

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM1(ICC)
 Calibrated by : K.T.Ho
 Date : 16/02/2017

Sampler

Model : TE-5170
 Serial Number : S/N 0767

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 14 Mar 2016
 Slope (m) : 2.09532
 Intercept (b) : -0.03812
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition


Pa (hpa) : 1021
 Ta(K) : 290

| Resistance Plate | dH [green liquid] (inch water) | Z | X=Qstd (cubic meter/min) | IC (chart) | Y (corrected) |
|------------------|-----------------------------------|-------|-----------------------------|---------------|------------------|
| 1 18 holes | 10.2 | 3.250 | 1.577 | 59 | 60.04 |
| 2 13 holes | 8.4 | 2.950 | 1.434 | 52 | 52.92 |
| 3 10 holes | 6.2 | 2.534 | 1.237 | 44 | 44.78 |
| 4 7 holes | 4.4 | 2.135 | 1.047 | 36 | 36.64 |
| 5 5 holes | 2.6 | 1.641 | 0.812 | 26 | 26.46 |

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 43.452 Intercept(b): -8.903 Correlation Coefficient(r): 0.9997

Checked by: 
 Magnum Fan

Date: 18/02/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM1(ICC)
 Calibrated by : K.T.Ho
 Date : 12/04/2017

Sampler

Model : TE-5170
 Serial Number : S/N 0767

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 20 Mar 2017
 Slope (m) : 2.08464
 Intercept (b) : -0.03684
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition


Pa (hpa) : 1014
 Ta(K) : 292

| Resistance Plate | dH [green liquid] (inch water) | Z | X=Qstd (cubic meter/min) | IC (chart) | Y (corrected) |
|------------------|-----------------------------------|-------|-----------------------------|---------------|------------------|
| 1 18 holes | 10.0 | 3.196 | 1.551 | 57 | 57.61 |
| 2 13 holes | 8.2 | 2.894 | 1.406 | 50 | 50.54 |
| 3 10 holes | 6.0 | 2.476 | 1.205 | 42 | 42.45 |
| 4 7 holes | 4.2 | 2.071 | 1.011 | 34 | 34.36 |
| 5 5 holes | 2.4 | 1.566 | 0.769 | 22 | 22.24 |

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 44.426 Intercept(b): -11.359 Correlation Coefficient(r): 0.9991

Checked by: 
 Magnum Fan

Date: 18/04/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM2A (Harbourside)
 Calibrated by : K.T.Ho
 Date : 16/02/2017

Sampler

Model : TE-5170
 Serial Number : S/N 8919

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 14 Mar 2016
 Slope (m) : 2.10326
 Intercept (b) : -0.06696
 Correlation Coefficient(r) : 0.99989

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition


Pa (hpa) : 1021
 Ta(K) : 290

| Resistance Plate | dH [green liquid] (inch water) | Z | X=Qstd (cubic meter/min) | IC (chart) | Y (corrected) |
|------------------|-----------------------------------|-------|-----------------------------|---------------|------------------|
| 1 18 holes | 12.2 | 3.555 | 1.722 | 60 | 61.06 |
| 2 13 holes | 9.2 | 3.087 | 1.499 | 52 | 52.92 |
| 3 10 holes | 7.2 | 2.731 | 1.330 | 44 | 44.78 |
| 4 7 holes | 4.6 | 2.183 | 1.070 | 34 | 34.60 |
| 5 5 holes | 2.6 | 1.641 | 0.812 | 24 | 24.42 |

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 40.647 Intercept(b): -8.741 Correlation Coefficient(r): 0.9994

Checked by: 
 Magnum Fan

Date: 18/02/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM2A (Harbourside)
Calibrated by : K.T.Ho
Date : 12/04/2017

