

Certificate of Calibration

校正證書

Certificate No. : C133030

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-1223)

Description / 儀器名稱 : Acoustical Calibrator

Manufacturer / 製造商 : Brüel & Kjær

Model No. / 型號 : 4231

Serial No. / 編號 : 3003246

Supplied By / 委託者 : Atkins China Limited

13/F, Wharf T&T Centre, Harbour City, Tsim Sha Tsui, Kowloon

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

DATE OF TEST / 測試日期 : 21 May 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

All results are within manufacturer's specification.

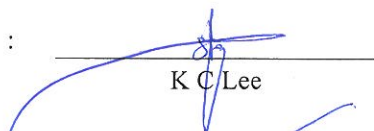
The results are detailed in the subsequent page(s).

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

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

Tested By

測試


K C Lee

Certified By

核證


K M Wu

Date of Issue :
簽發日期

23 May 2013

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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

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- 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	C123541
CL281	Multifunction Acoustic Calibrator	DC110233
TST150A	Measuring Amplifier	C120886

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

5.1.1 Before Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	± 0.2	± 0.2
114 dB, 1 kHz	114.1		

5.1.2 After Adjustment

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

5.2 Frequency Accuracy

5.2.1 Before Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

5.2.2 After Adjustment

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

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Certificate No. : C133030

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

Note :

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Certificate of Calibration

校正證書

Certificate No. : C126606

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC12-2838)

Description / 儀器名稱 : Integrating Sound Level Meter

Manufacturer / 製造商 : Brüel & Kjær

Model No. / 型號 : 2238

Serial No. / 編號 : 2684502

Supplied By / 委託者 : Atkins China Limited

13/F, Wharf T&T Centre, Harbour City, Tsim Sha Tsui, Kowloon

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 November 2012

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

All results are within manufacturer's specification.

The results are detailed in the subsequent page(s).

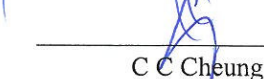
The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Precision Measurement Ltd., UK
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By
測試

: 
K C Lee

Certified By
核證

: 
C C Cheung

Date of Issue
簽發日期

15 November 2012

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- 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.
- Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.4.
- The results presented are the mean of 3 measurements at each calibration point.

- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C120016
CL281	Multifunction Acoustic Calibrator	DC110233

- Test procedure : MA101N.

- Results :

- Sound Pressure Level

- Reference Sound Pressure Level

- Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.1

- After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.1	± 0.7

- Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	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.

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6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.1	Ref.
	L _{ASP}		S			94.1	± 0.1
	L _{AIP}		I			94.1	± 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)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L _{ASP}	S	Continuous		106.0	Ref.	
	L _{ASMax}		500 ms		102.0	-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)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	54.8	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.4	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	95.3	+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	89.9	-4.3 (+3.0 ; -6.0)

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Certificate No. : C126606

證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.3	-3.0 ± 1.5
					63 Hz	93.3	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.0
					250 Hz	94.1	0.0 ± 1.0
					500 Hz	94.1	0.0 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	93.9	-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	88.0	-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)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L _{Acq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
						1/10 ²		90	89.9	± 0.5
			60 sec.			1/10 ³		80	79.7	± 1.0
			5 min.			1/10 ⁴		70	69.7	± 1.0

Remarks : - 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 :

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Certificate of Calibration

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Certificate No. : C125261
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ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC12-2206)

Description / 儀器名稱 : Integrating Sound Level Meter
Manufacturer / 製造商 : Bruel & Kjaer
Model No. / 型號 : 2238
Serial No. / 編號 : 2684503
Supplied By / 委託者 : Atkins China Limited
13/F., Wharf T&T Centre, Harbour City, Tsim Sha Tsui,
Kowloon

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(55 \pm 20)\%$

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 September 2012

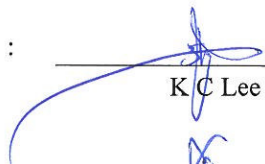
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within manufacturer's specification.
The results are detailed in the subsequent page(s).

