



Brüel & Kjær

Calibration Chart

Type 4231

Serial No. 3004068

Sound Pressure Level: 94.00 or 114.00 dB ± 0.20 dB
(re 20 μ Pa at reference conditions)

Frequency: 1000 Hz $\pm 0.1\%$

Distortion: $< 1\%$

Reference Conditions:

Temperature: 23°C
Pressure: 101.325 kPa
Humidity: 50% RH
Load: 0.25 cm³ ($\frac{1}{2}$ " Brüel & Kjær Mic.)

Date: 16/07/12 Signed: R. Khan



Brüel & Kjær

Sound Calibrator Type 4231

Levels for Brüel & Kjær $\frac{1}{2}$ " Microphones:

Equivalent Free Field: 93.85 dB or 113.85 dB
Equivalent Diffuse Field: 94.00 dB or 114.00 dB
Pressure Field: 94.00 dB or 114.00 dB

Frequency: 1000 Hz

Conforms to:

ANSI S1.40-1984 and IEC 60942 (2003) Class 1 & LS

Ambient Conditions:

Temperature: -10° to 50° C, Class LS $+16^{\circ}$ to 30° C
Pressure: 65 kPa to 108 kPa
Humidity: 25% to 90% RH

For further information refer to the User Manual

BC0210-12

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

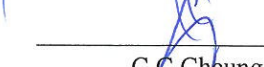
Tested By

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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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

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

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Website/網址: www.suncreation.com

Certificate of Calibration

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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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Certificate of Calibration

校正證書

Certificate No. : C126606
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)	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 of Calibration

校正證書

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 :

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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Certificate of Calibration

校正證書

Certificate No. : C125261
證書編號

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

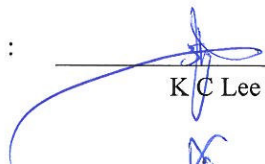
TEST RESULTS / 測試結果

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).

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 : 10 September 2012
簽發日期

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校正證書

Certificate No. : C125261

證書編號

- 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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Certificate of Calibration

校正證書

Certificate No. : C125261

證書編號

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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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 :

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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : ANS6(Dragonair Building)
Calibrated by : K.F.Ho
Date : 02/11/2012

Sampler

Model : TE-5170
Serial Number : S/N3639

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) : 1016
Ta(K) : 294

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC Indicated flow	Y
1	18 holes	10.8	3.314	1.664	58	58.5
2	13 holes	8.5	2.940	1.476	51	51.4
3	10 holes	6.6	2.590	1.301	46	46.4
4	7 holes	4.5	2.139	1.075	37	37.3
5	5 holes	2.7	1.657	0.833	29	29.2

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): 35.222 Intercept(b): -0.154 Correlation Coefficient(r): 0.9992

Checked by: Magnum Fan

Date: 04/11/2012

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : ANS5(Ma Wan Chung Village)
Calibrated by : K.F.Ho
Date : 15/10/2012

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) : 1015
Ta(K) : 299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (indicated flow)	Y
1	18 holes	10.4	3.223	1.618	55	54.9
2	13 holes	8.3	2.879	1.446	50	49.9
3	10 holes	6.5	2.548	1.280	45	44.9
4	7 holes	4.1	2.023	1.017	37	36.9
5	5 holes	2.5	1.580	0.794	29	28.9

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): 31.351 Intercept(b): 4.579 Correlation Coefficient(r): 0.9992

Checked by: Magnum Fan

Date: 16/10/2012

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : ANS6(Dragonair Building)
Calibrated by : K.F.Ho
Date : 08/12/2012

Sampler

Model : TE-5170
Serial Number : S/N3639

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) : 1016
Ta(K) : 291

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC Indicated flow	Y
1	18 holes	10.9	3.346	1.680	58	58.8
2	13 holes	8.7	2.989	1.501	51	51.7
3	10 holes	6.7	2.623	1.318	44	44.6
4	7 holes	4.6	2.174	1.092	37	37.5
5	5 holes	2.8	1.696	0.852	28	28.4

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): 36.270 Intercept(b): -2.560 Correlation Coefficient(r): 0.9990

Checked by: Magnum Fan

Date: 10/12/2012

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : ANS5(Ma Wan Chung Village)
Calibrated by : K.F.Ho
Date : 08/12/2012

