kHz | Pass | 0.3 | |
| 3 2 | 1 ms burst duty factor 1/104 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 Uncertanity (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:

End

Checked by:

| Fung Chi Yip | Cam Tze Wai | | Date: 09-Aug-2016

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.

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Form No.CARP152-2/Issue 1/Rev.C/01/02/2007



TISCH ENVIRONMENTAL, INC. 145 SOUTH MIAMI AVE VILLAGE OF CLEVES, OH 45002 513.467.9000 877.263.7610 TOLL FREE 513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

| Date - M Operator | | Rootsmeter Orifice I.I | | 0438320 3166 | Ta (K) - Pa (mm) - | 293 748.03 |
|-----------------------|-------------------------|----------------------------|------------------------------|--|----------------------------------|--------------------------------------|
| PLATE OR Run # | VOLUME START (m3) | VOLUME STOP (m3) | DIFF VOLUME (m3) | DIFF TIME (min) | METER DIFF Hg (mm) | ORFICE DIFF H2O (in.) |
| 1 2 3 4 5 | NA NA NA NA | NA NA NA NA NA | 1.00 1.00 1.00 1.00 | 1.4270 1.0220 0.9100 0.8730 0.7180 | 3.2 6.4 7.9 8.8 12.7 | 2.00 4.00 5.00 5.50 8.00 |

DATA TABULATION

| Vstd | (x axis) Qstd | (y axis) | Va | (x axis) Qa | (y axis) |
|--|--|--|--|--|--|
| 0.9967 0.9925 0.9904 0.9892 0.9840 | 0.6985 0.9711 1.0883 1.1332 1.3705 | 1.4150 2.0010 2.2372 2.3464 2.8299 | 0.9957 0.9915 0.9893 0.9882 0.9830 | 0.6977 0.9701 1.0872 1.1320 1.3691 | 0.8851 1.2517 1.3995 1.4678 1.7702 |
| Qstd slo intercep coeffici y axis = | t (b) = ent (r) = | 2.10714 -0.05158 0.99978 | Qa slop intercep coeffici | t (b) = | 1.31946 -0.03226 0.99978 |

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



| TESTING | Calib | ration [| Data for I | High Vol | ume San | npler (TS | P Sampler |) | |
|--------------------------------|-------------|--------------|----------------|----------------------------------|------------------|----------------|------------------|---|--------------|
| Location : | | CMA1b | | | | Calbratio | n Date | : | 12-Sep-16 |
| Equipment no. : | | HVS001 | | | | Calbratio | n Due Date | : | 13-Nov-16 |
| CALIBRATION OF CONTI | NUOUS FI | OW RECO | RDER | | | | | | |
| | | | | Ambient C | Condition | | | | |
| Temperature, T _a | | 302 | | | Pressure, P | | 10 | 010 | mmHg |
| | | | Orifice | Transfer Sta | ndard Inform | ation | | | |
| Equipment No. | | Ori002 | | Slope, m _c | 2.107 | 14 | Intercept, bc | | -0.05158 |
| Last Calibration Date | 20-May-16 | | | | (H | x Pa / 10 | 13.3 x 298 / T | r _a) 1/2 | |
| Next Calibration Date | | 20-May-1 | 7 | | = | | $Q_{std} + b_c$ | 860 USS | |
| | | | | Calibration | n of TSP | | | | |
| Calibration | Mai | nometer Re | eading | Q _{std} Continuous Flow | | | IC | | |
| Point | н (| inches of v | water) | (m³ / min.) | | Recorder, W | | (W(P _a /1013.3×298/T _a) ^{1/2} /35.31) | |
| | (up) | (down) | (difference) | X-a | axis | ((| CFM) | Y-axis | |
| 1 | 1.2 | 1.2 | 2.4 | 0.7 | 536 | | 12 11.900 | | 11.9008 |
| 2 | 2.2 | 2.2 | 4.4 | 1.0 | 117 | 20 | | 19.8347 | |
| 3 | 3.5 | 3.5 | 7.0 | 1.2 | 697 | | 26 | | 25.7852 |
| 4 | 4.5 | 4.5 | 9.0 | 1.4 | 364 | | 30 | | 29.7521 |
| 5 | 5.5 | 5.5 | 11.0 | 1.5 | 855 | | 34 | | 33.7190 |
| By Linear Regression of Y | on X | | | | | | | | |
| | Slope, m | = | 25.7 | 7206 | Int | ercept, b = | -6.9 | 9594 | |
| Correlation C | oefficient* | = | 0.9 | 984 | | , | | | |
| Calibration | Accepted | = | Yes/ | 'No** | | | | | |
| 101000 | | | | | | | | | |
| * if Correlation Coefficient < | 0.990, che | eck and reca | alibration aga | in. | | | | | |
| ** Delete as appropriate. | | | | | | | | | |
| Remarks : As per client's | provided i | nformation, | the equipme | nt reference r | no. of the calib | orated High Vo | olume Sampler ha | as been | |
| re-assigned fr | om EL452 | to HVS001 | with respect | to the update | in quality mar | nagement syst | em. | | |
| Calibrated by : | Ja | ackey MA | | | | Checked I | ру | : | Pauline Wong |
| Date : | 12 | 2-Sep-16 | | | | Date | | : | 12-Sep-16 |
| | | | | | | | | | |



