AECOM Asia Company Limited <u>TSP High Volume Sampler</u> <u>Field Calibration Report</u>

Station	Tung Chung Dev	elopment Pier (AMS	2) Operator:	Shum Kam Yuen	
Cal. Date:	7-Sep-12	2	Next Due Date:	7-Nov-12	X
Equipment No.:	A-001-78T		Serial No.	3383	
			Ambient Condition		
Temperat	ure, Ta (K)	302	Pressure, Pa (mmHg)	758.7	

	(Orifice Transfer St	andard Information		
Serial No:	843	Slope, mc	2.00834	Intercept, bc	-0.02923
Last Calibration Date:	15-Nov-11	mc x Qstd + bc = [DH x (Pa/760) x (298/Ta)] ^{1/2}			
Next Calibration Date:	15-Nov-12		Qstd = {[DH x (Pa/	760) x (298/Ta)] ^{1/2} -bc} / mc	2

		Calibration of	of TSP Sampler		
		Orfice		HVS	S Flow Recorder
Resistance Plate No.	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X - axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	8.5	2.89	1.46	45.0	44.66
13	7.6	2.74	1.38	42.0	41.69
10	5.6	2.35	1.18	36.0	35.73
7	3.9	1.96	0.99	31.0	30.77
5	2.4	1.54	0.78	24.0	23.82
Correlation Coe *If Correlation Co		0.9979 heck and recalibrate.	_		
			Calculation		
		ve, take Qstd = 1.30m ³ /min			
From the Regres	ssion Equation, the	"Y" value according to			
		mw x Qstd + bw = IC	x [(Pa/760) x (298/	Γa)] ^{1/2}	
Therefore, Set P	Point; IC = (mw x C	std + bw) x [(760 / Pa) x (Ta / 29	98)] ^{1/2} =	,	39.94
					s. ²
Remarks:					

AECOM Asia Company Limited <u>TSP High Volume Sampler</u> <u>Field Calibration Report</u>

Station	Site Boundary of	Site Office (WA2)) (AMS3A) Operator:	Shum Kam Yuen	
Cal. Date:	7-Sep-12		Next Due Date:	7-Nov-12	- X.
Equipment No.:	A-001-79T		Serial No.	3384	
			Ambient Condition		
Temperat	ure, Ta (K)	302	Pressure, Pa (mmHg)	758.7	*

	(Drifice Transfer St	andard Information		
Serial No:	843	Slope, mc	2.00834	Intercept, bc	-0.02923
Last Calibration Date:	15-Nov-11	mc x Qstd + bc = [DH x (Pa/760) x (298/Ta)] ^{1/2}			
Next Calibration Date:	15-Nov-12		Qstd = {[DH x (Pa/7	760) x (298/Ta)] ^{1/2} -bc} / mc	

		Calibration of	of TSP Sampler		
		Orfice		HV	S Flow Recorder
Resistance Plate No.	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X · axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	8.3	2.86	1.44	46.0	45.66
13	6.8	2.59	1.30	38.0	37.72
10	5.5	2.33	1.17	32.0	31.76
7	4.0	1.99	1.00	24.0	23.82
5	2.5	1.57	0.80	15.0	14.89
Slope , mw =	ession of Y on X 47.3617		Intercept, bw =	-23.5	3570
Correlation Coe		0.9968			
*If Correlation Co	pefficient < 0.990, c	heck and recalibrate.			
		Set Point	Calculation	4	
From the TSP Fi	eld Calibration Cur	ve, take Qstd = 1.30m ³ /min			
		"Y" value according to			
		mw x Qstd + bw = IC	x [(Pa/760) x (298/	Ta)] ^{1/2}	
Therefore, Set P	oint; IC = (mw x Q	std + bw) x [(760 / Pa) x (Ta / 29	98)] ^{1/2} =		38.50
			i i		1 2 2
Remarks:					
QC Reviewer:	WS CHAM	JSignature:	PI		Date: 7/9/12

AECOM Asia Company Limited <u>TSP High Volume Sampler</u> <u>Field Calibration Report</u>