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) : 1016
Ta(K) : 291

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (indicated flow)	Y
1	18 holes	10.5	3.284	1.647	56	56.8
2	13 holes	8.4	2.937	1.475	50	50.7
3	10 holes	6.5	2.584	1.298	45	45.6
4	7 holes	4.2	2.077	1.044	37	37.5
5	5 holes	2.5	1.602	0.806	29	29.4

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): 32.070 Intercept(b): 3.753 Correlation Coefficient(r): 0.9995

Checked by: Magnum Fan

Date: 10/12/2012

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

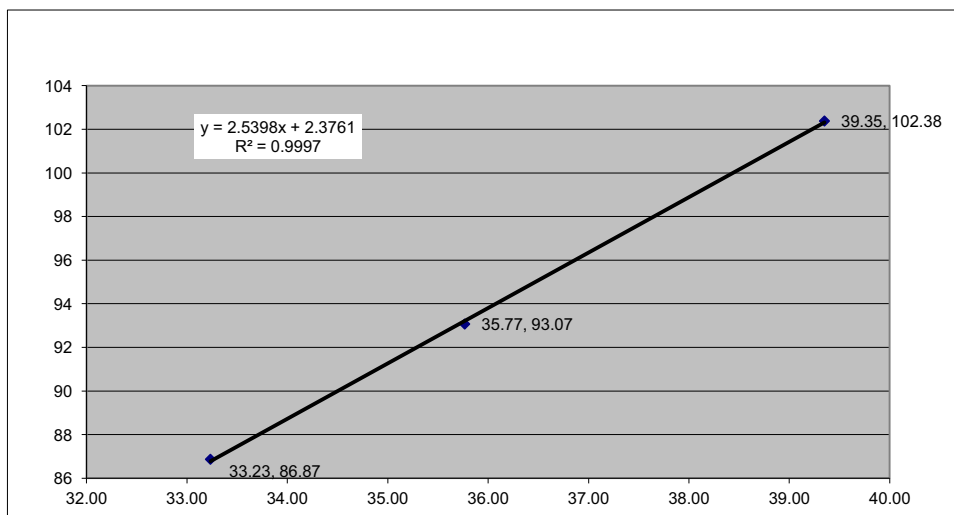
Hour	Date (dd-mmm-yy)	Time		Ambient Condition		Concentration (obtained by High Volume Sampler) (ug/m3) Y-axis	Total Count for 60mins (obtained by Laser Dust Monitor)	Count per Minute X-axis
				Temp (C)	R.H. (%)			
1	15-Oct-12	13:12	14:12	26.3	74%	86.87	1994	33.23
2	15-Oct-12	14:16	15:16	26.3	74%	93.07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

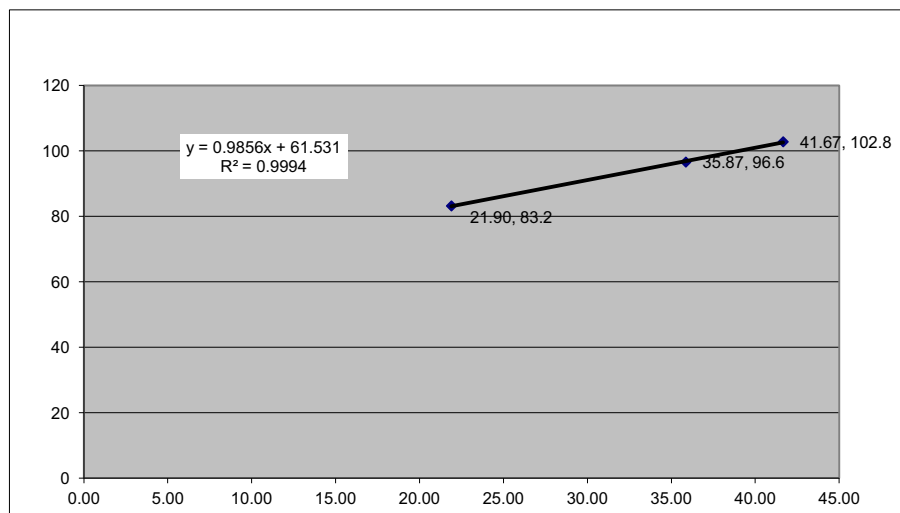
Hour	Date (dd-mmm-yy)	Time		Ambient Condition		Concentration (ug/m3) Y-axis	Total Count	Count/Minute X-axis
				Temp (C)	R.H. (%)			
1	16-Oct-12	13:14	14:14	26.2	74%	83.2	1314	21.90
2	16-Oct-12	14:22	15:22	26.2	74%	96.6	2152	35.87
3	16-Oct-12	15:30	16:30	26.2	74%	102.8	2500	41.67

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



FT Laboratories Ltd.