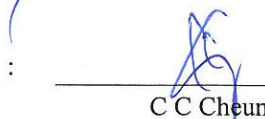
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- Fluke Precision Measurement Ltd., UK
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By
測試


K C Lee

Certified By
核證


C C Cheung

Date of Issue : 10 September 2012
簽發日期

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Certificate of Calibration

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Certificate No. : C125261

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- 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.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C120016
CL281	Multifunction Acoustic Calibrator	DC110233

- Test procedure : MA101N.

- Results :

5.1 Sound Pressure Level

5.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading	IEC 60651 Type 1 Spec.
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
50 - 130	L _{AFP}	A	F	94.00	1	94.0	± 0.7

5.1.2 Linearity

UUT Setting				Applied Value		UUT Reading
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)
50 - 130	L _{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

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

5.2 Time Weighting

5.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading	IEC 60651 Type 1 Spec.
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
50 - 130	L _{AFP}	A	F	94.00	1	94.0	Ref.
	L _{ASP}		S			94.0	± 0.1
	L _{AIP}		I			94.0	± 0.1

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5.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L _{ASP}	S	Continuous		106.0	Ref.	
	L _{ASMax}		500 ms		102.0	-4.1 ± 1.0	

5.3 Frequency Weighting

5.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	54.7	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.7	-4.3 (+3.0 ; -6.0)

5.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.1	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	90.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

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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

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. : C125261

證書編號

5.4 Time Averaging

UUT Setting				Applied Value					UUT	IEC 60804
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)	Reading (dB)	Type 1 Spec. (dB)
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
						1/10 ²		90	89.9	± 0.5
			60 sec.			1/10 ³		80	79.7	± 1.0
			5 min.			1/10 ⁴		70	69.8	± 1.0

Remarks : - 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.

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所書面批准。

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

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ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : ANS5(Ma Wan Chung Village)
Calibrated by : K.F.Ho
Date : 26/07/2013

Sampler

Model : TE-5170
Serial Number : S/N3640

Calibration Orifice and Standard Calibration Relationship

Serial Number : 1378
Service Date : 22 Feb 2012
Slope (m) : 1.99405
Intercept (b) : -0.00397
Correlation Coefficient(r) : 0.99984

Standard Condition

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

Calibration Condition

Pa (hpa) : 1005
Ta(K) : 300

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	10.8	3.262	1.574	63	62.5
2	13 holes	8.5	2.894	1.398	54	53.6
3	10 holes	6.4	2.511	1.215	46	45.7
4	7 holes	4.5	2.106	1.021	38	37.7
5	5 holes	2.7	1.631	0.794	27	26.8

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): 45.092 Intercept(b): -8.846 Correlation Coefficient(r): 0.9994

Checked by: Magnum Fan

Date: 29/07/2013

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : **ANS6(Dragonair Building)**
Calibrated by : **K.F.Ho**
Date : **26/07/2013**

Sampler

Model : **TE-5170**
Serial Number : **S/N3639**

Calibration Office and Standard Calibration Relationship

Serial Number : **1378**
Service Date : **22 Feb 2012**
Slope (m) : **1.99405**
Intercept (b) : **-0.00397**
Correlation Coefficient(r) : **0.99984**

Standard Condition

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

Calibration Condition

Pa (hpa) : **1005**
Ta(K) : **300**

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	10.5	3.217	1.552	62	61.5
2	13 holes	8.6	2.911	1.406	55	54.6
3	10 holes	6.8	2.589	1.252	48	47.7
4	7 holes	4.5	2.106	1.021	38	37.7
5	5 holes	2.5	1.570	0.764	27	26.8

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

Sampler Calibration Relationship

Slope(m):43.934 **Intercept(b):** -7.003 **Correlation Coefficient(r):** 0.9998

Checked by: Magnum Fan

Date: 29/07/2013



TISCH ENVIRONMENTAL, INC.
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WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Dec 26, 2012 Rootsmeter S/N 0438320 Ta (K) - 295
Operator Tisch Orifice I.D. - 2323 Pa (mm) - 753.11