| ILUTINE | | | | | | | | | | |
|------------------------------|--------------------|------------------|-----------------|-------------------------|-----------------|---------------|-------------------|---|--------------|--|
| Location | : | CMA1b | | | | Calibrati | ion Date | : _ | 11-Nov-16 | |
| Equipment no. | : | HVS001 | | | | Calibrati | ion Due Date | : | 11-Jan-17 | |
| | 10 BC 1000 | | | | | | | , - | | |
| | | | | | | | | | | |
| CALIBRATION OF CONT | TINUOUS FL | OW RECO | RDER | | | | | | | |
| | | | | Ambient C | ondition | | | | | |
| Temperature, T _a | T | 293 | 3 | Kelvin | Pressure, P. | 1 | 1 | 019 | mmHg | |
| | THE REAL PROPERTY. | Name of the last | Orifice | Transfer Sta | ndard Inform | ation | | | | |
| Equipment No. | | Ori002 | | Slope, m _c | 2.107 | | Intercept, bc | | -0.05158 | |
| Last Calibration Date | | 20-May-1 | 6 | | (H | x P = / 10 |)13.3 x 298 / | T_{a} | | |
| Next Calibration Date | | 20-May-1 | 7 | | = | | $x Q_{std} + b_c$ | . 47 | | |
| | | | | Calibration | n of TSP | | | | | |
| Calibration | Ma | nometer R | eading | | std | Contin | nuous Flow | | IC | |
| Point | 1 | inches of | | (m ³ / min.) | | Recorder, W | | (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) | | |
| | (up) | (down) | (difference) | | ixis | | (CFM) | | Y-axis | |
| 1 | 1.6 | 1.6 | 3.2 | | 830 | , | 27 | | 27.3059 | |
| 2 | 2.6 | 2.6 | 5.2 | | 189 | | 33 | | 33.3739 | |
| 3 | 3.9 | 3.9 | 7.8 | | 649 | | 43 | | 43.4871 | |
| 4 | 4.9 | 4.9 | 9.8 | - | 270 | | 50 | 50.5664 | | |
| 5 | 6.3 | 6.3 | 12.6 | 27 | 281 | | 55 | | 55.6231 | |
| By Linear Regression of Y | on X | | | | | | | | | |
| | Slope, m | = | 35.1 | 337 | Int | ercept, b = | -4 | 4599 | | |
| Correlation | Coefficient* | = | | 954 | | | | | | |
| | on Accepted | = | Yes/ | | | | | | | |
| | | | | | | | | | | |
| | | | | ,,,,, | | | | | | |
| * if Correlation Coefficient | < 0.990, che | eck and rec | alibration agai | n. | | | | | | |
| ** Delete as appropriate. | | | | | | | | | | |
| Remarks : As per client | t's provided i | nformation, | the equipmen | nt reference n | o. of the calib | orated High V | olume Sampler h | as be | en | |
| 9.7 | from EL452 | to HVS001 | with respect t | o the undate | in quality mar | agement sys | tem | | | |
| | | ickey MA | | spaulo | specify mai | Checked | | | Pauline Wong | |
| Calibrated by | - | 1-Nov-16 | | | | Date | -, | · – | 11-Nov-16 | |
| Date . | | | | | | | | | 111101-10 | |



| TESTING | Callb | ration L | ala ioi i | ngn von | ille Sali | ipier (13 | or Sampler |) | |
|--------------------------------|--------------|---|-----------------|-----------------------|-----------------|----------------|-------------------|---------------------|---|
| Location : | | CMA2a | | | | Calbratio | on Date | : | 12-Sep-16 |
| Equipment no. : | | HVS002 | | | | Calbratio | on Due Date | : | 13-Nov-16 |
| | | | | | | | | | |
| CALIBRATION OF CONTI | NUOUS FL | OW RECO | RDER | | | | | | |
| | | | | Ambient Co | ondition | | | | |
| Temperature, T _a | | 302 | ! | Kelvin | Pressure, P | 1 | 10 | 010 | mmHg |
| | | | Orifice 1 | Transfer Star | ndard Inform | ation | | | |
| Equipment No. | | Ori002 | | Slope, m _c | 2.107 | 14 | Intercept, bc | T | -0.05158 |
| Last Calibration Date | | 20-May-16 (H x P _a / 1013.3 x 29 | | | | | 13.3 x 298 / T | r _a) 1/ | 2 |
| Next Calibration Date | | 20-May-1 | 7 | | = | m _c | $x Q_{std} + b_c$ | | |
| | | | | Calibration | of TSP | | | | |
| Calibration | Ma | nometer R | eading | Q, | std | Contir | nuous Flow | IC | |
| Point | н | (inches of v | vater) | (m³ / | min.) | Rec | order, W | (W(Pa | /1013.3x298/T _a) ^{1/2} /35.31) |
| | (up) | (down) | (difference) | X-a | xis | (| CFM) | Y-axis | |
| 1 | 1.4 | 1.4 | 2.8 | 0.81 | 120 | | 28 | 27.7686 | |
| 2 | 2.3 | 2.3 | 4.6 | 1.03 | 339 | | 34 | 33.7190 | |
| 3 | 4.3 | 4.3 | 8.6 | 1.40 |)47 | | 44 | 43.6364 | |
| 4 | 4.9 | 4.9 | 9.8 | 1.49 | 79 | | 48 | | 47.6034 |
| 5 | 6.0 | 6.0 | 12.0 | 1.65 | 549 | | 56 | | 55.5372 |
| By Linear Regression of Y | on X | | | | | | | | |
| | Slope, m | = | 31.4 | 606 | Int | ercept, b = | 1.3 | 620 | |
| Correlation (| Coefficient* | = | 0.99 | 900 | | | | | |
| Calibration | Accepted | = | Yes/ | No ** | | | | | |
| * if Correlation Coefficient < | 0.990, che | eck and reca | alibration agai | n. | | | | | |
| ** Delete as appropriate. | | | | | | | | | |
| 2.27 5 | s provided i | nformation, | the equipmer | nt reference no | o. of the calib | orated High V | olume Sampler ha | as beer | 1 |
| re-assigned fi | rom EL449 | to HVS002 | with respect t | o the update i | n quality man | agement svs | tem. | | |
| | | ackey MA | | | | Checked | | : | Pualine Wong |
| Calibrated by | | 2-Sep-16 | | | | Date | • | : | 12-Sep-16 |
| Date | | 1992 | | | | | | _ | |