Management System Document Control Cover Sheet

Document Name	Ref. No.	Revision No.
Performance Check of Sonde	CHM158	0

	Prepared By	Reviewed By	Approved By
Name	Fragrance Ho	Rowena R. De Jesus	W.C. Yue
Position	Senior Chemist	Senior Chemist	Director & General Manager
Signature			
Date	24/10/12	24/10/2012	24/10/2012

For Comment

☐

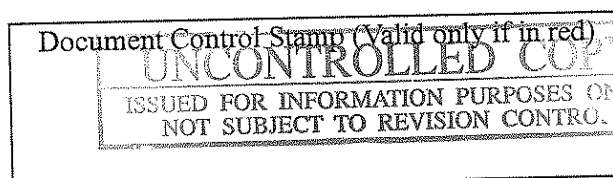
For Use

☐

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Issued To	
Name: Fragrance Ho	Signature:
Position: Sr. Chemist.	Date: 24 Oct. 2012

Please return a photocopy of signed cover sheet to QSE Dept. as evidence of receipt.



REVISION STATUS

Revision No.	Effective Date	Description / Summary of Revision
0	10 Oct 2012	Initial issue

Contents

1. Introduction
2. Apparatus
3. Reagents
4. Sample Storage
5. Procedure
6. Calculation
7. Data Recording
8. Reporting Criteria

1. Introduction

- 1.1 This procedure is based on instrument manual, BS1427:1993 and APHA, Standard Methods for the Examination of Water & Wastewater, 19th edition
- 1.2 The environmental condition during the performance check should be under temperature $20 \pm 5^{\circ}\text{C}$ and humidity 45 - 80%.

2. Performance Check Interval

- 2.1 Parameters include temperature, pH, conductivity, turbidity and dissolved oxygen should all be checked every 3 months.

3. Temperature Check

3.1 Equipment

- 3.1.1 Reference thermometer, traceable to national standard
- 3.1.2 Liquid bath
- 3.1.3 Timer

3.2 Procedures

- 3.2.1 Prepare a liquid (distilled water) bath and equilibrium the temperature to 10, 20 and 30°C .
- 3.2.2 Set up the instrument to parallel with reference thermometer.
- 3.2.3 Compare and record the temperature with reference thermometer for the temperature 10, 20 and 30°C and the record sheet.
- 3.2.4 The temperature deviation should be within $\pm 0.15^{\circ}\text{C}$

4. pH Value Check

4.1 Reagent

- 4.1.1 Primary pH buffer solution and commercial buffer solution, traceable to national standard

4.2 Procedures

- 4.2.1 Use a certain amount of pH 7 buffer standard in a clean, dry or pre-rinsed calibration cup, carefully immerse the probe end of the sonde into the solution.
- 4.2.2 Allow at least 1 minute for temperature equilibration before proceeding.
- 4.2.3 From the Calibration Menu, select **ISE1 pH** to access the pH calibration choices

and then press **3-3-Point**. Press **Enter** and input the value of the buffer at the prompt.

