

Certificate of Calibration

校正證書

Certificate No. : C173907
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1606)

Date of Receipt / 收件日期 : 11 July 2017

Description / 儀器名稱 : Integrating Sound Level Meter
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2800932
Supplied By / 委託者 : Atkins China Limited
13/F., Wharf T&T Centre, Harbour City,
Tsim Sha Tsui, Kowloon, Hong Kong

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 : 17 July 2017

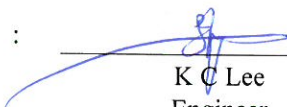
TEST RESULTS / 測試結果

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).

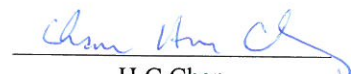
The test equipment used for calibration are traceable to National Standards via :

- 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


K C Lee
Engineer

Certified By
核證


H C Chan
Engineer

Date of Issue :
簽發日期

17 July 2017

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

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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 B & K Acoustic Calibrator 4231, S/N : 3004068 was performed before the test.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
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

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 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	± 1.1

- 6.1.2 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 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

- 6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 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	± 0.3

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6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.5
					250 Hz	85.4	-8.6 ± 1.4
					500 Hz	90.8	-3.2 ± 1.4
					1 kHz	94.1	Ref.
					2 kHz	95.3	+1.2 ± 1.6
					4 kHz	95.1	+1.0 ± 1.6
					8 kHz	92.9	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (Db)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	63 Hz	93.3	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.0	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.9	-0.2 ± 1.6
					4 kHz	93.2	-0.8 ± 1.6
					8 kHz	90.9	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

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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

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

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Certificate No. : C173907
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Remarks : - UUT Microphone Model No. : 4188 & S/N : 2793199

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB : 63 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)

- 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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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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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C173906
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1606)

Date of Receipt / 收件日期 : 11 July 2017

Description / 儀器名稱 : Acoustical Calibrator
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 3004068
Supplied By / 委託者 : Atkins China Limited
13/F., Wharf T&T Centre, Harbour City,
Tsim Sha Tsui, Kowloon, Hong Kong

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 : 17 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).

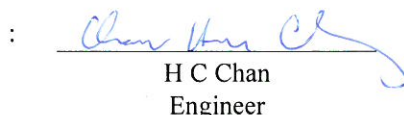
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- Fluke Everett Service Center, USA

Tested By
測試


K C Lee
Engineer

Certified By
核證


H C Chan
Engineer

Date of Issue
簽發日期

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Certificate No. : C173906

證書編號

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

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

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

Remark : 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.

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ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : AMS5(Ma Wan Chung Village)
Calibrated by : K.F.Ho
Date : 08/11/2017

Sampler

Model : TE-5170
Serial Number : S/N3640

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) : 1015
Ta(K) : 298

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1 18 holes	11.4	3.380	1.639	54	54.05
2 13 holes	9.0	3.003	1.458	48	48.05
3 10 holes	6.9	2.629	1.279	43	43.04
4 7 holes	4.4	2.100	1.025	36	36.04
5 5 holes	2.6	1.614	0.792	27	27.03

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): 31.096 Intercept(b): 3.126 Correlation Coefficient(r): 0.9980

Checked by: Magnum Fan

Date: 10/11/2017

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : AMS6(Dragonair Building)
Calibrated by : P.F.Yeung
Date : 19/10/2017

Sampler

Model : TE-5170
Serial Number : S/N3639

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
Service Date : 20 March 2017
Slope (m) : 2.08464
Intercept (b) : -0.036840
Correlation Coefficient(r) : 0.99994

Standard Condition

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

Calibration Condition

Pa (hpa) : 1008
Ta(K) : 301

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1 18 holes	11.2	3.327	1.614	53	52.69
2 13 holes	9.0	2.983	1.448	48	47.72
3 10 holes	6.6	2.554	1.243	42	41.76
4 7 holes	4.5	2.109	1.029	35	34.80
5 5 holes	2.6	1.603	0.787	27	26.84

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): 31.218 Intercept(b): 2.545 Correlation Coefficient(r): 0.9996