| Location : | | CMA2a | | | | : 11-Nov-16 | | | |
|--------------------------------|-------------|-------------|----------------|-----------------------|----------------|---------------------|------------------|---|--|
| Equipment no. | | HVS002 | | | | Calibrati | on Due Date | : 11-Jan-17 | |
| | | | | | | | | | |
| | | | | | | | | | |
| CALIBRATION OF CONTIN | NUOUS FL | OW RECO | RDER | | | | | | |
| | | | | Ambient C | ondition | | | | |
| Temperature, T _a | | 293 | | Kelvin | Pressure, Pa | ı | 10 | 019 mmHg | |
| Great Control of the Control | | | Orifice 1 | Transfer Sta | ndard Inform | ation | | | |
| Equipment No. | | Ori002 | | Slope, m _c | 2.107 | -0.05158 | | | |
| Last Calibration Date | | 20-May-1 | 6 | | (H | xP _a /10 | 13.3 x 298 / 1 | Γ _a) ^{1/2} | |
| Next Calibration Date | | 20-May-1 | 7 | | = | m _c : | $Q_{std} + b_c$ | | |
| | | | | Calibration | n of TSP | | | | |
| Calibration | Mai | nometer Re | ading | Q | std | Contin | nuous Flow | IC | |
| Point | н (| inches of v | vater) | (m ³ / | min.) | Recorder, W | | (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) | |
| | (up) | (down) | (difference) | X-a | axis | (CFM) | | Y-axis | |
| 1 | 1.8 | 1.8 | 3.6 | 0.9 | 351 | | 28 | 28.3172 | |
| 2 | 2.7 | 2.7 | 5.4 | 1.1 | 398 | 35 | | 35.3965 | |
| 3 | 4.6 | 4.6 | 9.2 | 1.4 | 802 | | 46 | 46.5211 | |
| 4 | 5.5 | 5.5 | 11.0 | 1.6 | 163 | | 51 | 51.5778 | |
| 5 | 6.7 | 6.7 | 13.4 | 1.7 | 814 | | 57 | 57.6457 | |
| By Linear Regression of Yo | n X | | | | | | | | |
| | Slope, m | = | 34.3 | 3731 ———— | Int | ercept, b = | -3.9 | 9066 | |
| Correlation C | oefficient* | = | 0.9 | 997 | | | | | |
| Calibration | Accepted | = | Yes | /Ne** | | | | | |
| | | | | _ | | | | | |
| * if Correlation Coefficient < | 0.990, che | ck and rec | alibration aga | in. | | | | | |
| ** Delete as appropriate. | | | | | | | | | |
| 5.8° 5. | provided : | nformation | the equipme | nt reference r | o of the call | orated High V | olume Sampler ha | as heen | |
| Remarks : | provided | niormation, | trie equipme | - Teleferice i | io. or the cam | orated might v | Olume Sampler na | 35 Deen | |
| re-assigned fr | om EL449 | to HVS002 | with respect | to the update | in quality mar | | | | |
| Calibrated by | | ackey MA | | | | Checked | by | : Pualine Wong | |
| Date : | 1 | 1-Nov-16 | | Date : | | | | : 11-Nov-16 | |



| Location : | 21100-00-1-0 | CMA3a | | | | Calbra | : | 12-Sep-16 | | | | |
|---------------------------------------|--|-----------|------------------------------|-----------------------|-------------|---------------------|----------------|---|-----------|--|--|--|
| Equipment no. | | HVS012 | | | | Calbra | ation Due Date | : | 13-Nov-16 | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| CALIBRATION OF CONT | INUOUS I | FLOW REC | ORDER | | | | | | | | | |
| | Ambient Condition | | | | | | | | | | | |
| Temperature, T _a | | 302 | 2 | Kelvin | Pressure, P | a | | 1010 | mmHg | | | |
| Orifice Transfer Standard Information | | | | | | | | | | | | |
| Equipment No. | | Ori002 | | Slope, m _c | 2.107 | 14 | Intercept, bo | | -0.05158 | | | |
| Last Calibration Date | | 20-May-1 | 6 | | (Hx | (P _a /10 | 013.3 x 298 / | T _a) | 1/2 | | | |
| Next Calibration Date | | 20-May-1 | $= m_c \times Q_{std} + b_c$ | | | | | | | | | |
| Calibration of TSP | | | | | | | | | | | | |
| Calibration | Manometer Reading Q std Continuous Flow IC | | | | | | IC | | | | | |
| Point | Н (| inches of | water) | (m ³ / | min.) | Re | corder, W | (W(P _a /1013.3x298/T _a) ^{1/2} /35 | | | | |
| | (up) | (down) | (difference) | X-a | xis | | (CFM) | | Y-axis | | | |
| 1 | 1.2 | 1.2 | 2.4 | 0.7 | 536 | | 24 | | 23.8017 | | | |
| 2 | 1.8 | 1.8 | 3.6 | 0.9 | 175 | | 32 | | 31.7356 | | | |
| 3 | 3.2 | 3.2 | 6.4 | 1.2 | 152 | | 40 | | 39.6695 | | | |
| 4 | 4.2 | 4.2 | 8.4 | 1.3 | 886 | | 45 | | 44.6281 | | | |
| 5 | 5.4 | 5.4 | 10.8 | 1.5 | 712 | | 50 | | 49.5868 | | | |
| By Linear Regression of Y | on X | | | | | | | | | | | |
| | Slope, m | = | 30.5 | 105 | Int | tercept, b | = 2 | .2112 | | | | |
| Correlation C | oefficient* | = | 0.99 | 943 | | | | | | | | |
| Calibration | Accepted | = | Yes/ | \\0 ** | | | | | | | | |
| | | | | | | | | | | | | |