- 4.2.4 After entering the correct pH value of the buffer, press **Enter** and the current values of all enabled sensors will appear on the screen and change with time as they stabilize in the solution.
- 4.2.5 Observe the readings under pH and when they show no significant change for approximately 30 seconds, press **Enter**. The display will indicate that the calibration is accepted.
- 4.2.6 Use a certain amount of an additional pH buffer standard into a clean, dry or pre-rinsed calibration cup, carefully immerse the probe end of the sonde into the solution.
- 4.2.7 Allow at least 1 minute for temperature equilibration before proceeding.
- 4.2.8 Press **Enter** and input the correct value of the second buffer for the calibration temperature at the prompt.
- 4.2.9 Press **Enter** and the current values of all enabled sensors will appear on the screen and will change with time as they stabilize in the solution.
- 4.2.10 Observe the readings under pH and when they show no significant change for approximately 30 seconds, press **Enter**.
- 4.2.11 Use a certain amount of a third pH buffer standard into a clean, dry or pre-rinsed calibration cup, carefully immerse the probe end of the sonde into the solution.
- 4.2.12 Allow at least 1 minute for temperature equilibration before proceeding.
- 4.2.13 Press **Enter** and input the correct value of the third buffer for the calibration temperature at the prompt.
- 4.2.14 Observe the readings under pH and when they show no significant change for approximately 30 seconds, press **Enter**.
- 4.2.15 After the third calibration point is complete, press **Enter** again, as instructed on the screen, to return to the Calibrate Menu.
- 4.2.16 Rinse the sonde in water and dry.
(Noted: the mV of the 1st pH buffer calibration should be within $\pm 30\text{mV}$; and the mV between 2 buffer calibration should be within 168-180mV.)
- 4.2.17 Immerse a verified pH buffer solution to cross check the calibration curve. Record on the record sheet.
- 4.2.18 pH value difference should be within ± 0.10 pH-unit.

5. Conductivity Check

5.1 Reagent

- 5.1.1 Primary chemical – potassium chloride, 58.67ms/cm at 25°C, traceable to national standard
- 5.1.2 Primary chemical - potassium chloride, 0.20mol/L (24.80ms/cm at 25°C) should be used for performance check, traceable to national standard

5.2 Procedures

- 5.2.1 Place a certain amount of 58.67mS/cm conductivity standard solution into a clean, dry or pre-rinsed calibration cup.
- 5.2.2 Before proceeding, ensure that the sensor is as dry as possible. Ideally, rinse the conductivity sensor with a small amount of standard that can be discarded. Be certain that to avoid cross-contamination of standard solutions with other solutions. Make certain that there are no salt deposits around the oxygen and pH/ORP probes, particularly if you are employing standards of low conductivity.
- 5.2.3 Carefully immerse the probe end of the sonde into the solution.
- 5.2.4 Gently rotate and/or move the sonde up and down to remove any bubbles from the conductivity cell.
- 5.2.5 The probe must be completely immersed past its vent hole and insure that the vent hole is covered by solution.
- 5.2.6 Allow at least one minute for temperature equilibration before proceeding.
- 5.2.7 From the Calibrate Menu, select **Conductivity** to access the Conductivity calibration procedure and then **1-SpCond** to access the specific conductance calibration procedure.
- 5.2.8 Enter the calibration value of the standard used (mS/cm at 25°C) and press **Enter**.
- 5.2.9 The current values of all enabled sensors will appear on the screen and will change with time as they stabilize.
- 5.2.10 Observe the readings under Specific Conductance or Conductivity and when they show no significant change for approximately 30 seconds, press **Enter**. The screen will indicate that the calibration has been accepted and prompt you to press **Enter** again to return the Calibrate Menu.
- 5.2.11 Rinse the sonde with distilled water and dry the sonde.
- 5.2.12 Immerse a standard conductivity solution (24.80 ms/cm at 25°C) for counter check. Record on the record sheet.
- 5.2.13 The conductivity difference should be within $\pm 0.5\%$ of reading $+ 0.001$ ms/cm.

6. Turbidity Check

6.1 Reagents

- 6.1.1 Turbidity standard solution with 0, 10 and 126 NTU.