Checked by: Magnum Fan

Date: 22/10/2017

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : AMS6 (Dragonair Building)
Calibrated by : P.F.Yeung
Date : 15/12/2017

Sampler

Model : TE-5170
Serial Number : S/N3639

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
Service Date : 20 March 2017
Slope (m) : 2.08464
Intercept (b) : -0.036840
Correlation Coefficient(r) : 0.99994

Standard Condition

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

Calibration Condition

Pa (hpa) : 1008
Ta(K) : 292

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1 18 holes	11.2	3.389	1.643	60	60.76
2 13 holes	8.5	2.953	1.434	53	53.67
3 10 holes	6.7	2.621	1.275	48	48.61
4 7 holes	4.3	2.100	1.025	42	42.53
5 5 holes	2.5	1.601	0.786	35	35.44

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): 28.986 Intercept(b): 12.475 Correlation Coefficient(r): 0.9982

Checked by: Magnum Fan

Date: 16/12/2017



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

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

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

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

DATA TABULATION

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

CALCULATIONS

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

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

For subsequent flow rate calculations:

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

EQUIPMENT CALIBRATION RECORD

Type :	Laser Dust Monitor
Manufacturer / Brand :	SIBATA
Model No.:	LD-3B
Equipment No.:	LD-3B-001
Serial No.:	934393
Sensitivity Adjustment Scale Setting :	640 CPM

Standard Equipment

Equipment :	MFC High Volume Air Sampler
Venue :	Tung Chung Pier
Model No.:	TE-5170 Total Suspended Particulate
Serial No.:	S/N3641
Previous Calibration Date	29/09/2016

Calibration Result

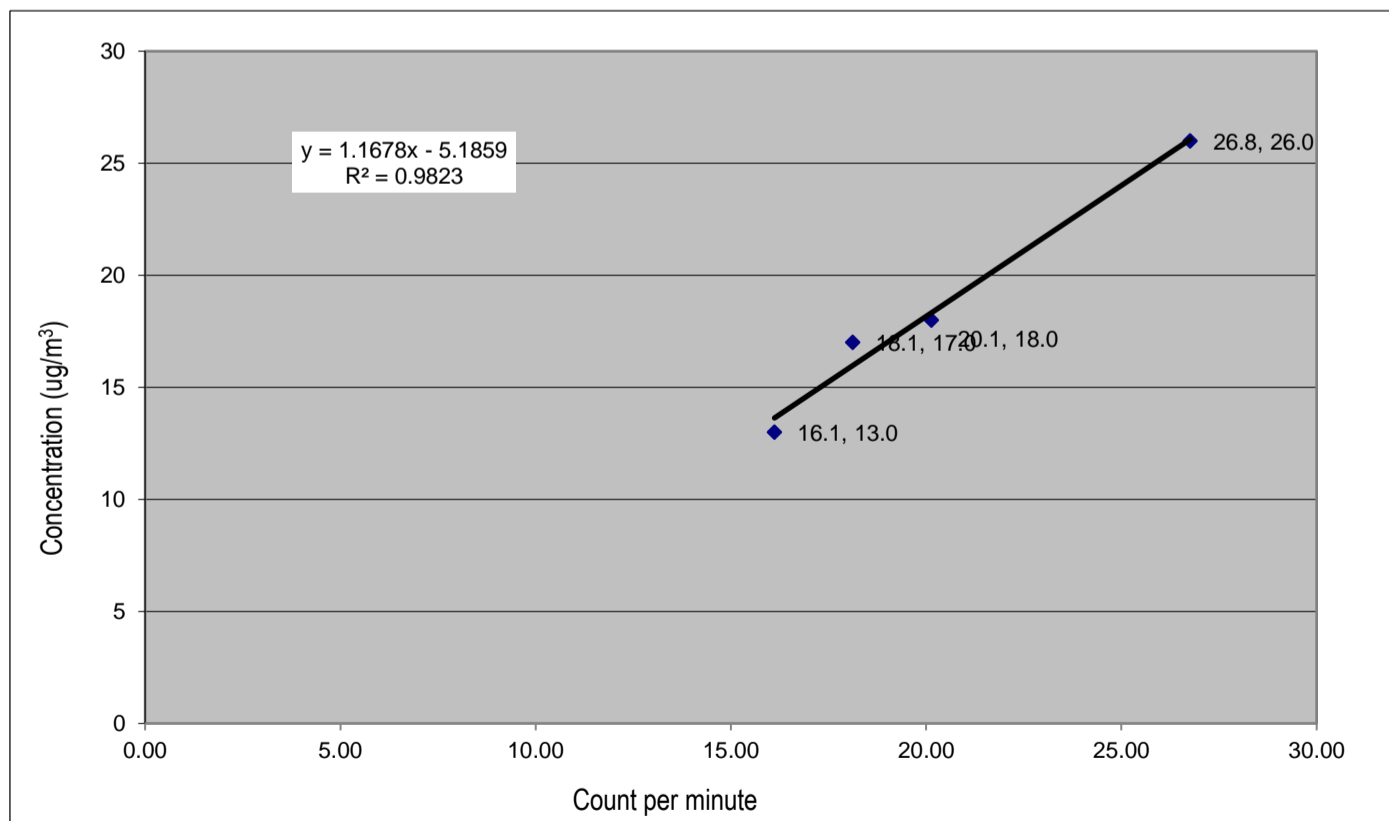
Sensitivity Adjustment Scale Setting (Before Calibration) :	640 CPM
Sensitivity Adjustment Scale Setting (After Calibration) :	640 CPM