Sampler

Model : TE-5170
Serial Number : S/N 8919

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
Service Date : 20 Mar 2017
Slope (m) : 2.08464
Intercept (b) : -0.03684
Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1014
Ta(K) : 292

| Resistance Plate | dH [green liquid] (inch water) | Z | X=Qstd (cubic meter/min) | IC (chart) | Y (corrected) |
|------------------|-----------------------------------|-------|-----------------------------|---------------|------------------|
| 1 18 holes | 11.8 | 3.472 | 1.683 | 54 | 54.58 |
| 2 13 holes | 8.8 | 2.998 | 1.456 | 46 | 46.49 |
| 3 10 holes | 6.8 | 2.636 | 1.282 | 39 | 39.42 |
| 4 7 holes | 4.2 | 2.071 | 1.011 | 30 | 30.32 |
| 5 5 holes | 2.2 | 1.499 | 0.737 | 21 | 21.23 |

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 35.358 Intercept(b): -5.218 Correlation Coefficient(r): 0.9994

Checked by: 
Magnum Fan

Date: 18/04/2017



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

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 14, 2016 Rootsmeter S/N 0438320 Ta (K) - 295
 Operator Tisch Orifice I.D. - 2454 Pa (mm) - 745.49

| PLATE OR Run # | VOLUME START (m3) | VOLUME STOP (m3) | DIFF VOLUME (m3) | DIFF TIME (min) | METER DIFF Hg (mm) | ORFICE DIFF H2O (in.) |
|----------------|-------------------|------------------|------------------|-----------------|--------------------|-----------------------|
| 1 | NA | NA | 1.00 | 1.4020 | 3.2 | 2.00 |
| 2 | NA | NA | 1.00 | 1.0060 | 6.4 | 4.00 |
| 3 | NA | NA | 1.00 | 0.9010 | 7.9 | 5.00 |
| 4 | NA | NA | 1.00 | 0.8590 | 8.8 | 5.50 |
| 5 | NA | NA | 1.00 | 0.7090 | 12.8 | 8.00 |

DATA TABULATION

| Vstd | (x axis) Qstd | (y axis) | Va | (x axis) Qa | (y axis) |
|-------------------------------------|---------------|----------|---------------------------|-------------|----------|
| 0.9866 | 0.7037 | 1.4078 | 0.9957 | 0.7102 | 0.8896 |
| 0.9824 | 0.9765 | 1.9909 | 0.9914 | 0.9855 | 1.2581 |
| 0.9803 | 1.0880 | 2.2259 | 0.9893 | 1.0980 | 1.4066 |
| 0.9792 | 1.1399 | 2.3345 | 0.9882 | 1.1504 | 1.4753 |
| 0.9738 | 1.3735 | 2.8155 | 0.9828 | 1.3862 | 1.7792 |
| Qstd slope (m) = 2.10326 | | | Qa slope (m) = 1.31703 | | |
| intercept (b) = -0.06696 | | | intercept (b) = -0.04232 | | |
| coefficient (r) = 0.99989 | | | coefficient (r) = 0.99989 | | |
| y axis = SQRT[H2O(Pa/760) (298/Ta)] | | | y axis = SQRT[H2O(Ta/Pa)] | | |

CALCULATIONS

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

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

For subsequent flow rate calculations:

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



TISCH ENVIRONMENTAL, INC.
 145 SOUTH MIAMI AVE
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 513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 20, 2017 Rootsmeter S/N 0438320 Ta (K) - 293
 Operator Tisch Orifice I.D. - 2454 Pa (mm) - 759.46

| PLATE OR Run # | VOLUME START (m3) | VOLUME STOP (m3) | DIFF VOLUME (m3) | DIFF TIME (min) | METER | ORFICE |
|----------------|-------------------|------------------|------------------|-----------------|--------------|----------------|
| | | | | | DIFF Hg (mm) | DIFF H2O (in.) |
| 1 | NA | NA | 1.00 | 1.4390 | 3.2 | 2.00 |
| 2 | NA | NA | 1.00 | 1.0240 | 6.4 | 4.00 |
| 3 | NA | NA | 1.00 | 0.9170 | 7.9 | 5.00 |
| 4 | NA | NA | 1.00 | 0.8730 | 8.8 | 5.50 |
| 5 | NA | NA | 1.00 | 0.7200 | 12.8 | 8.00 |