6.2 Procedures

- 6.2.1 Before proceeding with the calibration of the sonde has been cleaned and is free of debris. Solid particles from this source, particularly those carried over from past deployments, will contaminate the standards during calibration protocol and cause either calibration errors and/or inaccurate field data.
- 6.2.2 One standard must be 0 NTU and this standard must be calibrated first.
- 6.2.3 To begin the calibration, place the correct amount of 0 NTU standard (distilled water) into calibration cup provided with the sonde.
- 6.2.4 Immerse the sonde into water. Input the value 0 NTU at the prompt, and press **Enter**.
- 6.2.5 The screen will display real-time readings that will allow you to determine when the readings have stabilized.
- 6.2.6 Activate the wiper 1-2 times by pressing **3-Clean Optics** as shown on the screen, to remove any bubbles.
- 6.2.7 After stabilization is complete, press **Enter** to “confirm” the first calibration and then, as instructed, press **Enter** to continue.
- 6.2.8 Dry the sonde carefully and then place the sonde in the second turbidity standard 10 NTU using the same container as for the 0 NTU standard.
- 6.2.9 Input the correct turbidity value in NTU, press **Enter**, and view the stabilization of the values on the screen in real-time.
- 6.2.10 As above, activate the wiper with the **3-Clean Optics** key to remove bubbles.
- 6.2.11 After stabilization is complete, press **Enter** to “confirm” the second calibration and then, as instructed, press **Enter** to continue.
- 6.2.12 Dry the sonde carefully and then place the sonde in the third turbidity standard 126 NTU using the same container as for the 0 NTU standard.
- 6.2.13 Input the correct turbidity value in NTU, press **Enter**, and view the stabilization of the values on the screen in real-time.
- 6.2.14 As above, activate the wiper with the **3-Clean Optics** key to remove bubbles.
- 6.2.15 After the readings have stabilized, press **Enter** to confirm the calibration and then press **Enter** to return to the Calibration Menu.
- 6.2.16 Immerse the mid-point check of turbidity standard solution, 10.0NTU, then record

the reading on the record sheet.

- 6.2.17 The turbidity difference should be within $\pm 2\%$ of reading or 0.3 NTU (whichever is greater).

7. Dissolved Oxygen Check

7.1 Preparation of water samples for Winkler Titration

- 7.1.1 Air-saturated distilled water
- 7.1.2 Half air-saturated distilled water
- 7.1.3 Zero-oxygen distilled water

7.2 Reagents for Winkler Titration

- 7.2.1 Manganous sulfate solution
- 7.2.2 Alkali-iodide-azide reagent
- 7.2.3 Concentrated sulphuric acid
- 7.2.4 Diluted sulphuric acid, 6N
- 7.2.5 Starch solution
- 7.2.6 Standard potassium bi-iodate solution, approx. 0.0021M
- 7.2.7 Standard sodium thiosulfate solution, 0.025N

7.3 Titration Procedures

- 7.3.1 Place 300ml of distilled water (cl. 7.1) in the BOD bottle.
- 7.3.2 Add 1 ml MnSO_4 solution to the water sampler, and add 1 ml alkali-iodide-azide reagent thereafter.
- 7.3.3 Stopper carefully to exclude air bubbles. Rinse any overflow of alkali with running water and mix by inverting bottle a few minutes.
- 7.3.4 When the precipitate has settled sufficiently (to approximate half the bottle volume) by leaving a clear supernatant above the manganese hydroxide floc, add 2ml concentrated H_2SO_4
- 7.3.5 Restopper the bottle carefully. Rinse any overflow of acid with running water and mix the content by inverting several times until it is completely dissolved. If the precipitate does not dissolve completely, a little more acid should be added.
- 7.3.6 Measure 100ml of the solution with glass pipette and add it into 250ml Erlenmeyer flask.
- 7.3.7 Titrate with 0.025N $\text{Na}_2\text{S}_2\text{O}_3$ solution to a pale straw color. Add a few drops of the starch indicator and continue titration to blue color disappearance completely.

Ignore any reappearance of blue color. The titration should be carried out as quickly as possible. Otherwise the dissolved oxygen content may be changed.

7.3.8 Calculate the dissolved oxygen content by:

DO, mg/L

$$= \frac{[(\text{vol. of std Na}_2\text{S}_2\text{O}_3 \text{ used, ml}) \times (\text{normality of Na}_2\text{S}_2\text{O}_3, \text{N}) \times 8 \times 1000]}{100\text{ml}}$$

7.4 Procedures

- 7.4.1 Place the sensor into a calibration cup containing about 1/8 inch of water which is vented by loosening the threads.
- 7.4.2 Wait approximately 10 minutes before proceeding to allow the temperature and oxygen pressure to equilibrate.
- 7.4.3 Select **ODOsat%** and then **1-Point** to access the DO calibration procedure.
- 7.4.4 Calibration of Optical dissolved oxygen sensor in the DO% procedure also results in calibration of the DO mg/L mode and vice versa.
- 7.4.5 Enter the current barometric pressure in **mm of Hg**. (Inches of Hg x 25.4 = mm Hg).
- 7.4.6 Press **Enter** and the current values of all enabled sensors will appear on the screen and change with time as they stabilize.
- 7.4.7 Observe the readings under **ODOsat%**. When they show no significant change for approximately 30 seconds, press **Enter**.
- 7.4.8 The screen will indicate that the calibration has been accepted and prompt you to press **Enter** again to return to the Calibrate Menu.
- 7.4.9 Rinse the sonde with distilled water and dry the sonde.
- 7.4.10 Immerse the DO sensor into the water sample (cl. 7.1) and record the reading on record sheet.
- 7.4.11 The dissolved oxygen deviation should be within ± 0.15 mg/L.