| | 1000 | | | | | |
|--------------|-------------|--------|----------------------------------|---|--------|--------------|
| Remarks : | As per clie | ent's | provided information, the equipm | ent reference no. of the calibrated High Volume | Sample | r has been |
| | re-assigne | ed fro | om EL333 to HVS012 with respec | et to the update in quality management system. | | |
| Calibrated b | у | : | Jackey MA | Checked by | : _ | Pauline Wong |
| Date | | : | 12-Sep-16 | Date | : | 12-Sep-16 |

^{*} if Correlation Coefficient < 0.990, check and recalibration again.

^{**} Delete as appropriate.



| Location | : | CMA3a | Calibration Date | : | 11-Nov-16 | |
|---------------|---|--------|----------------------|---|-----------|--|
| Equipment no. | : | HVS012 | Calibration Due Date | : | 11-Jan-17 | |
| | | | | | | |

CALIBRATION OF CONTINUOUS FLOW RECORDER

| Temperature, T _a | 293 | Kelvin Pressure, Pa | 1019 | mmHg |
|-----------------------------|-----|---------------------|------|------|
|-----------------------------|-----|---------------------|------|------|

| Orifice Transfer Standard Information | | | | | | | | | | |
|---------------------------------------|-----------|------------------------------|--|---------------|----------|--|--|--|--|--|
| Equipment No. | Ori002 | Slope, m _c | 2.10714 | Intercept, bc | -0.05158 | | | | | |
| Last Calibration Date | 20-May-16 | | $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ | | | | | | | |
| Next Calibration Date | 20-May-17 | $= m_c \times Q_{std} + b_c$ | | | | | | | | |

| Calibration of TSP | | | | | | | | | | | |
|--------------------|---------------------|-----------|--------------|-------------------------|-----------------|--|--|--|--|--|--|
| Calibration | Ma | nometer R | eading | Q _{std} | Continuous Flow | IC | | | | | |
| Point | H (inches of water) | | water) | (m ³ / min.) | Recorder, W | (W(P _a /1013.3x298/T _a) ^{1/2} /35.31 | | | | | |
| | (up) | (down) | (difference) | X-axis | (CFM) | Y-axis | | | | | |
| 1 | 1.3 | 1.3 | 2.6 | 0.7984 | 32 | 32.3625 | | | | | |
| 2 | 2.1 | 2.1 | 4.2 | 1.0081 | 38 | 38.4305 | | | | | |
| 3 | 3.3 | 3.3 | 6.6 | 1.2575 | 45 | 45.5098 | | | | | |
| 4 | 4.2 | 4.2 | 8.4 | 1.4155 | 50 | 50.5664 | | | | | |
| 5 | 5.2 | 5.2 | 10.4 | 1.5723 | 56 | 56.6344 | | | | | |

By Linear Regression of Y on X

Slope, m = 30.8649 Intercept, b = 7.3433

Correlation Coefficient* = 0.9982

Calibration Accepted = Yes/Ne**

| ** | Delete | as a | ppro | priate. |
|----|--------|------|------|---------|
|----|--------|------|------|---------|

Remarks : As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been

re-assigned from EL333 to HVS012 with respect to the update in quality management system.

Calibrated by : Jackey MA Checked by : Pauline Wong

^{*} if Correlation Coefficient < 0.990, check and recalibration again.