DATA TABULATION

| Vstd | (x axis) Qstd | (y axis) | Va | (x axis) Qa | (y axis) |
|-------------------------------------|---------------|----------|---------------------------|-------------|----------|
| 1.0120 | 0.7033 | 1.4257 | 0.9958 | 0.6920 | 0.8784 |
| 1.0078 | 0.9842 | 2.0163 | 0.9916 | 0.9683 | 1.2423 |
| 1.0057 | 1.0967 | 2.2543 | 0.9895 | 1.0791 | 1.3889 |
| 1.0045 | 1.1507 | 2.3643 | 0.9884 | 1.1322 | 1.4567 |
| 0.9992 | 1.3878 | 2.8514 | 0.9831 | 1.3654 | 1.7568 |
| Qstd slope (m) = 2.08464 | | | Qa slope (m) = 1.30537 | | |
| intercept (b) = -0.03684 | | | intercept (b) = -0.02270 | | |
| coefficient (r) = 0.99994 | | | coefficient (r) = 0.99994 | | |
| y axis = SQRT[H2O(Pa/760) (298/Ta)] | | | y axis = SQRT[H2O(Ta/Pa)] | | |

CALCULATIONS

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

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

For subsequent flow rate calculations:

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

CALIBRATION CERTIFICATE

Date: December 21, 2016

| | |
|------------------------|---------------------------------------|
| Equipment Name | : Digital Dust Indicator, Model LD-3B |
| Code No. | : 080000-42 |
| Quantity | : 1 unit |
| Serial No. | : 276020 |
| Sensitivity | : 0.001 mg/m ³ |
| Sensitivity Adjustment | : 787CPM |
| Scale Setting | : December 16, 2016 |

We hereby certify that the above mentioned instrument has been calibrated satisfactorily.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Shintaro Okamura

Shintaro Okamura

Overseas Sales Division

TEST CERTIFICATE

Report No. 16-1879-1.

CUSTOMER : INNOTECH INSTRUMENTATION CO.LTD.



SIBATA SCIENTIFIC TECHNOLOGY LTD.
DATE 19/ December /2016

| | | |
|----------------|-----------------|---------------|
| APPROVE BY | VERIFIED BY | ISSUED BY |
|----------------|-----------------|---------------|

| | |
|------------------|--------------------------|
| PRODUCT NAME | : Digital Dust Indicator |
| MODEL NUMBER | : LD-3B |
| SERIAL NUMBER | : 276020 |
| CALIBRATION DATE | : 16- December -2016 |

| Testing Category | Judging Standard | Judgment | | |
|------------------------------|--|--------------------|----------------------------|----------------------|
| | | Reading of Master | Reading of this Instrument | Correction |
| Function Test | Switch, Display, Wiring will normally function | OK | | |
| Sensitivity Calibration | Count is $\pm 2\%$ accurate to the master by the standard calibration particle | 799 CPM | 795 CPM | -0.5 % |
| Dust Concentration Measuring | Count is $\pm 10\%$ accurate to the master under the 3 different concentration. | 2053 CPM | 1979 CPM | -3.6 % |
| | | 978 CPM | 957 CPM | -2.1 % |
| Reproducibility | The difference between maximum and minimum value of sensitivity adjustment scale setting must be 5.0 % or less of maximum value. (The results of measurement of sensitivity adjustment in 5 times are within this range.) | 516 CPM | 507 CPM | -1.7 % |
| | | OK | | |
| Synthetic Judgment | | Good | | |
| | | Reference Value(S) | | 787 CPM |
| | | Test atmosphere | | Temperature Humidity |
| | | 23 °C | 45 % | |


REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO. : HK1710039
 PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 17/01/2017
 CUSTOMER : Envirotech Services Company
 ADDRESS : Rm. 113, 1/F., MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T.

