High-Volume TSP Sampler
5-Point Calibration Record

Location : AM1(ICC)
Calibrated by : K.T.Ho
Date : 12/02/2018

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) : 1022
Ta(K) : 290

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.2	3.408	1.652	58	59.06
2	13 holes	8.2	2.916	1.416	50	50.91
3	10 holes	6.2	2.535	1.234	42	42.76
4	7 holes	4.4	2.136	1.042	34	34.62
5	5 holes	2.6	1.642	0.805	22	22.40

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

Sampler Calibration Relationship

Slope(m):43.329 Intercept(b): -11.344 Correlation Coefficient(r): 0.9972

Checked by: Date: 13/02/2018
Magnum Fan

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	AM1(ICC)
Calibrated by	:	K.T.Ho
Date	:	12/04/2018

Sampler

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

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	19 Mar 2018
Slope (m)	:	2.05242
Intercept (b)	:	-0.01383
Correlation Coefficient(r)	:	0.99994

Standard Condition

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

Calibration Condition

Pa (hpa)	:	1012
Ta(K)	:	299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	10.2	3.187	1.559	58	57.87
2	13 holes	7.5	2.733	1.338	50	49.89
3	10 holes	5.6	2.361	1.157	42	41.91
4	7 holes	3.8	1.945	0.954	34	33.93
5	5 holes	2.6	1.609	0.791	24	23.95

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

Sampler Calibration Relationship

Slope(m):43.447 Intercept(b): -8.889 Correlation Coefficient(r): 0.9959

Checked by: Magnum Fan Date: 14/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	AM2A (Harbourside)
Calibrated by	:	K.T.Ho
Date	:	12/02/2018

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)	:	1022
Ta(K)	:	290

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.4	3.438	1.667	62	63.13
2	13 holes	9.0	3.055	1.483	56	57.02
3	10 holes	6.4	2.576	1.253	48	48.87
4	7 holes	4.2	2.087	1.019	36	36.65
5	5 holes	2.2	1.510	0.742	26	26.47

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

Sampler Calibration Relationship

Slope(m):40.581 Intercept(b):-3.598 Correlation Coefficient(r): 0.9973

Checked by:_____ Date: 13/02/2018
Magnum Fan

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	AM2A (Harbourside)
Calibrated by	:	K.T.Ho
Date	:	12/04/2018

Sampler

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

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	19 Mar 2018
Slope (m)	:	2.05242
Intercept (b)	:	-0.01383
Correlation Coefficient(r)	:	0.99994

Standard Condition

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

Calibration Condition

Pa (hpa)	:	1012
Ta(K)	:	299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.0	3.457	1.691	60	59.87
2	13 holes	8.2	2.857	1.399	52	51.89
3	10 holes	6.2	2.485	1.217	44	43.90
4	7 holes	4.0	1.996	0.979	34	33.93
5	5 holes	2.4	1.546	0.760	24	23.95

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

Sampler Calibration Relationship

Slope(m):39.142 Intercept(b):-4.264 Correlation Coefficient(r): 0.9949

Checked by:_____ Date: 14/04/2018
Magnum Fan

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

TISCH Environmental

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 DIFF Hg (mm)	ORFICE 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}

TISCH Environmental

RECALIBRATION DUE DATE:
March 19, 2019

Certificate of Calibration

Calibration Certification Information					
Cal. Date:	March 19, 2018	**Rootsmeter S/N:** 438320	**Ta:** 294	°K
Operator:	Jim Tisch		**Pa:** 746.8	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **2454**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4300	3.2	2.00
2	3	4	1	1.0040	6.4	4.00
3	5	6	1	0.9030	7.9	5.00
4	7	8	1	0.8590	8.7	5.50
5	9	10	1	0.7080	12.8	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
0.9917	0.6935	1.4113	0.9957	0.6963	0.8874
0.9874	0.9835	1.9959	0.9914	0.9875	1.2549
0.9854	1.0913	2.2315	0.9894	1.0957	1.4030
0.9843	1.1459	2.3405	0.9883	1.1506	1.4715
0.9789	1.3826	2.8227	0.9829	1.3882	1.7747
QSTD	**m=**	**2.05242**	**QA**	**m=**	**1.28519**
	b=	**-0.01383**		**b=**	**-0.00869**
	r=	**0.99994**		**r=**	**0.99994**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

Qstd= $1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

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

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009

SIBATA

SIBATA SCIENTIFIC TECHNOLOGY LTD.
1-1-62, Nakane, Soka, Saitama, 340-0005 Japan
TEL : 048-933-1582 FAX : 048-933-1591

CALIBRATION CERTIFICATE

Date: July 27, 2017

Equipment Name	:	Digital Dust Indicator, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	245833
Sensitivity	:	0.001 mg/m3
Sensitivity Adjustment	:	711CPM
Scale Setting	:	Jul 25, 2017

We hereby certify that the avobe mentioned instrment has been calibrated satisfactory.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Tong Zhang

Tong Zhang
Overseas Sales Division

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO.	: HK1710682
PROJECT NAME	: PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE	: 21/8/2017
CUSTOMER	: Envirotech Services Company
ADDRESS	: Rm. 113, 1/F., MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T.