| TESTING | Callb | ation | Data 101 | nigii voi | uille Sai | iihiei (| or Sample | , | | |
|--|-------------------------------|----------------------|----------------|-------------------------|----------------|----------------------|-------------------|--------------|---|--|
| Location : | | CMA4a | | | | Calbrat | ion Date | : | 12-Sep-16 | |
| Equipment no. | No. and the second | HVS004 | | | | Calbrat | ion Due Date | : | 13-Nov-16 | |
| CALIBRATION OF CON | TINUIOUS | ELOW/BEO | PORNER | | | | | | | |
| CALIBRATION OF CON | TINUUUS | -LOW REC | OKDEK | | | | | | | |
| TT | 1 | 200 | | Ambient C | | | 1 | 040 | | |
| Temperature, T _a | | 302 | 2 | Kelvin | Pressure, P | a | 1 | 010 | mmHg | |
| | | | Orifice | Transfer Sta | ndard Infor | mation | | | | |
| Equipment No. | | Ori002 | | Slope, m _c | 2.107 | | Intercept, bc | | -0.05158 | |
| Last Calibration Date | | 20-May-1 | 16 | | (H | x P _a / 1 | 013.3 x 298 / | $T_a)^{1/2}$ | 2 | |
| Next Calibration Date | | 20-May-1 | 17 | | = | m _c | $x Q_{std} + b_c$ | | | |
| | | | | Calibratio | n of TSP | | | | | |
| Calibration | Calibration Manometer Reading | | eading | Q, | std | Cont | Continuous Flow | | IC | |
| Point | н | inches of | water) | (m ³ / min.) | | Re | ecorder, W | (W(Pa | /1013.3x298/T _a) ^{1/2} /35.31) | |
| | (up) | (down) | (difference) | X-a | xis | (CFM) | | | Y-axis | |
| 1 | 1.4 | 1.4 | 2.8 | 0.81 | 120 | 22 | | | 21.8182 | |
| 2 | 2.2 | 2.2 | 4.4 | 1.01 | 117 | | 32 | | 31.7356 | |
| 3 | 3.4 | 3.4 | 6.8 | 1.25 | 518 | | 44 | | 43.6364 | |
| 4 | 4.4 | 4.4 | 8.8 | 1.42 | 207 | | 48 | | 47.6034 | |
| 5 | 5.5 | 5.5 | 11.0 | 1.58 | 355 | | 56 | | 55.5372 | |
| By Linear Regression of Y | on X | | | | | | | | | |
| | Slope, m | = | 42.7 | 7983 | In | tercept, b = | -11. | .9911 | | |
| Correlation C | Coefficient* | = | 0.9 | 952 | | | | | | |
| Calibration | n Accepted | = | Yes | /No** | | | | | | |
| | | | | | | | | | | |
| * if Correlation Coefficient | < 0.990, ch | neck and re | calibration ag | ain. | | | | | | |
| ** Delete as appropriate. | | | | | | | | | | |
| As per clien Remarks : | t's provided | l informatio | n, the equipme | ent reference | no. of the ca | llibrated Hig | h Volume Sampler | has bee | en | |
| 0.00 (Bit 100 (Bit 10 | from EL39 | 0 to HVS00 |)4 with respec | t to the undate | e in quality m | anagement | system. | | | |
| | | ackey MA | | | ,, | Checke | | | Pauline Wong | |
| Calibrated by | | 2-Sep-16 | | | | Date | • | : | 12-Sep-16 | |
| Date | - 22 | 20 202 0 2323 | | | | | | 99 | | |



| IESTING | | | | • | | | | , | |
|------------------------------|--------------|-------------|---------------------------------------|------------------------------|---------------|---|------------------|----------|---|
| Location : | | CMA4a | | | | Calibration | on Date | : | 11-Nov-16 |
| Equipment no. | | HVS004 | | | | Calibration | on Due Date | : | 11-Jan-17 |
| | | | · · · · · · · · · · · · · · · · · · · | | | | | | |
| | | | | | | | | | |
| CALIBRATION OF CON | TIMUOUE | LOWBEO | OBBER | | | | | | |
| CALIBRATION OF CON | IINUUUS | -LOW REC | ORDER | | | | | | |
| | | | | Ambient 0 | | | | | |
| Temperature, T _a | | 293 | | Kelvin | Pressure, P | a | 10 |)19 | mmHg |
| | | | Orifice | Transfer Sta | indard Inform | mation | | | |
| Equipment No. | | Ori002 | | Slope, m _c | 2.107 | 14 | Intercept, bc | | -0.05158 |
| Last Calibration Date | | 20-May-1 | 6 | | (H | XP _a / 10 | 13.3 x 298 / 1 | a) 1/2 | *** |
| Next Calibration Date | | 20-May-1 | 7 | $= m_c \times Q_{std} + b_c$ | | | | | |
| | | | | 0 | | | | | |
| | | | | Calibratio | | | | | |
| Calibration | | nometer R | | Q _{std} | | 1 | Continuous Flow | | IC |
| Point | Н (| inches of v | water) | (m ³ / min.) | | Rec | Recorder, W | |)13.3x298/T _a) ^{1/2} /35.31) |
| | (up) | (down) | (difference) | X-a | xis | (CFM) | | | Y-axis |
| 1 | 1.4 | 1.4 | 2.8 | 0.82 | 276 | 25 | | | 25.2832 |
| 2 | 2.2 | 2.2 | 4.4 | 1.03 | 312 | 32 | | | 32.3625 |
| 3 | 3.3 | 3.3 | 6.6 | 1.25 | 575 | 41 | | | 41.4645 |
| 4 | 4.3 | 4.3 | 8.6 | 1.43 | 320 | | 46 | | 46.5211 |
| 5 | 5.6 | 5.6 | 11.2 | 1.63 | 307 | | 52 | | 52.5891 |
| By Linear Regression of Y | on X | | | | 3100 | | | | |
| | Slope, m | = | 34.3 | 3403 | Int | ercept, b = | -2.7 | 938 | |
| Correlation C | Coefficient* | = | 0.9 | 982 | | | | | |
| Calibration | Accepted | = | Yes/ | 'No** | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| * if Correlation Coefficient | < 0.990, ch | eck and re | calibration aga | ain. | | | | | |
| ** Delete as appropriate. | | | | | | | | | |
| No.0 60 | | | | | | | | | |
| Remarks : As per clien | t's provided | information | n, the equipme | ent reference | no. of the ca | librated High | Volume Sampler h | nas been | **** |
| re-assigned | from EL390 | 0 to HVS00 | 4 with respect | to the update | in quality ma | anagement sy | stem. | | |
| Calibrated by | Ja | ickey MA | | | | Checked I | by | : | Pauline Wong |
| Date : | 11 | 1-Nov-16 | - | | | Date | | ; | 11-Nov-16 |
| | , | | | | | | | | |