REPORT NO. : HK1710039
 PROJECT ITEM NO. : HK1710039-01
PERFORMANCE CHECK / CALIBRATED EQUIPMENT
 TYPE : Digital Dust Indicator
 MANUFACTURER : SIBATA
 MODEL NO. : LD-3B
 SERIAL NO. : 276020
 EQUIPMENT NO. : ---
 RECEIPT DATE : 11/01/2017
 PERFORMANCE CHECK / CALIBRATION DATE : 12/01/2017

PERFORMANCE CHECK / CALIBRATION Information

| CODE | Calibration Parameter | Method Procedure | Reference Method |
|----------------|---|------------------|--|
| Dust PC/CAL | Performance Check / Calibration of Dust Meter | CAL003 | General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK |

- Notes :
1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory

Issue Date:

17/01/2017

 Wong Po Yan Pauline
 (Testing Engineer)


REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 17/01/2017
 REPORT NO. : HK1710039

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE : Digital Dust Indicator
 MANUFACTURER : SIBATA
 MODEL NO. : LD-3B
 SERIAL NO. : 276020
 EQUIPMENT NO. : ---
 SENSITIVITY ADJUSTMENT : ---
 PERFORMANCE CHECK / CALIBRATION DATE : 12/01/2017

STANDARD EQUIPMENT

TYPE : HIGH VOLUME AIR SAMPLER
 MANUFACTURER : TISCH
 MODEL NO. : TE-5170
 EQUIPMENT REF NO. : PTL_HV002
 LAST CALIBRATION DATE : 23/11/2016

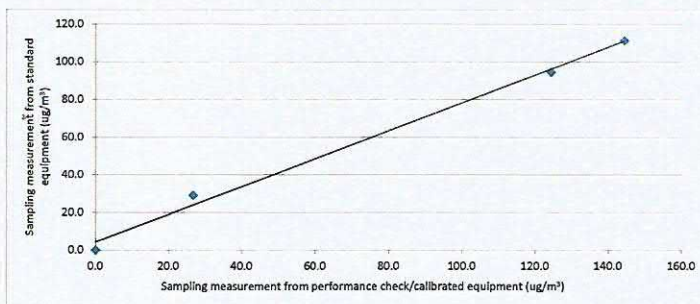
EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

Sensitivity Adjustment Scale Setting (Before Performance check / Calibration): 787 CPM
 Sensitivity Adjustment Scale Setting (After Performance check / Calibration): 787 CPM

| Trial no. in 1-hr period | Time | Mean Temp (°C) | Mean Pressure (hPa) | Concentration in ug/m ³ (Standard equipment) (Y - Axis) | Total Count ² (Performance Check / Calibrated equipment) | Concentration in Count/Minute ³ (Performance Check / Calibrated equipment) (X - Axis) |
|--------------------------|------------------------|----------------|---------------------|--|--|--|
| Zero Check ¹ | 12/01/2017,10:00:00 AM | 19 | 1016 | 0 | 0 | 0 |
| 1 | 12/01/2017,11:10:00 AM | 19 | 1016 | 95 | 7462 | 124 |
| 2 | 12/01/2017,2:30:00 PM | 19 | 1016 | 111 | 8670 | 145 |
| 3 | 12/01/2017,3:34:00 PM | 19 | 1016 | 29 | 1600 | 27 |

Linear Regression of Y on X

Slope (K- factor) : 0.7
 Correlation Coefficient : 0.9972
 Validity of Performance Check / Calibration Record : 12/01/2018



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
 2. Total Count was measured by Digital Dust Indicator.
 3. Count/minute was calculated by (Total Count/60)
 4. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 5. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: MA Ching Him, Jackey Signature: [Signature] Date: 12/01/2017

Checked by: Wong Po Yan, Pauline Signature: [Signature] Date: 17/01/2017

CALIBRATION CERTIFICATE

Date: December 21, 2016

| | | |
|------------------------|---|-------------------------------------|
| Equipment Name | : | Digital Dust Indicator, Model LD-3B |
| Code No. | : | 080000-42 |
| Quantity | : | 1 unit |
| Serial No. | : | 2Z6240 |
| Sensitivity | : | 0.001 mg/m ³ |
| Sensitivity Adjustment | : | 565CPM |
| Scale Setting | : | December 16, 2016 |

We hereby certify that the above mentioned instrument has been calibrated satisfactorily.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Shintaro Okamura

Shintaro Okamura

Overseas Sales Division

TEST CERTIFICATE

Report No. 16-1879-2

CUSTOMER : INNOTECH INSTRUMENTATION CO.LTD.



SIBATA SCIENTIFIC TECHNOLOGY LTD.