Hour	Date (dd-mmm-yy)	Time		Ambient Condition		Concentration (ug/m ³) Y-axis	Total Count	Count/Minute X-axis
				Temp (°C)	R.H. (%)			
1	26/10/2016	13:59	14:59	30.7	64%	18	1208	20.13
2	26/10/2016	15:12	16:12	30.9	59%	13	967	16.12
3	26/10/2016	16:21	17:21	30.9	61%	17	1087	18.12
4	26/10/2016	17:30	18:30	30.9	61%	26	1606	26.77

Be Linear Regression of Y or X

Slope (K-factor): 1.1678 Intercept,b: -5.186
 Correlation coefficient (R): 0.9911

Remark: _____



Recorded by: Ray Cheng

Signature: _____

Date: 25/11/2016

Checked by: Ketih Chau

Signature: _____

Date: 25/11/2016

EQUIPMENT CALIBRATION RECORD

Type :	Laser Dust Monitor
Manufacturer / Brand :	SIBATA
Model No.:	LD-3B
Equipment No.:	LD-3B-003
Serial No.:	276018
Sensitivity Adjustment Scale Setting :	799 CPM

Standard Equipment

Equipment :	MFC High Volume Air Sampler
Venue :	Tung Chung Pier
Model No.:	TE-5170 Total Suspended Particulate
Serial No.:	S/N3641