Station	Hong Kong SkyC	ity Marriott Hotel	(AMS7) Operator:	Shum Kam Yuen	
Cal. Date:	7-Sep-12		Next Due Date:	7-Nov-12	X
Equipment No.:	A-001-80T		Serial No.	3385	
			Ambient Condition		1.000
Temperat	ure, Ta (K)	302.0	Pressure, Pa (mmHg)	758.7	

	(Drifice Transfer St	andard Information		
Serial No:	843	Slope, mc	2.00834	Intercept, bc	-0.02923
Last Calibration Date:	15-Nov-11			OH x (Pa/760) x (298/Ta)] ^{1/2}	
Next Calibration Date:	15-Nov-12	Qstd = {[DH x (Pa/760) x (298/Ta)] ^{1/2} -bc} / mc			

		Calibration of	of TSP Sampler		
		Orfice		HVS	S Flow Recorder
Resistance Plate No.	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X · axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	8.2	2.84	1.43	45.0	44.66
13	6.8	2.59	1.30	38.0	37.72
10	5.5	2.33	1.17	33.0	32.75
7	4.0	1.99	1.00	24.0	23.82
5	3.6	1.88	0.95	21.0	20.84
Slope , mw = Correlation Coe		0.9971	Intercept, bw =	-25.3	5080
			Calculation	•	
From the TSP Fi	ield Calibration Cur	ve, take Qstd = 1.30m ³ /min			
From the Regres	ssion Equation, the	"Y" value according to			
		mw x Qstd + bw = IC	x [(Pa/760) x (298/	Ta)] ^{1/2}	
	Point; IC = (mw x G	std + bw) x [(760 / Pa) x (Ta / 2	98)] ^{1/2} =		38.49
Therefore, Set P					¢
t.			8		
Therefore, Set P					



TISCH ENVIROMENTAL, INC. 145 SOUTH MIAMI AVE. VILLAGE OF CLEVES, OH 45002 513.467.9000 877.263.7610 TOLL FREE 513.467.9009 FAX WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

	ORIFICE 7	TRANSFER STAN	JDARD CERT	FICATION	WORKSHEET 7	E-5025A
Date - No Operator		Rootsmeter Orifice I.I		438320 0843	Ta (K) - Pa (mm) -	294 - 748.03
PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1 2 3 4 5	NA NA NA NA NA	NA NA NA NA NA	1.00 1.00 1.00 1.00 1.00	1.3810 0.9810 0.8760 0.8370 0.6890	3.2 6.4 7.8 8.8 12.7	2.00 4.00 5.00 5.50 8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
0.9934 0.9891 0.9871 0.9859 0.9807	0.7193 1.0083 1.1269 1.1779 1.4233	1.4125 1.9976 2.2334 2.3424 2.8251		0.9957 0.9915 0.9895 0.9882 0.9830	0.7210 1.0107 1.1295 1.1807 1.4267	0.8866 1.2538 1.4018 1.4703 1.7732
Qstd slop intercep coefficie	t (b) =	2.00834 -0.02923 0.99994		Qa slope intercept coefficie	t (b) =	1.25759 -0.01835 0.99994
y axis =	SQRT [H2O (I	Pa/760) (298/1	ra)]	y axis =	SQRT [H20 (7	[a/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:

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

Laser Dust Monitor		
SIBATA		
LD-3		
A.005.07a		
557 CPM		

Operator:

Mike Shek (MSKM)

Standard Equipment

Equipment:	Rupprecht	Rupprecht & Patashnick TEOM [®]					
Venue:	Cyberport (Pui Ying Secondary School)						
Model No.:	Series 140	Series 1400AB					
Serial No:	Control:	140AB219899803					
	Sensor:	1200C143659803	K _o :	12500			
Last Calibration Date*:	5 May 201	2	_				

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): Sensitivity Adjustment Scale Setting (After Calibration): 557 CPM 557 CPM

Hour	Date (dd-mm-yy)	Time		Amb Cond		Concentration ¹ (mg/m ³)	Total Count ²	Count/ Minute ³	
					Temp (°C)	R.H. (%)	Y-axis		X-axis
1	02-06-12	13:30	-	14:30	27.9	63	0.04070	1628	27.13
2	02-06-12	14:30	-	15:30	27.9	63	0.04167	1669	27.82
3	02-06-12	15:30	-	16:30	28.2	64	0.04283	1713	28.55
4	02-06-12	16:30	-	17:30	28.1	63	0.04146	1655	27.58