DATE 19/ December /2016

| | | |
|----------------|-----------------|---------------|
| APPROVE BY | VERIFIED BY | ISSUED BY |
|----------------|-----------------|---------------|

| | |
|------------------|--------------------------|
| PRODUCT NAME | : Digital Dust Indicator |
| MODEL NUMBER | : LD-3B |
| SERIAL NUMBER | : 2Z6240 |
| CALIBRATION DATE | : 16-- December --2016 |

| Testing Category | Judging Standard | Judgment | | | Inspection chart |
|------------------------------|--|-------------------|----------------------------|------------|--|
| | | Reading of Master | Reading of this Instrument | Correction | |
| Function Test | Switch, Display, Wiring will normally function | OK | | | Reference Value(S) 565 CPM Test atmosphere Temperature Humidity 23 °C 45 % |
| Sensitivity Calibration | Count is $\pm 2\%$ accurate to the master by the standard calibration particle | 798 CPM | 796 CPM | -0.3 % | |
| Dust Concentration Measuring | Count is $\pm 10\%$ accurate to the master under the 3 different concentration. | 2053 CPM | 1989 CPM | -3.1 % | |
| Reproducibility | The difference between maximum and minimum value of sensitivity adjustment scale setting must be 5.0 % or less of maximum value. (The results of measurement of sensitivity adjustment in 5 times are within this range.) | 978 CPM | 966 CPM | -1.2 % | |
| | Synthetic Judgment | 516 CPM | 515 CPM | -0.2 % | OK |
| Good | | | | | |


REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO. : HK1710040
PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE : 17/01/2017

CUSTOMER : Envirotech Services Company
ADDRESS : Rm. 113, 1/F., MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T.

REPORT NO. : HK1710040
PROJECT ITEM NO. : HK1710040-01
PERFORMANCE CHECK / CALIBRATED EQUIPMENT
TYPE : Digital Dust Indicator
MANUFACTURER : SIBATA
MODEL NO. : LD-3B
SERIAL NO. : 2Z6240
EQUIPMENT NO. : ---
RECEIPT DATE : 11/01/2017
PERFORMANCE CHECK / CALIBRATION DATE : 12/01/2017

PERFORMANCE CHECK / CALIBRATION Information

| CODE | Calibration Parameter | Method Procedure | Reference Method |
|----------------|---|------------------|--|
| Dust PC/CAL | Performance Check / Calibration of Dust Meter | CAL003 | General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK |

- Notes :
1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory :

Issue Date: 17/01/2017

 Wong Po Yan Pauline
 (Testing Engineer)


REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 17/01/2017
 REPORT NO. : HK1710040

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE : Digital Dust Indicator
 MANUFACTURER : SIBATA
 MODEL NO. : LD-3B
 SERIAL NO. : 2Z6240
 EQUIPMENT NO. : ---
 SENSITIVITY ADJUSTMENT : ---
 PERFORMANCE CHECK / CALIBRATION DATE : 12/01/2017

STANDARD EQUIPMENT

TYPE : HIGH VOLUME AIR SAMPLER
 MANUFACTURER : TISCH
 MODEL NO. : TE-5170
 EQUIPMENT REF NO. : PTL_HV002
 LAST CALIBRATION DATE : 23/11/2016

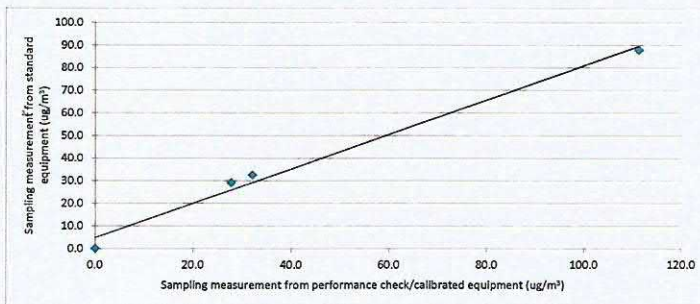
EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