Previous Calibration Date 29/09/2016

Calibration Result

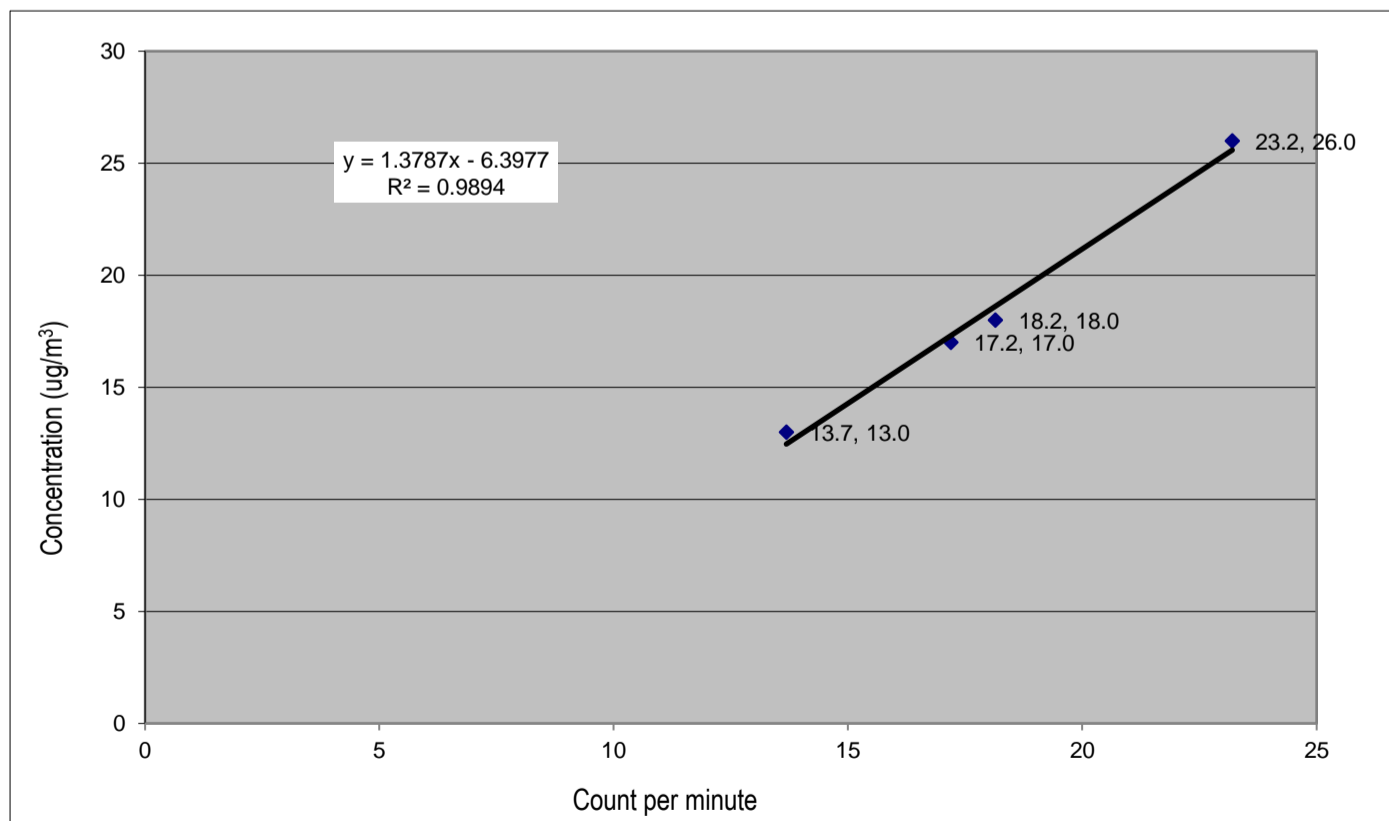
Sensitivity Adjustment Scale Setting (Before Calibration) : 799 CPM
 Sensitivity Adjustment Scale Setting (After Calibration) : 799 CPM

Hour	Date (dd-mmm-yy)	Time		Ambient Condition		Concentration (ug/m ³) Y-axis	Total Count	Count/Minute X-axis
				Temp (°C)	R.H. (%)			
1	26/10/2016	13:59	14:59	30.7	64%	18	1089	18.15
2	26/10/2016	15:12	16:12	30.9	59%	13	821	13.68
3	26/10/2016	16:21	17:21	30.9	61%	17	1032	17.20
4	26/10/2016	17:30	18:30	30.9	61%	26	1392	23.20

Be Linear Regression of Y or X

Slope (K-factor): 1.3787 Intercept,b: -6.398
 Correlation coefficient : 0.9947

Remark: _____



Recorded by: <u>Ray Cheng</u>	Signature:	Date: <u>25/11/2016</u>
Checked by: <u>Ketih Chau</u>	Signature:	Date: <u>25/11/2016</u>

EQUIPMENT CALIBRATION RECORD

Type : Laser Dust Monitor
 Manufacturer / Brand : SIBATA
 Model No.: LD-3B
 Equipment No.: LD-3B-003
 Serial No.: 276018
 Sensitivity Adjustment Scale Setting : 799 CPM

Standard Equipment

Equipment : MFC High Volume Air Sampler
 Venue : Dragonair Building
 Model No.: TE-5170 Total Suspended Particulate
 Serial No.: S/N3693