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	1.4440	3.2	2.00
2	NA	NA	1.00	1.0240	6.4	4.00
3	NA	NA	1.00	0.9120	8.0	5.00
4	NA	NA	1.00	0.8720	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)
0.9967	0.6902	1.4149	0.9957	0.6896	0.8851
0.9925	0.9693	2.0010	0.9915	0.9683	1.2517
0.9903	1.0858	2.2372	0.9893	1.0847	1.3995
0.9893	1.1345	2.3464	0.9883	1.1334	1.4678
0.9840	1.3666	2.8299	0.9830	1.3652	1.7702
Qstd slope (m) = 2.09107			Qa slope (m) = 1.30939		
intercept (b) = -0.02838			intercept (b) = -0.01775		
coefficient (r) = 0.99996			coefficient (r) = 0.99996		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			x axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

$$Vstd = \text{Diff. Vol}[(Pa - \text{Diff. Hg})/760] (298/Ta)$$

$$Qstd = Vstd/\text{Time}$$

$$Va = \text{Diff Vol} [(Pa - \text{Diff Hg})/Pa]$$

$$Qa = Va/\text{Time}$$

For subsequent flow rate calculations:

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

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



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AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Feb 22, 2012 Rootmeter S/N 0438320 Ta (K) - 295
Operator Tisch Orifice I.D. - 1378 Pa (mm) - 740.41

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	1.3940	3.2	2.00
2	NA	NA	1.00	0.9740	6.4	4.00
3	NA	NA	1.00	0.8720	8.0	5.00
4	NA	NA	1.00	0.8340	8.8	5.50
5	NA	NA	1.00	0.6870	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9799	0.7029	1.4029	0.9957	0.7142	0.8927
0.9756	1.0017	1.9841	0.9914	1.0178	1.2624
0.9734	1.1163	2.2183	0.9891	1.1343	1.4114
0.9724	1.1660	2.3265	0.9881	1.1848	1.4803
0.9671	1.4077	2.8059	0.9827	1.4304	1.7853
Qstd slope (m) =		1.99405	Qa slope (m) =		1.24864
intercept (b) =		-0.00397	intercept (b) =		-0.00252
coefficient (r) =		0.99984	coefficient (r) =		0.99984

y axis = $\text{SQRT}[\text{H}_2\text{O}(\text{Pa}/760)(298/\text{Ta})]$

y axis = $\text{SQRT}[\text{H}_2\text{O}(\text{Ta}/\text{Pa})]$

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 = $1/m\{[\text{SQRT}(\text{H}_2\text{O}(\text{Pa}/760)(298/\text{Ta}))] - b\}$
Qa = $1/m\{[\text{SQRT}(\text{H}_2\text{O}(\text{Ta}/\text{Pa}))] - b\}$

EQUIPMENT CALIBRATION RECORD

Type : Laser Dust Monitor
Manufacturer / Brand : SIBATA
Model No.: LD-3B
Equipment No.: LD-3B-002
Sensitivity Adjustment Scale Setting : 622 CPM

Operator: _____

Standard Equipment

Equipment : MFC High Volume Air Sampler
Venue : Wah Ming House, Wah Fu Estate
Model No.: TE-5170 Total Suspended Particulated
Serial No.: 2100

Previous Calibration Date 10/21/2011

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration) : 622 CPM
Sensitivity Adjustment Scale Setting (After Calibration) : 622 CPM