Sensitivity Adjustment Scale Setting (Before Performance check / Calibration): 565 CPM
 Sensitivity Adjustment Scale Setting (After Performance check / Calibration): 565 CPM

| Trial no. in 1-hr period | Time | Mean Temp (°C) | Mean Pressure (hPa) | Concentration in ug/m ³ (Standard equipment) (Y - Axis) | Total Count ² (Performance Check / Calibrated equipment) | Concentration in Count/Minute ³ (Performance Check / Calibrated equipment) (X - Axis) |
|--------------------------|-------------------------|----------------|---------------------|--|--|--|
| Zero Check ¹ | 12/01/2017, 10:00:00 AM | 19 | 1016 | 0 | 0 | 0 |
| 1 | 12/01/2017, 12:15:00 PM | 19 | 1016 | 88 | 6680 | 111 |
| 2 | 12/01/2017, 1:25:00 PM | 19 | 1016 | 33 | 1924 | 32 |
| 3 | 12/01/2017, 3:34:00 PM | 19 | 1016 | 29 | 1664 | 28 |

Linear Regression of Y on X

Slope (K- factor) : 0.8
 Correlation Coefficient : 0.9940
 Validity of Performance Check / Calibration Record : 12/01/2018



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
 2. Total Count was measured by Digital Dust Indicator.
 3. Count/minute was calculated by (Total Count/60)
 4. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 5. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: MA Ching Him, Jackey Signature: _____ Date: 12/01/2017

Checked by: Wong Po Yan, Pauline Signature:  Date: 17/01/2017



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration 校正證書

Certificate No. : C164166
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-1465) Date of Receipt / 收件日期 : 20 July 2016

Description / 儀器名稱 : Precision Integrating Sound Level Meter
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-18
Serial No. / 編號 : 00360030
Supplied By / 委託者 : Envirotech Services Co.
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

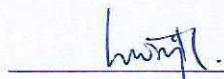
DATE OF TEST / 測試日期 : 29 July 2016

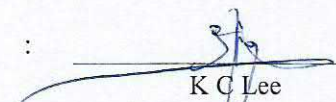
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : _____
H T Wong
Technical Officer

Certified By : 
核證 : _____
K C Lee
Project Engineer

Date of Issue : 1 August 2016
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C164166
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration was performed before the test.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

| Equipment ID | Description | Certificate No. |
|--------------|-------------------------------------|-----------------|
| CL280 | 40 MHz Arbitrary Waveform Generator | C160077 |
| CL281 | Multifunction Acoustic Calibrator | PA160023 |

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | | |
| 50 - 110 | LA | A | Fast | 94.00 | 1 | 94.4 | ± 0.7 |

- 6.1.2 Linearity

| UUT Setting | | | | Applied Value | | UUT Reading (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | |
| 60 - 120 | LA | A | Fast | 94.00 | 1 | 94.4 (Ref.) |
| | | | | 104.00 | | 104.4 |
| | | | | 114.00 | | 114.4 |

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

- 6.2 Time Weighting

- 6.2.1 Continuous Signal

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | | |
| 50 - 110 | LA | A | Fast | 94.00 | 1 | 94.4 | Ref. |
| | | | Slow | | | 94.4 | ± 0.1 |

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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6.2.2 Tone Burst Signal (2 kHz)

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|----------------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Burst Duration | | |
| 50 -110 | LA | A | Fast | 106.00 | Continuous | 106.0 | Ref. |
| | LAmx | | | | 200 ms | 105.1 | -1.0 ± 1.0 |
| | LA | Slow | Continuous | | 106.0 | Ref. | |
| | LAmx | | 500 ms | | 102.4 | -4.1 ± 1.0 | |

6.3 Frequency Weighting

6.3.1 A-Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|----------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. | | |
| 50 - 110 | LA | A | Fast | 94.00 | 31.5 Hz | 54.7 | -39.4 ± 1.5 |
| | | | | | 63 Hz | 68.0 | -26.2 ± 1.5 |
| | | | | | 125 Hz | 78.0 | -16.1 ± 1.0 |
| | | | | | 250 Hz | 85.6 | -8.6 ± 1.0 |
| | | | | | 500 Hz | 91.1 | -3.2 ± 1.0 |
| | | | | | 1 kHz | 94.4 | Ref. |
| | | | | | 2 kHz | 95.7 | +1.2 ± 1.0 |
| | | | | | 4 kHz | 95.5 | +1.0 ± 1.0 |
| | | | | | 8 kHz | 93.3 | -1.1 (+1.5 ; -3.0) |
| | | | | | 12.5 kHz | 90.1 | -4.3 (+3.0 ; -6.0) |