8. Data Recording

- 8.1 All analytical data should be recorded on the data sheet – H158/001.

9. Reporting Criteria

- 9.1 The temperature deviation should be within $\pm 0.15^{\circ}\text{C}$
- 9.2 pH value difference should be within ± 0.10 pH-unit.
- 9.3 The conductivity difference should be within $\pm 0.5\%$ of reading + 0.001 ms/cm.
- 9.4 The turbidity difference should be within $\pm 2\%$ of reading or 0.3 NTU (whichever is greater).
- 9.5 The dissolved oxygen deviation should be within ± 0.15 mg/L.



Performance Check of Sonde

Report No. : CHM/190 & CHM/190-1-01

Equipment Information

Name / Description	:	Display System	Sonde
Manufacturer	:	YSI	YSI
Equipment No.	:	CHM/190	CHM/190-1
Model No.	:	YSI 650MDS	YSI 6920V2
Serial No.	:	12J101862	12J102249

Reference standard solution	:	CRM KIO ₃ , CRM Buffer
Major measurement equipment	:	Thermometer

Performance Method : Refer to BS1427:1993 and APHA, Standard Methods for the Examination of Water & Wastewater, 19th edition

Date of Performance : 12-Oct-12 to 13-Oct-12

Date of Next Performance Check : 12-Jan-13

Location of Performance Check : Chemical and Environmental Laboratory

Environmental Condition

Temperature	:	20 ± 5	°C
Relative Humidity	:	45 - 80	%

Test Results

1. Temperature Check

Temperature Set (°C)	Thermometer Corrected Reading (°C)	Sonde Reading (°C)	Deviation (°C)	Compliance (Pass / Fail)
10	10.34	10.37	0.03	Pass
20	20.69	20.71	0.02	Pass
30	30.03	30.03	0.00	Pass

Note: Temperature deviation : ± 0.15°C

2. pH Value Check

Verified pH Buffer	pH value at 20°C	Sonde Reading (pH-unit)	Difference (pH-unit)	Compliance (Pass / Fail)
6.00	5.98	5.99	0.01	Pass
9.00	9.01	9.01	0.00	Pass

Note: pH value difference : ± 0.10 pH-unit



Performance Check of Sonde

Report No. : CHM/190 & CHM/190-1-01

3. Conductivity Check

KCl (mol/L)	Standard Conductivity (mS/cm at 25°C)	Sonde Reading (mS/cm at 25°C)	Difference (%)	Compliance (Pass / Fail)
0.2000	24.80	24.84	0.16	Pass

Note:

- Conductivity difference : $\pm 0.5\%$ of reading + 0.001 mS/cm
- According to YSI Incorporated Environmental Monitoring Systems Manual, page 5-2 & 2-76, salinity is determined automatically from the sonde conductivity and temperature readings according to algorithms found in Standard Methods for the Examination of Water and Wastewater.

4. Turbidity Check

Standard Turbidity (NTU)	Sonde Reading (NTU)	Difference (%)	Difference (NTU)	Compliance (Pass / Fail)
10.0	10.0	0.0	0.0	Pass

Note: Turbidity difference : $\pm 2\%$ of reading or 0.3 NTU (whichever is greater)

5. Dissolved Oxygen (DO) Check

DO from Winkler Titration (mg/L)	Sonde Reading (mg/L)	Deviation (mg/L)	Compliance (Pass / Fail)
8.75	8.74	-0.01	Pass
4.49	4.57	0.08	Pass
0.00	0.00	0.00	Pass