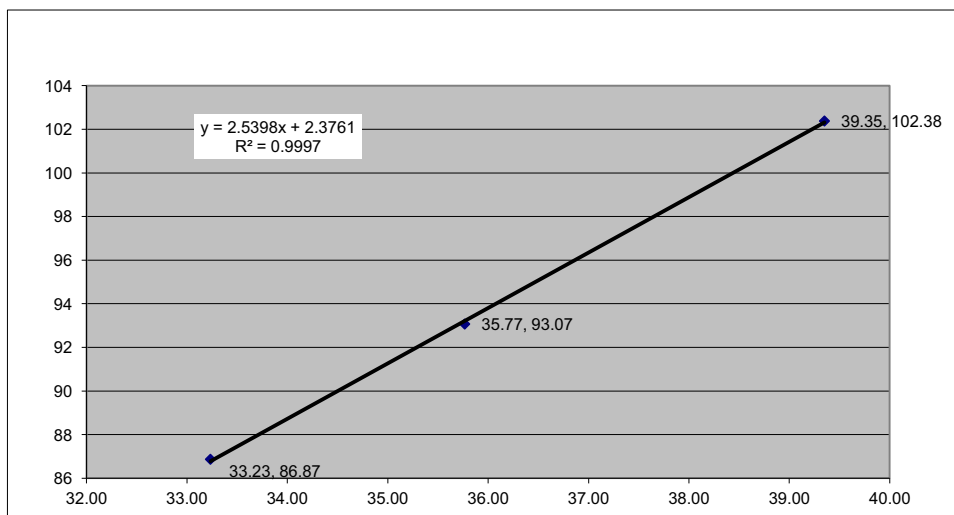
Hour	Date (dd-mmm-yy)	Time		Ambient Condition		Concentration (obtained by High Volume Sampler) (ug/m3) Y-axis	Total Count for 60mins (obtained by Laser Dust Monitor)	Count per Minute X-axis
				Temp (C)	R.H. (%)			
1	15-Oct-12	13:12	14:12	26.3	74%	86.87	1994	33.23
2	15-Oct-12	14:16	15:16	26.3	74%	93.07	2146	35.77
3	15-Oct-12	15:33	16:33	26.3	74%	102.38	2361	39.35

Be Linear Regression of Y or X

Slope (K-factor): 2.5398

Correlation coefficient : 0.9997

Remark: _____



Recorded by: Ruby Law

Signature: 

Date: 10/21/2012

Checked by: Keith Chau

Signature: 

Date: 10/21/2012

EQUIPMENT CALIBRATION RECORD

Type : Laser Dust Monitor
Manufacturer / Brand : SIBATA
Model No.: LD-3B
Equipment No.: LD-3B-003
Sensitivity Adjustment Scale Setting : 799 CPM

Operator: _____

Standard Equipment

Equipment : MFC High Volume Air Sampler
Venue : Wah Ming House, Wah Fu Estate
Model No.: TE-5170 Total Suspended Particulated
Serial No.: 276018

Previous Calibration Date N/A

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration) : 799 CPM
Sensitivity Adjustment Scale Setting (After Calibration) : 799 CPM

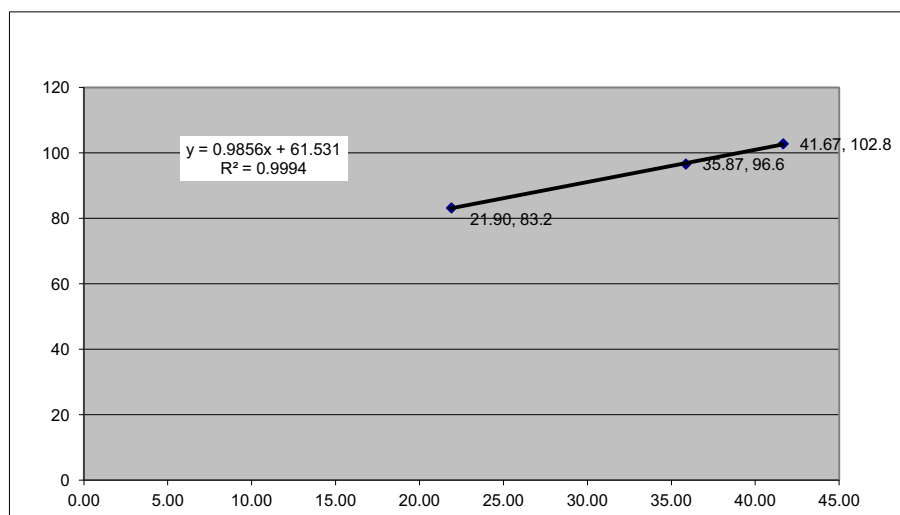
Hour	Date (dd-mmm-yy)	Time		Ambient Condition		Concentration (ug/m3) Y-axis	Total Count	Count/Minute X-axis
				Temp (C)	R.H. (%)			
1	16-Oct-12	13:14	14:14	26.2	74%	83.2	1314	21.90
2	16-Oct-12	14:22	15:22	26.2	74%	96.6	2152	35.87
3	16-Oct-12	15:30	16:30	26.2	74%	102.8	2500	41.67