6.3.2 C-Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|----------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. | | |
| 50 - 110 | LC | C | Fast | 94.00 | 31.5 Hz | 91.3 | -3.0 ± 1.5 |
| | | | | | 63 Hz | 93.5 | -0.8 ± 1.5 |
| | | | | | 125 Hz | 94.2 | -0.2 ± 1.0 |
| | | | | | 250 Hz | 94.4 | 0.0 ± 1.0 |
| | | | | | 500 Hz | 94.5 | 0.0 ± 1.0 |
| | | | | | 1 kHz | 94.4 | Ref. |
| | | | | | 2 kHz | 94.3 | -0.2 ± 1.0 |
| | | | | | 4 kHz | 93.6 | -0.8 ± 1.0 |
| | | | | | 8 kHz | 91.4 | -3.0 (+1.5 ; -3.0) |
| | | | | | 12.5 kHz | 88.1 | -6.2 (+3.0 ; -6.0) |

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Certificate of Calibration

校正證書

Certificate No. : C164166

證書編號

6.4 Time Averaging

| UUT Setting | | | | Applied Value | | | | | UUT | IEC 60804 |
|-------------|------|---------------------|------------------|---------------|---------------------|-------------------|------------------|-----------------------|--------------|-------------------|
| Range (dB) | Mode | Frequency Weighting | Integrating Time | Freq. (kHz) | Burst Duration (ms) | Burst Duty Factor | Burst Level (dB) | Equivalent Level (dB) | Reading (dB) | Type 1 Spec. (dB) |
| 50 - 110 | LAeq | A | 10 sec. | 4 | 1 | | 110 | 100 | 100.1 | ± 0.5 |
| | | | 60 sec. | | | | | 90 | 89.9 | ± 0.5 |
| | | | 5 min. | | | | | 80 | 79.6 | ± 1.0 |
| | | | | | | | | 70 | 69.7 | ± 1.0 |

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 307435

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

| | | |
|--------|------------------------|---|
| 94 dB | 31.5 Hz - 125 Hz | : ± 0.35 dB |
| | 250 Hz - 500 Hz | : ± 0.30 dB |
| | 1 kHz | : ± 0.20 dB |
| | 2 kHz - 4 kHz | : ± 0.35 dB |
| | 8 kHz | : ± 0.45 dB |
| | 12.5 kHz | : ± 0.70 dB |
| 104 dB | : 1 kHz | : ± 0.10 dB (Ref. 94 dB) |
| 114 dB | : 1 kHz | : ± 0.10 dB (Ref. 94 dB) |
| | Burst equivalent level | : ± 0.2 dB (Ref. 110 dB continuous sound level) |

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C163248

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-1307) Date of Receipt / 收件日期 : 10 June 2016

Description / 儀器名稱 : Sound Level Calibrator
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-73
Serial No. / 編號 : 10997142
Supplied By / 委託者 : Envirotech Services Co.
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 15 June 2016


TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).


The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

17 June 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Page 1 of 2

Certificate of Calibration

校正證書

Certificate No. : C163248
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

| Equipment ID | Description | Certificate No. |
|--------------|-----------------------------------|-----------------|
| CL130 | Universal Counter | C153519 |
| CL281 | Multifunction Acoustic Calibrator | PA160023 |
| TST150A | Measuring Amplifier | C161175 |

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

| UUT Nominal Value | Measured Value (dB) | Mfr's Spec. (dB) | Uncertainty of Measured Value (dB) |
|----------------------|------------------------|---------------------|---------------------------------------|
| 94 dB, 1 kHz | 93.7 | ± 0.5 | ± 0.2 |

5.2 Frequency Accuracy

| UUT Nominal Value (kHz) | Measured Value (kHz) | Mfr's Spec. | Uncertainty of Measured Value (Hz) |
|----------------------------|-------------------------|-----------------|---------------------------------------|
| 1 | 0.985 | 1 kHz $\pm 2\%$ | ± 1 |

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

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