| Location | : | CMA5b | Calbration Date | : | 12-Sep-16 |
|---------------|---|--------|---------------------|---|-----------|
| Equipment no. | : | HVS010 | Calbration Due Date | : | 13-Nov-16 |

| | Mark Harry | | | Ambient Condition | | | | |
|-----------------------------|--------------|---------------------|-----------------|-------------------------|-------------------|-----------------|-------------------------|--|
| emperature, T _a | | 302 | | Kelvin Pressur | e, P _a | | 1010 | mmHg |
| | | - | Orifice 7 | Fransfer Standard Inf | ormation | | | |
| Equipment No. | | Ori002 | | Slope, m _c 2 | .10714 | Intercept, bo | | -0.05158 |
| Last Calibration Date | | 20-May-1 | 6 | | $(HxP_a/10$ | 13.3 x 298 / | $(T_a)^{1/2}$ | |
| Next Calibration Date | | 20-May-1 | 7 | | $= m_c$ | $Q_{std} + b_c$ | | |
| | | | | Calibration of TSP | | | | |
| Calibration | Ma | nometer R | eading | Q _{std} | Contin | uous Flow | | IC |
| Point | н | inches of | water) | (m ³ / min.) | Rec | order, W | (W(P _a /1013 | .3x298/T _a) ^{1/2} /35.3 |
| | (up) | (down) | (difference) | X-axis | | CFM) | , | Y-axis |
| 1 | 1.4 | 1.4 | 2.8 | 0.8120 | | 34 | | 33.7190 |
| 2 | 2.2 | 2.2 | 4.4 | 1.0117 | | 42 | | 11.6529 |
| 3 | 3.4 | 3.4 | 6.8 | 1.2518 | | 50 | | 19.5868 |
| 4 | 4.4 | 4.4 | 8.8 | 1.4207 | | 56 | 5 | 55.5372 |
| 5 | 5.6 | 5.6 | 11.2 | 1.5996 | | 61 | 6 | 60.4959 |
| Linear Regression of Y | on X | | · | | | | | |
| | Slope, m | = | 34.0 | 485 | Intercept, b = | 6 | .6876 | |
| Correlation C | coefficient* | = | 0.99 | 985 | | | | |
| Calibration | Accepted | = | Yes/ | No** | | | | |
| | | | | | | | | |
| - M. W-11 | | Topological Control | | | | | | |
| f Correlation Coefficient < | 0.990, che | eck and rec | alibration agai | n. | | | | |
| Controlation Committee | 0.000, 0 | | | | | | | |

| ** | Da | lota | 20 | an | nro | nri | ate. |
|----|----|------|----|----|-----|-----|------|
| | | | | | | | |

Remarks : As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been

re-assigned from EL222 to HVS010 with respect to the update in quality management system.

Checked by Pauline Wong Calibrated by Jackey MA 12-Sep-16 Date 12-Sep-16 Date



| Location | | CMA5b | Calibration Date | | 11-Nov-16 |
|---------------|---|--------|----------------------|---|-----------|
| Equipment no. | : | HVS010 | Calibration Due Date | : | 11-Jan-17 |

CALIBRATION OF CONTINUOUS FLOW RECORDER

| emperature, T _a | 293 | Kelvin | Pressure, Pa | 1019 | mmHg |
|----------------------------|-----------|-----------------------|-------------------|--|----------|
| | Or | ifice Transfer Sta | ndard Information | | |
| Equipment No. | Ori002 | Slope, m _c | 2.10714 | Intercept, bc | -0.05158 |
| Last Calibration Date | 20-May-16 | | (HxP | a / 1013.3 x 298 / T _a) ¹ | 1/2 |
| Next Calibration Date | 20-May-17 | | = | $m_c \times Q_{std} + b_c$ | |

Ambient Condition

| Calibration | Ma | nometer R | eading | Q _{std} | Continuous Flo | w IC |
|----------------------|--------------|------------|--------------|------------------|----------------|---|
| Point | н | (inches of | water) | (m³ / min.) | Recorder, W | (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) |
| | (up) | (down) | (difference) | X-axis | (CFM) | Y-axis |
| 1 | 1.4 | 1.4 | 2.8 | 0.8276 | 32 | 32.3625 |
| 2 | 2.3 | 2.3 | 4.6 | 1.0539 | 38 | 38.4305 |
| 3 | 3.5 | 3.5 | 7.0 | 1.2943 | 48 | 48.5438 |
| 4 | 4.6 | 4.6 | 9.2 | 1.4802 | 52 | 52.5891 |
| 5 | 5.8 | 5.8 | 11.6 | 1.6591 | 60 | 60.6797 |
| Linear Regression of | on X | | | | | |
| | Slope, m | = | 33.86 | 51 | Intercept, b = | 3.7484 |
| Correlation | Coefficient* | = | 0.99 | 56 | | |
| Calibrati | on Accepted | = | Yes/A | e** | | |

^{*} if Correlation Coefficient < 0.990, check and recalibration again.

| ** | De | lete | as | appro | priate. |
|----|----|------|----|-------|---------|
|----|----|------|----|-------|---------|

Remarks : As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been re-assigned from EL222 to HVS010 with respect to the update in quality management system.