Be Linear Regression of Y or X

Slope (K-factor): 0.9856

Correlation coefficient : 0.9994

Remark: _____



Recorded by: Ruby Law

Signature: 

Date: 10/21/2012

Checked by: Keith Chau

Signature: 

Date: 10/21/2012

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1313282
Date of Issue: 20/05/2013
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 16 May, 2013

Date of next Calibration: 16 August, 2013

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	148.9	1.4
6667	6290	-5.7
12890	12670	-1.7
58670	56290	-4.1
Tolerance Limit (±%)		10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.85	3.92	0.07
5.90	5.87	-0.03
7.35	7.40	0.05
Tolerance Limit (±mg/L)		0.20

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.06	0.06
7.0	7.16	0.16
10.0	10.16	0.16
Tolerance Limit (±pH unit)		0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.02	--
10	9.70	-3.0
20	19.11	-4.5
30	29.32	-2.3
Tolerance Limit (±%)		10.0

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1313282
Date of Issue: 20/05/2013
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 16 May, 2013

Date of next Calibration: 16 August, 2013

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
15.0	14.35	-0.7
23.5	23.16	-0.3
36.0	36.27	0.3
Tolerance Limit ($\pm^{\circ}\text{C}$)		2.0

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.1	--
4	4.2	5.0
10	10.2	2.0
20	20.9	4.5
50	50.7	1.4
100	96.7	-3.3
Tolerance Limit ($\pm\%$)		10.0

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1322077
Date of Issue: 21/08/2013
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: -- W. 026.35
Date of Calibration: 15 August, 2013

Date of next Calibration: 15 November, 2013

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	152.0	3.5
6667	6582	-1.3
12890	11950	-7.3
58670	56820	-3.2
Tolerance Limit (±%)		10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.45	3.49	0.04
5.80	5.85	0.05
7.25	7.29	0.04
Tolerance Limit (±mg/L)		0.20

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.99	-0.01
7.0	7.07	0.07
10.0	10.00	0.00
Tolerance Limit (±pH unit)		0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.02	--
10	9.83	-1.7
20	19.41	-3.0
30	29.13	-2.9
Tolerance Limit (±%)		10.0

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1322077
Date of Issue: 21/08/2013
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: -- W.026.35
Date of Calibration: 15 August, 2013

Date of next Calibration: 15 November, 2013

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
15.0	14.86	-0.1
25.5	25.39	-0.1
36.0	36.10	0.1
Tolerance Limit ($\pm^{\circ}\text{C}$)		2.0

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0	--
4	4.1	2.5
10	10.2	2.0
20	20.5	2.5
50	51.1	2.2
100	100.8	0.8
Tolerance Limit ($\pm\%$)		10.0

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1318311
Date of Issue: 12/07/2013
Client: AECOM ASIA COMPANY LIMITED



Description: Sonde Environmental Monitoring System
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D100972
Equipment No.: *N.026.36*
Date of Calibration: 09 July, 2013

Date of next Calibration: 09 October, 2013

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	145.5	-1.0
6667	6351	-4.7
12890	12650	-1.9
58670	58450	-0.4
Tolerance Limit (±%)		10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.80	3.85	0.05
5.00	5.06	0.06
7.51	7.46	-0.05
Tolerance Limit (±mg/L)		0.20

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.99	-0.01
7.0	7.10	0.10
10.0	9.97	-0.03
Tolerance Limit (±pH unit)		0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.01	--
10	9.62	-3.8
20	19.73	-1.4
30	29.96	-0.1
Tolerance Limit (±%)		10.0

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1318311
Date of Issue: 12/07/2013
Client: AECOM ASIA COMPANY LIMITED



Description: Sonde Environmental Monitoring System
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D100972
Equipment No.: W.026.36
Date of Calibration: 09 July, 2013

Date of next Calibration: 09 October, 2013

Parameters:

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
15.0	14.63	-0.4
24.5	24.57	0.1
35.5	35.22	-0.3
Tolerance Limit ($\pm$ °C)		2.0

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.1	2.5
10	9.7	-3.0
20	20.3	1.5
50	49.2	-1.6
100	99.8	-0.2
Tolerance Limit ($\pm$ %)		10.0

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