REPORT NO.	: HK1710682
PROJECT ITEM NO.	: HK1710682-01
PERFORMANCE CHECK / CALIBRATED EQUIPMENT	
TYPE	: Digital Dust Indicator
MANUFACTURER	: SIBATA
MODEL NO.	: LD-3B
SERIAL NO.	: 245833
EQUIPMENT NO.	: ---
RECEIPT DATE	: 18/8/2017
PERFORMANCE CHECK / CALIBRATION DATE	: 18/8/2017

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: 21/8/2017

Wong Po Yan Pauline
(Assistant Laboratory Manager)

PILOT TESTING

REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME	:	PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE	:	21/8/2017
REPORT NO.	:	HK1710682

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE	:	Digital Dust Indicator
MANUFACTURER	:	SIBATA
MODEL NO.	:	LD-3B
SERIAL NO.	:	245833
EQUIPMENT NO.	:	---
SENSITIVITY ADJUSTMENT	:	---
PERFORMANCE CHECK / CALIBRATION DATE	:	18/8/2017

STANDARD EQUIPMENT

	:	
TYPE	:	HIGH VOLUME AIR SAMPLER
MANUFACTURER	:	TISCH
MODEL NO.	:	TE-5170
EQUIPMENT REF NO.	:	PTL_HV002
LAST CALIBRATION DATE	:	31/7/2017

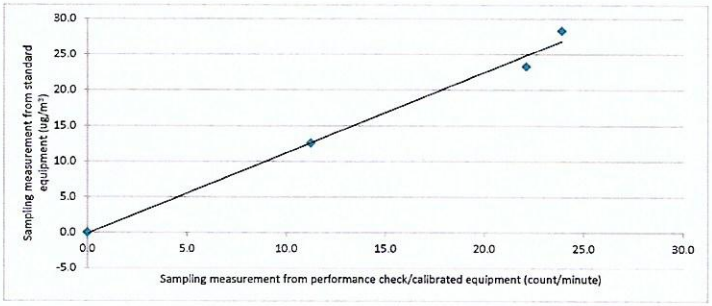
EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

Sensitivity Adjustment Scale Setting (Before Performance check / Calibration): 712 CPM
Sensitivity Adjustment Scale Setting (After Performance check / Calibration): 712 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]	18/8/2017,1:15:00 PM	30.4	1010	0	0	0
1	18/8/2017,2:19:00 PM	30.4	1010	23	1327	22
2	18/8/2017,3:24:00 PM	30.4	1010	28	1434	24
3	18/8/2017,4:29:00 PM	30.4	1010	13	674	11

Linear Regression of Y on X

Slope (K- factor)	:	1.1
Correlation Coefficient	:	0.9953
Validity of Performance Check / Calibration Record	:	18/8/2018



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 calcuated 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: Lau, Natalie Signature: Natalie Date: 18/8/2017

Checked by: Wong Po Yan, Pauline Signature: Date: 21/8/2017

SIBATA

SIBATA SCIENTIFIC TECHNOLOGY LTD.
1-1-62, Nakane, Soka, Saitama, 340-0005 Japan
TEL : 048-933-1582 FAX : 048-933-1591

CALIBRATION CERTIFICATE

Date: July 27, 2017

Equipment Name	:	Digital Dust Indicator, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	276015
Sensitivity	:	0.001 mg/m3
Sensitivity Adjustment	:	721CPM
Scale Setting	:	Jul 6, 2017

We hereby certify that the avobe mentioned instrment has been calibrated satisfactory.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Tong Zhang

Tong Zhang
Overseas Sales Division

PILOT TESTING

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO.	: HK1710683
PROJECT NAME	: PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE	: 21/8/2017
CUSTOMER	: Envirotech Services Company
ADDRESS	: Rm. 113, 1/F., MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T.