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®

2. Total Count was logged by Laser Dust Monitor

3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or XSlope (K-factor):0.0015Correlation coefficient:0.9951

Validity of Calibration Record:

1 June 2013

Remarks:

QC Reviewer:	YW Fung

Signature:

4

Type:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3
Equipment No.:	A.005.08a
Sensitivity Adjustment Scale Setting:	702 CPM

Operator:

Mike Shek (MSKM)

Standard Equipment

Equipment:	Rupprecht	& Patashnick TEOM [®]				
Venue:	Cyberport (Pui Ying Secondary School)					
Model No.:	Series 1400AB					
Serial No:	Control:	140AB219899803				
	Sensor:	1200C143659803	K _o :	12500		
Last Calibration Date*:	5 May 2012	2				

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

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

702	CPM
702	CPM

Hour	Date (dd-mm-yy)	Time		Amb Conc		Concentration ¹ (mg/m ³)	Total Count ²	Count/ Minute ³
		-		Temp (°C)	R.H. (%)	Y-axis		X-axis
1	02-07-12	13:30 -	14:30	28.9	73	0.04127	1545	25.75
2	02-07-12	14:30 -	15:30	29.0	73	0.04163	1566	26.10
3	02-07-12	15:30 -	16:30	29.0	73	0.04334	1630	27.17
4	02-07-12	16:30 -	17:30	29.1	74	0.04426	1665	27.74

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®

2. Total Count was logged by Laser Dust Monitor

3. Count/minute was calculated by (Total Count/60)

Slope (K-factor):	0.0016	
Correlation coefficient:	0.9952	

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Validity of Calibration Record:

1 July 2013

Remarks:

QC Reviewer: YW Fung

Signature:

Date: 3 July 2012

Laser Dust Monitor
SIBATA
LD-3
A.005.09a
797 CPM

Operator:

Mike Shek (MSKM)

Standard Equipment

Equipment:	Rupprecht	Rupprecht & Patashnick TEOM [®]					
Venue:	Cyberport (Pui Ying Secondary School)						
Model No.:	Series 1400AB						
Serial No:	Control: 140AB219899803						
	Sensor:	1200C143659803	K _o :	12500			
Last Calibration Date*:	5 May 201	2					

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): Sensitivity Adjustment Scale Setting (After Calibration): 797 CPM 797 CPM

Hour	Date (dd-mm-yy)	Time		and the second second	bient dition	Concentration ¹ (mg/m ³)	Total Count ²	Count/ Minute ³
				Temp (°C)	R.H. (%)	Y-axis		X-axis
1	02-06-12	13:30	- 14:30	27.9	63	0.04070	1626	27.10
2	02-06-12	14:30	- 15:30	27.9	63	0.04167	1667	27.78
3	02-06-12	15:30	- 16:30	28.2	64	0.04283	1708	28.47
4	02-06-12	16:30	- 17:30	28.1	63	0.04146	1659	27.65

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®

2. Total Count was logged by Laser Dust Monitor

3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X		
Slope (K-factor):	0.0015	
Correlation coefficient:	0.9949	
Validity of Calibration Record:	1 June 2013	

Remarks:

QC Reviewer:	YW Fung

Signature:

Date: 4 June 2012

Laser Dust Monitor
SIBATA
LD-3
A.005.10a
753 CPM

Operator:

Mike Shek (MSKM)

Standard Equipment

Equipment:	Rupprecht & Patashnick TEOM [®]				
Venue:	Cyberport (Pui Ying Secondary School)				
Model No.:	Series 1400AB				
Serial No:	Control: 140AB219899803				
	Sensor:	1200C143659803	K _o :	12500	
Last Calibration Date*:	5 May 201	2			

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): Sensitivity Adjustment Scale Setting (After Calibration): 753 CPM 753 CPM

Hour	Date (dd-mm-yy)	1	Гime)	Amb Cond		Concentration ¹ (mg/m ³)	Total Count ²	Count/ Minute ³
					Temp (°C)	R.H. (%)	Y-axis		X-axis
1	02-06-12	12:45	-	13:45	27.9	63	0.04041	1613	26.88
2	02-06-12	13:45	-	14:45	27.9	63	0.04085	1631	27.18
3	02-06-12	14:45	-	15:45	27.9	63	0.04154	1663	27.72
4	02-06-12	15:45	-	16:45	28.1	64	0.04272	1711	28.52