Previous Calibration Date 24/08/2017

Calibration Result

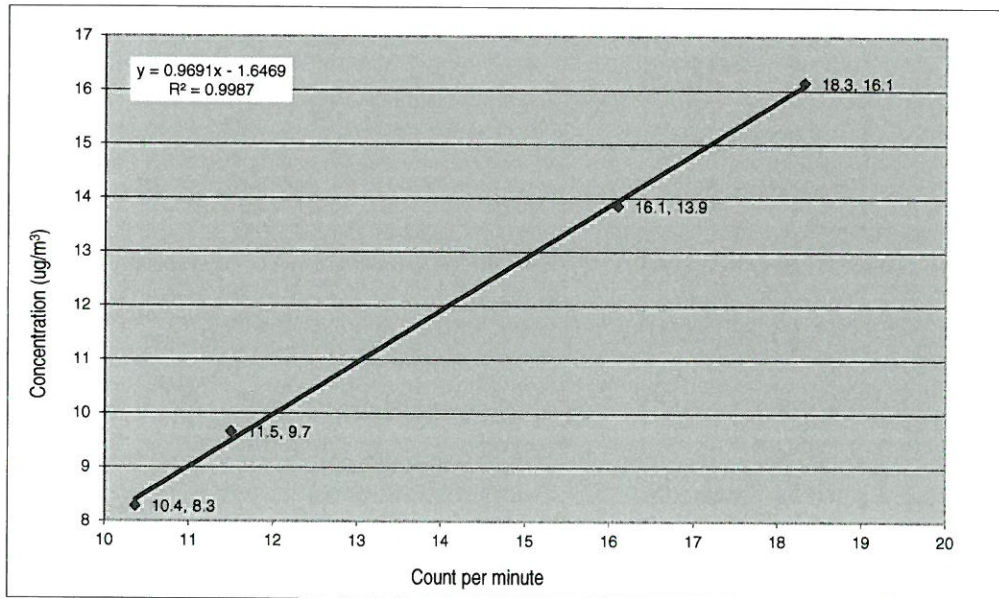
Sensitivity Adjustment Scale Setting (Before Calibration) : 799 CPM
 Sensitivity Adjustment Scale Setting (After Calibration) : 800 CPM

Hour	Date (dd-mmm-yy)	Time		Ambient Condition		Concentration (ug/m ³) Y-axis	Total Count	Count/Minute X-axis
				Temp (°C)	R.H. (%)			
1	11-Sep-17	13:51	14:51	33	60%	9.7	690	11.50
2	11-Sep-17	15:01	16:01	33	60%	8.3	622	10.37
3	11-Sep-17	16:05	17:05	33	60%	13.9	966	16.10
4	11-Sep-17	17:05	18:05	33	60%	16.1	1099	18.32

Be Linear Regression of Y or X

Slope (K-factor): 0.9691 Intercept,b: -1.6469
 Correlation coefficient (R): 0.9993

Remark: _____



Recorded by: William Chan

Signature: 

Date: 20/10/2017

Checked by: Keith Chau

Signature: 

Date: 20/10/2017



ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

CONTACT: MR MIKE SHEK
CLIENT: AECOM ASIA COMPANY LIMITED
ADDRESS: 1501- 10, 15/F, TOWER 1,
GRAND CENTRAL PLAZA,
138 SHATIN RURAL COMMITTEE ROAD,
SHATIN, NEW TERRITORIES, HONG KONG

WORK ORDER: HK1731176
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 20/07/2017
DATE OF ISSUE: 26/07/2017

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Conductivity, Dissolved Oxygen, Salinity, pH, Turbidity and Temperature
Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 20 July, 2017

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


Mr Chan Siu Ming, Vico
Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1731176
Sub-batch: 0
Client: AECOM ASIA COMPANY LIMITED
Date of Issue: 26/07/2017



Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 20 July, 2017

Date of next Calibration: 20 October, 2017

Parameters:

Conductivity Method Ref: APHA (21th edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	148	+0.7
6667	6740	+1.1
12890	12760	-1.0
58670	58770	+0.2
	Tolerance Limit (%)	±10.0