REPORT NO.	: HK1710683
PROJECT ITEM NO.	: HK1710683-01
PERFORMANCE CHECK / CALIBRATED EQUIPMENT	
TYPE	: Digital Dust Indicator
MANUFACTURER	: SIBATA
MODEL NO.	: LD-3B
SERIAL NO.	: 276015
EQUIPMENT NO.	: ---
RECEIPT DATE	: 18/8/2017
PERFORMANCE CHECK / CALIBRATION DATE	: 18/8/2017

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 : Wong Po Yan Pauline
(Assistant Laboratory Manager)

Issue Date: 21/8/2017

PILOT TESTING

REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME	:	PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE	:	21/8/2017
REPORT NO.	:	HK1710683

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE	:	Digital Dust Indicator
MANUFACTURER	:	SIBATA
MODEL NO.	:	LD-3B
SERIAL NO.	:	276015
EQUIPMENT NO.	:	---
SENSITIVITY ADJUSTMENT	:	---
PERFORMANCE CHECK / CALIBRATION DATE	:	18/8/2017

STANDARD EQUIPMENT

TYPE	:	HIGH VOLUME AIR SAMPLER
MANUFACTURER	:	TISCH
MODEL NO.	:	TE-5170
EQUIPMENT REF NO.	:	PTL_HV002
LAST CALIBRATION DATE	:	31/7/2017

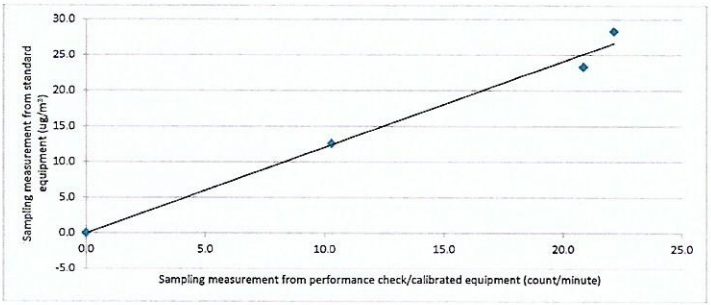
EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

Sensitivity Adjustment Scale Setting (Before Performance check / Calibration): 721 CPM
Sensitivity Adjustment Scale Setting (After Performance check / Calibration): 721 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]	18/8/2017,1:15:00 PM	30.4	1010	0	0	0
1	18/8/2017,2:19:00 PM	30.4	1010	23	1252	21
2	18/8/2017,3:24:00 PM	30.4	1010	28	1329	22
3	18/8/2017,4:29:00 PM	30.4	1010	13	618	10

Linear Regression of Y on X

Slope (K- factor)	:	1.2
Correlation Coefficient	:	0.9937
Validity of Performance Check / Calibration Record	:	18/8/2018



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 calcuated 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: Lau, Natalie Signature: Natalie Date: 18/8/2017

Checked by: Wong Po Yan, Pauline Signature: Date: 21/8/2017

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. : C174093
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1613) Date of Receipt / 收件日期 : 11 July 2017

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

DATE OF TEST / 測試日期 : 22 July 2017

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification. (after adjustment)
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
Engineer

Date of Issue 簽發日期 : 24 July 2017

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 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel 電話: 2927 2606 Fax 傳真: 2744 8986 E-mail 電郵: callab@suncreation.com Website 網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C174093
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 using the internal standard (After Adjustment) was performed before the test from 6.1.1.2 to 6.4.

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	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Adjustment

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	* 92.9	± 0.7

* Out of IEC 60651 Type 1 Spec.

6.1.1.2 After Adjustment

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	94.1	± 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	94.1 (Ref.)
				104.00		104.1
				114.00		114.1

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

Certificate of Calibration
校正證書

Certificate No. : C174093
證書編號

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	94.1	Ref.
			Slow			94.0	± 0.1

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	54.5	-39.4 ± 1.5
					63 Hz	67.7	-26.2 ± 1.5
					125 Hz	77.7	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	95.4	+1.2 ± 1.0
					4 kHz	95.1	+1.0 ± 1.0
					8 kHz	93.0	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

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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	90.9	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.0
					250 Hz	94.1	0.0 ± 1.0
					500 Hz	94.2	0.0 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	94.0	-0.2 ± 1.0
					4 kHz	93.3	-0.8 ± 1.0
					8 kHz	91.1	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Integrating Time	Freq. (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
50 - 110	LAeq	A	10 sec.	4	1	1/10	110	100	100.1	± 0.5
						$1/10^2$		90	90.1	± 0.5
			60 sec.			$1/10^3$		80	79.5	± 1.0
			5 min.			$1/10^4$		70	69.8	± 1.0

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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 :
Only the original copy or the laboratory's certified true copy is valid.

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.

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ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1613) Date of Receipt / 收件日期 : 11 July 2017

Description / 儀器名稱	:	Sound Level Calibrator
Manufacturer / 製造商	:	Rion
Model No. / 型號	:	NC-73
Serial No. / 編號	:	10786708
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 : 22 July 2017

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
Engineer

Date of Issue 簽發日期 : 24 July 2017

Sun Creation Engineering Limited Calibration & Testing Laboratory
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1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. 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	94.0	± 0.5	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.986	1 kHz ± 2 %	± 1

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

Note :
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