 Calibrated by
 :
 Jackey MA
 Checked by
 :
 Pauline Wong

 Date
 :
 11-Nov-16
 Date
 :
 11-Nov-16



 Location
 :
 MA1w
 Calbration Date
 :
 12-Sep-16

 Equipment no.
 :
 HVS008
 Calbration Due Date
 :
 13-Nov-16

CALIBRATION OF CONTINUOUS FLOW RECORDER

| Ambient Condition | | A STATE OF THE STATE OF | HK1610369 | | |
|-----------------------------|-----|-------------------------|--------------------------|------|------|
| Temperature, T _a | 302 | Kelvin | Pressure, P _a | 1010 | mmHg |

| | Orifi | ce Transfer Standar | d Information | | |
|-----------------------|-----------|-----------------------|---------------|---------------------------------|----------|
| Equipment No. | Ori002 | Slope, m _c | 2.10714 | Intercept, bc | -0.05158 |
| Last Calibration Date | 20-May-16 | | $(HxP_a/$ | 1013.3 x 298 / T _a) | 1/2 |
| Next Calibration Date | 20-May-17 | | = <i>m</i> | $a_c \times Q_{std} + b_c$ | |

| | | | | Calibration of TSP | | |
|--------------------------|---------------------------------------|--------|---|---------------------|---|---------|
| Calibration Point | Manometer Reading H (inches of water) | | Q _{std} (m ³ / min.) | Continuous Flow | IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) | |
| | (up) | (down) | (difference) | 34 9000 AC 36000000 | (CFM) | Y-axis |
| 1 | 1.8 | 1.8 | 3.6 | 0.9175 | 24 | 23.8017 |
| 2 | 2.6 | 2.6 | 5.2 | 1.0977 | 32 | 31.7356 |
| 3 | 4.2 | 4.2 | 8.4 | 1.3886 | 44 | 43.6364 |
| 4 | 5.4 | 5.4 | 10.8 | 1.5712 | 52 | 51.5703 |
| 5 | 6.6 | 6.6 | 13.2 | 1.7345 | 58 | 57.5207 |
| y Linear Regression of Y | on X | | | | | |
| | Slope, m | = | 41.44 | 175 In | tercept, b = - | 13.9650 |
| Correlation C | Coefficient* | = | 0.99 | 97 | | |
| Calibration | Accepted | = | Yes/A | lo ** | | |

| k | if C | Correlation | Coefficient | < 0.990. | check and | recalibration | again. |
|---|------|-------------|-------------|----------|-----------|---------------|--------|

Remarks: As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been

re-assigned from EL080 to HVS008 with respect to the update in quality management system.

 Calibrated by
 :
 Jackey MA
 Checked by
 :
 Pauline Wong

 Date
 :
 12-Sep-16
 Date
 :
 12-Sep-16



| Location | : | MA1w | Calibration Date | : | 11-Nov-16 |
|---------------|---|--------|----------------------|---|-----------|
| Equipment no. | : | HVS008 | Calibration Due Date | : | 11-Jan-17 |

CALIBRATION OF CONTINUOUS FLOW RECORDER

| Ambient Condition | | HK1610369 | | |
|-----------------------------|-----|---------------------|------|------|
| Temperature, T _a | 293 | Kelvin Pressure, Pa | 1019 | mmHg |

| | Orifi | ce Transfer Standar | d Information | | |
|-----------------------|-----------|-----------------------|---------------|---------------------------------|----------|
| Equipment No. | Ori002 | Slope, m _c | 2.10714 | Intercept, bc | -0.05158 |
| Last Calibration Date | 20-May-16 | | (HxPa/ | 1013.3 x 298 / T _a) | 1/2 |
| Next Calibration Date | 20-May-17 | | = m | $a_c \times Q_{std} + b_c$ | |

| | | | (| Calibration of TSP | | |
|---------------------------|-------------|---------------------|--------------|-------------------------|-----------------|---|
| Calibration | Mai | Manometer Reading | | Q std | Continuous Flow | IC |
| Point | н | H (inches of water) | | (m ³ / min.) | Recorder, W | (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) |
| | (up) | (down) | (difference) | X-axis | (CFM) | Y-axis |
| 1 | 1.6 | 1.6 | 3.2 | 0.8830 | 22 | 22.2492 |
| 2 | 2.4 | 2.4 | 4.8 | 1.0760 | 30 | 30.3399 |
| 3 | 3.8 | 3.8 | 7.6 | 1.3476 | 40 | 40.4532 |
| 4 | 4.9 | 4.9 | 9.8 | 1.5270 | 46 | 46.5211 |
| 5 | 6.1 | 6.1 | 12.2 | 1.7009 | 52 | 52.5891 |
| By Linear Regression of Y | on X | | | | | |
| | Slope, m | = | 36.88 | 392 In | tercept, b = | -9.7802 |
| Correlation C | oefficient* | = | 0.99 | 93 | * | |
| Calibration | Accepted | = | Yes/A | lo** | | |

| | : C | 0 | - 0 000 | | | |
|---|----------------|------------|----------|-----------|----------------------|--|
| - | if Correlation | Coemicient | < 0.990. | cneck and | recalibration again. | |

| Remarks: | As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been | |
|----------|--|--|
| | re-assigned from EL080 to HVS008 with respect to the update in quality management system. | |