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.60	3.62	+0.02
5.40	5.43	+0.03
7.60	7.57	-0.03
	Tolerance Limit (mg/L)	±0.20

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

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
10.0	10.04	+0.0
20.5	20.47	-0.0
38.5	38.52	+0.0
	Tolerance Limit (°C)	±2.0

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


 Mr Chan Siu Ming, Vice
 Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1731176
Sub-Batch: 0
Client: AECOM ASIA COMPANY LIMITED
Date of Issue: 26/07/2017



Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 20 July, 2017

Date of next Calibration: 20 October, 2017

Parameters:

Salinity

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

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)
0	0.00	--
10	10.01	+0.1
20	20.03	+0.2
30	30.06	+0.2
Tolerance Limit (%)		±10.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	3.9	-2.5
10	10.2	+2.0
20	20.1	+0.5
50	50.6	+1.2
100	100.0	0.0
Tolerance Limit (%)		±10.0

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.02	+0.02
7.0	7.02	+0.02
10.0	10.05	+0.05
Tolerance Limit (pH Unit)		±0.20

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


Mr Chan Siu Ming, Vice
Manager - Inorganics



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR MIKE SHEK
CLIENT: AECOM ASIA COMPANY LIMITED
ADDRESS: 1501-10, 15/F, TOWER 1,
GRAND CENTRAL PLAZA,
138 SHATIN RURAL COMMITTEE ROAD,
SHATIN, NEW TERRITORIES, HONG KONG

WORK ORDER: HK1731171
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 20/07/2017
DATE OF ISSUE: 26/07/2017

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Conductivity, Dissolved Oxygen, Salinity, pH, Turbidity and Temperature
Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D100972
Equipment No.: W.026.36
Date of Calibration: 20 July, 2017

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.


Mr Chan Siu Ming, *Vico*
Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1731171
Sub-batch: 0
Client: AECOM ASIA COMPANY LIMITED
Date of Issue: 26/07/2017



Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D100972
Equipment No.: W.026.36
Date of Calibration: 20 July, 2017

Date of next Calibration: 20 October, 2017

Parameters:

Conductivity Method Ref: APHA (21th edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	143	- 2.7
6667	6630	- 0.6
12890	12790	- 0.8
58670	58730	+ 0.1
Tolerance Limit (%)		± 10.0

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.60	3.57	- 0.03
5.40	5.46	+ 0.06
7.60	7.56	- 0.04
Tolerance Limit (mg/L)		± 0.20

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

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
10.0	10.01	+ 0.0
20.5	20.44	- 0.1
38.5	38.46	- 0.0
Tolerance Limit (°C)		± 2.0

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


 Mr Chan Siu Ming, *Vice*
 Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1731171
Sub-Batch: 0
Client: AECOM ASIA COMPANY LIMITED
Date of Issue: 26/07/2017



Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D100972
Equipment No.: W.026.36
Date of Calibration: 20 July, 2017

Date of next Calibration: 20 October, 2017

Parameters:

Salinity

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

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)
0	0.00	--
10	9.96	- 0.4
20	20.02	+ 0.1
30	30.05	+ 0.2
Tolerance Limit (%)		± 10.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.1	+ 2.5
10	10.1	+ 1.0
20	20.4	+ 2.0
50	50.5	+ 1.0
100	99.8	- 0.2
Tolerance Limit (%)		± 10.0

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.98	- 0.02
7.0	6.96	- 0.04
10.0	9.95	- 0.05
Tolerance Limit (pH Unit)		± 0.20

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


 Mr Chan Siu Ming, Vice
 Manager - Inorganics



REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

CONTACT: MR MIKE SHEK
CLIENT: AECOM ASIA COMPANY LIMITED
ADDRESS: 1501- 10, 15/F, TOWER 1,
GRAND CENTRAL PLAZA,
138 SHATIN RURAL COMMITTEE ROAD,
SHATIN, NEW TERRITORIES, HONG KONG

WORK ORDER: HK1771923
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 19- Oct- 2017
DATE OF ISSUE: 24- Oct- 2017

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Conductivity, Dissolved Oxygen, Salinity, pH, Turbidity and Temperature
Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 19 October, 2017