Note: Dissolved oxygen deviation : ± 0.15 mg/L

< End of Report >

Checked By : Yandy Chau

Reviewed By : Fragrance Ho

Certified By : W C Yue

Date : 13/10/2012

Date : 15/10/12

Date : 15/10/2012

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1227690
Amendment: 1
Date of Issue: 17/10/2012
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: 6820-V1
Serial No.: W.026.09
Equipment No.: W.026.09
Date of Calibration: 16 October, 2012
Date of next Calibration: 16 January, 2013

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	155	5.5
6667	7086	6.3
12890	13010	0.9
58670	56680	-3.4
Tolerance Limit (%)		10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.78	5.74	-0.04
6.32	6.42	0.10
7.59	7.49	-0.10
Tolerance Limit (±mg/L)		0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.59	5.9
20	20.62	3.1
30	30.42	1.4
Tolerance Limit (±%)		10.0

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1227690
Date of Issue: 17/10/2012
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: 6820-V1
Serial No.: W.026.09
Equipment No.: W.026.09
Date of Calibration: 16 October, 2012 Date of next Calibration: 16 January, 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)
18.5	18.81	0.3
23.0	22.75	-0.3
31.0	30.65	-0.4
Tolerance Limit (°C)		2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.3	7.5
10	9.3	-7.0
20	21.3	6.5
50	54.3	8.6
100	106.5	6.5
Tolerance Limit (±%)		10.0

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1230161
 Date of Issue: 13/11/2012
 Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde V2
 Brand Name: YSI
 Model No.: YSI 6820 V2
 Serial No.: 12A101545
 Equipment No.: W.026.35
 Date of Calibration: 13 November, 2012

Date of next Calibration: 13 February, 2013

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	147.5	0.4
6667	6344	-4.8
12890	12490	-3.1
58670	55720	-5.0
Tolerance Limit (%)		10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.40	4.23	-0.17
6.44	6.33	-0.11
8.20	8.21	0.01
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	3.89	-0.11
7.0	7.01	0.01
10.0	10.13	0.13
Tolerance Limit (±unit)		0.2

Salinity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.00	--
10	9.82	-1.8
20	20.04	0.2
30	29.73	-0.9
Tolerance Limit (±%)		10.0

Mr. Chan Kwok Fai, Godfrey
 Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1230161
Date of Issue: 13/11/2012
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde V2
Brand Name: YSI
Model No.: YSI 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 13 November, 2012

Date of next Calibration: 13 February, 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)
22.6	22.25	-0.4
30.0	29.70	-0.3
38.5	38.90	0.4
Tolerance Limit (°C)		2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	3.8	-5.0
10	9.6	-4.0
20	19.5	-2.5
50	48.8	-2.4
100	96.3	-3.7
Tolerance Limit (±%)		10.0


Mr. Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1226911
Date of Issue: 09/10/2012
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D 100972
Equipment No.: W.026.36
Date of Calibration: 09 October, 2012

Date of next Calibration: 09 January, 2013

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
142.6	142.0	-0.4
6667	6537	-1.9
12890	12260	-4.9
58670	56930	-3.0
Tolerance Limit (%)		10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.17	5.26	0.09
6.58	6.64	0.06
7.30	7.39	0.09
Tolerance Limit (\pm 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	4.11	0.11
7.0	7.08	0.08
10.0	9.94	-0.06
Tolerance Limit (\pm unit)		0.2

Salinity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.00	--
10	10.26	2.6
20	20.46	2.3
30	30.39	1.3
Tolerance Limit (\pm %)		10.0

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1226911
Date of Issue: 09/10/2012
Client: AECOM ASIA COMPANY LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D 100972
Equipment No.: W.026.36
Date of Calibration: 09 October, 2012

Date of next Calibration: 09 January, 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)
20.5	20.38	-0.1
24.5	24.04	-0.5
29.5	28.96	-0.5
Tolerance Limit (°C)		2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.4	10.0
10	10.2	2.0
20	20.7	3.5
50	49.4	-1.2
100	99.9	-0.1
Tolerance Limit (±%)		10.0

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1228018
Date of Issue: 20/10/2012
Client: AECOM ASIA COMPANY LIMITED



Description: pH Meter
Brand Name: Orion
Model No.: 230A+
Serial No.: 020365
Equipment No.: W.039.04
Date of Calibration: 18 October, 2012

Date of next Calibration: 18 January, 2013

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.94	-0.06
7.0	6.96	-0.04
10.0	9.85	-0.15
Tolerance Limit (\pm unit)		0.2