 Calibrated by
 :
 Jackey MA
 Checked by
 :
 Pauline Wong

 Date
 :
 11-Nov-16
 Date
 :
 11-Nov-16



| Location | : | MA1e | Calbration Date | : | 12-Sep-16 |
|---------------|---|--------|---------------------|-----|-----------|
| Equipment no. | : | HVS007 | Calbration Due Date | : [| 13-Nov-16 |

CALIBRATION OF CONTINUOUS FLOW RECORDER

| | | Ambient Condition | | ga fazir a san a san |
|-----------------------------|-----|---------------------|------|----------------------|
| Temperature, T _a | 302 | Kelvin Pressure, Pa | 1010 | mmHg |

| | Orifi | ice Transfer Standa | ard Information | | |
|-----------------------|-----------|-----------------------|-----------------|-------------------------------|----------|
| Equipment No. | Ori002 | Slope, m _c | 2.10714 | Intercept, bc | -0.05158 |
| Last Calibration Date | 20-May-16 | | $(HxP_a/$ | $1013.3 \times 298 / T_a)$ | 1/2 |
| Next Calibration Date | 20-May-17 | | = <i>m</i> | $_{c} \times Q_{std} + b_{c}$ | |

| | | | | Calibration of TSP | | |
|------------------------|---------------------|------------|-------------------------|--------------------|---|---------|
| Calibration | Ma | nometer Re | eading | Q _{std} | Continuous Flow | IC |
| Point | H (inches of water) | | (m ³ / min.) | Recorder, W | (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) | |
| | (up) | (down) | (difference) | X-axis | (CFM) | Y-axis |
| 1 | 1.4 | 1.4 | 2.8 | 0.8120 | 19 | 18.8430 |
| 2 | 2.6 | 2.6 | 5.2 | 1.0977 | 31 | 30.7438 |
| 3 | 4.2 | 4.2 | 8.4 | 1.3886 | 44 | 43.6364 |
| 4 | 5.4 | 5.4 | 10.8 | 1.5712 | 54 | 53.5538 |
| 5 | 6.7 | 6.7 | 13.4 | 1.7474 | 62 | 61.4877 |
| Linear Regression of Y | on X | | | | | |
| | Slope, m | = | 45.9 | 175 Ir | ntercept, b = -1 | 9.1135 |

Correlation Coefficient* 0.9991 Yes/No** Calibration Accepted

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

As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been

re-assigned from EL455 to HVS007 with respect to the update in quality management system.

Pauline Wong Calibrated by Checked by Jackey MA 12-Sep-16 Date Date 12-Sep-16



| Location | : | MA1e | Calibration Date | : | 11-Nov-16 |
|---------------|---|--------|----------------------|-----|-----------|
| Equipment no. | : | HVS007 | Calibration Due Date | : [| 11-Jan-17 |

CALIBRATION OF CONTINUOUS FLOW RECORDER

| | | Ambient Condition | | |
|-----------------------------|-----|---------------------|------|------|
| Temperature, T _a | 293 | Kelvin Pressure, Pa | 1019 | mmHg |

| | Orif | ice Transfer Standa | rd Information | | |
|-----------------------|-----------|-----------------------|----------------|---------------------------------|----------|
| Equipment No. | Ori002 | Slope, m _c | 2.10714 | Intercept, bc | -0.05158 |
| Last Calibration Date | 20-May-16 | | $(HxP_a/$ | 1013.3 x 298 / T _a) | 1/2 |
| Next Calibration Date | 20-May-17 | | = <i>m</i> | $c \times Q_{std} + b_c$ | |

| | | | С | alibration of TSP | | |
|-------------------------------|------|------------------|-----------------|-------------------------|-------------|--|
| Calibration Manometer Reading | | Q _{std} | Continuous Flow | IC | | |
| Point | н | (inches of | water) | (m ³ / min.) | Recorder, W | (W(P _a /1013.3x298/T _a) ^{1/2} /35.31 |
| | (up) | (down) | (difference) | X-axis | (CFM) | Y-axis |
| 1 | 1.5 | 1.5 | 3.0 | 0.8558 | 28 | 28.3172 |
| 2 | 2.4 | 2.4 | 4.8 | 1.0760 | 32 | 32.3625 |
| 3 | 3.7 | 3.7 | 7.4 | 1.3301 | 40 | 40.4532 |
| 4 | 5.0 | 5.0 | 10.0 | 1.5422 | 46 | 46.5211 |
| 5 | 6.3 | 6.3 | 12.6 | 1.7281 | 52 | 52.5891 |

| By | Linear | Regression | of | Y | on X | |
|----|--------|------------|----|---|------|--|
|----|--------|------------|----|---|------|--|

Slope, m 28.3203 Intercept, b = 3.0496

Correlation Coefficient* 0.9964

Calibration Accepted Yes/No**

As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been re-assigned from EL455 to HVS007 with respect to the update in quality management system.

Calibrated by Jackey MA Checked by Pauline Wong Date 11-Nov-16 Date 11-Nov-16

^{*} if Correlation Coefficient < 0.990, check and recalibration again.