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vice
Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1771923
Sub-batch: 0
Client: AECOM ASIA COMPANY LIMITED
Date of Issue: 24- Oct- 2017



Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 19 October, 2017

Date of next Calibration: 19 January, 2018

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	144.0	- 2.0
6667	6710	+ 0.6
12890	12740	- 1.2
58670	58740	+ 0.1
Tolerance Limit (%)		± 10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.60	3.57	- 0.03
5.60	5.62	+ 0.02
7.56	7.55	- 0.01
Tolerance Limit (mg/L)		± 0.20

Temperature

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

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
10.5	10.49	- 0.0
20.8	20.77	- 0.0
38.0	37.94	- 0.1
Tolerance Limit (°C)		± 2.0

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


 Mr Chan Siu Ming, Vice
 Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1771923
Sub-Batch: 0
Client: AECOM ASIA COMPANY LIMITED
Date of Issue: 24- Oct- 2017



Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12A101545
Equipment No.: W.026.35
Date of Calibration: 19 October, 2017

Date of next Calibration: 19 January, 2018

Parameters:

Salinity

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

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)
0	0.00	--
10	10.05	+0.5
20	19.98	-0.1
30	30.07	+0.2
Tolerance Limit (%)		±10.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.0	0.0
10	9.9	-1.0
20	19.4	-3.0
50	50.3	+0.6
100	99.6	-0.4
Tolerance Limit (%)		±10.0

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.02	+0.02
7.0	7.02	+0.02
10.0	10.03	+0.03
Tolerance Limit (pH Unit)		±0.20

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


 Mr Chan Siu Ming, Vice
 Manager - Inorganics



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR MIKE SHEK
CLIENT: AECOM ASIA COMPANY LIMITED
ADDRESS: 1501- 10, 15/F, TOWER 1,
GRAND CENTRAL PLAZA,
138 SHATIN RURAL COMMITTEE ROAD,
SHATIN, NEW TERRITORIES, HONG KONG

WORK ORDER: HK1771924
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 19- Oct- 2017
DATE OF ISSUE: 24- Oct- 2017

COMMENTS

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The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Conductivity, Dissolved Oxygen, Salinity, pH, Turbidity and Temperature
Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D100972
Equipment No.: W.026.36
Date of Calibration: 19 October, 2017

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vice
Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1771924
Sub-batch: 0
Client: AECOM ASIA COMPANY LIMITED
Date of Issue: 24- Oct- 2017



Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D100972
Equipment No.: W.026.36
Date of Calibration: 19 October, 2017

Date of next Calibration: 19 January, 2018

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	148.0	+ 0.7
6667	6640	- 0.4
12890	12830	- 0.5
58670	58760	+ 0.2
Tolerance Limit (%)		± 10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.60	3.62	+ 0.02
5.60	5.63	+ 0.03
7.56	7.52	- 0.04
Tolerance Limit (mg/L)		± 0.20

Temperature

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

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
10.5	10.43	- 0.1
20.8	20.74	- 0.1
38.0	37.95	- 0.0
Tolerance Limit (°C)		± 2.0

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

Mr Chan Siu Ming, Vice
Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1771924
Sub-Batch: 0
Client: AECOM ASIA COMPANY LIMITED
Date of Issue: 24- Oct- 2017



Description: Multifunctional Meter
Brand Name: YSI
Model No.: 6820 V2
Serial No.: 12D100972
Equipment No.: W.026.36
Date of Calibration: 19 October, 2017

Date of next Calibration: 19 January, 2018

Parameters:

Salinity

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

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)
0	0.00	--
10	10.06	+0.6
20	20.09	+0.4
30	30.10	+0.3
Tolerance Limit (%)		±10.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	4.2	+5.0
10	9.7	-3.0
20	19.5	-2.5
50	50.4	+0.8
100	100.6	+0.6
Tolerance Limit (%)		±10.0

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.97	-0.03
7.0	6.95	-0.05
10.0	10.03	+0.03
Tolerance Limit (pH Unit)		±0.20

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


 Mr Chan Siu Ming, Vice
 Manager - Inorganics