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®

2. Total Count was logged by Laser Dust Monitor

3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X		
Slope (K-factor):	0.0015	
Correlation coefficient:	0.9939	

Validity of Calibration Record:

1 June 2013

Remarks:

QC Reviewer:	YW Fung

Signature:

Date: 4 June 2012

Laser Dust Monitor
SIBATA
LD-3
A.005.11a
799 CPM

Operator:

Mike Shek (MSKM)

Standard Equipment

Equipment:	Rupprecht	Rupprecht & Patashnick TEOM [®]					
Venue:	Cyberport	Cyberport (Pui Ying Secondary School)					
Model No.:	Series 1400AB						
Serial No:	Control:						
	Sensor:	1200C143659803	K _o :	12500			
Last Calibration Date*:	5 May 201	2					

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

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

Hour	Date (dd-mm-yy)	-	Fime	9	Amb Cond	1.1	Concentration ¹ (mg/m ³)	Total Count ²	Count/ Minute ³
					Temp	R.H.	Y-axis		X-axis
					(°C)	(%)			
1	02-07-12	13:45	-	14:45	29.0	73	0.04152	1659	27.65
2	02-07-12	14:45	-	15:45	29.0	73	0.04194	1670	27.83
3	02-07-12	15:45	-	16:45	29.1	74	0.04318	1725	28.75
4	02-07-12	16:45	-	17:45	29.1	74	0.04443	1780	29.67

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®

2. Total Count was logged by Laser Dust Monitor

3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X		
Slope (K-factor):	0.0015	
Correlation coefficient:	0.9928	50.33

Validity of Calibration Record:

1 July 2013

R	en	nai	rks:

QC Reviewer: YW Fung

Signature:

Date: 3 July 2012

Туре:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3B
Equipment No.:	A.005.13a
Sensitivity Adjustment Scale Setting:	643 CPM

Operator:

10-20

Mike Shek (MSKM)

Standard Equipment

Equipment:	Rupprecht & Patashnick TEOM [®]				
Venue:	Cyberport (Pui Ying Secondary School)				
Model No.:	Series 1400AB				
Serial No:	Control:	140AB219899803			
	Sensor:	1200C143659803	K _o :	12500	
Last Calibration Date*:	5 May 201	2			

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): Sensitivity Adjustment Scale Setting (After Calibration): <u>643</u> CPM 643 CPM

Hour	Date (dd-mm-yy)	Time	Э	Amt Cond		Concentration ¹ (mg/m ³)	Total Count ²	Count/ Minute ³
				Temp (°C)	R.H. (%)	Y-axis		X-axis
1	02-06-12	13:30 -	14:30	27.9	63	0.04070	1623	27.05
2	02-06-12	14:30 -	15:30	27.9	63	0.04167	1663	27.72
3	02-06-12	15:30 -	16:30	28.2	64	0.04283	1771	28.52
4	02-06-12	16:30 -	17:30	28.1	63	0.04146	1656	27.60

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®

2. Total Count was logged by Laser Dust Monitor

3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X	•
Slope (K-factor):	0.0015
Correlation coefficient:	0.9988
Validity of Calibration Record:	1 June 2013

Remarks:					
			/		
OC Deviewen		Olana aku yanu	1/	Data	1 June 2012
QC Reviewer:	TVV Fung	Signature:		Date:	4 June 2012
			¥		

Type:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3B
Equipment No.:	A.005.14a
Sensitivity Adjustment Scale Setting:	786 CPM

Operator:

he

Mike Shek (MSKM)

Standard Equipment

Equipment:	Rupprecht	& Patashnick TEOM®			
Venue:	Cyberport (Pui Ying Secondary School)				
Model No.:	Series 1400AB				
Serial No:	Control:	140AB219899803			
	Sensor:	1200C143659803	K _o :	12500	
Last Calibration Date*:	5 May 201	2	_ 0		

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

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

786	CPM
786	CPM

Hour	Date (dd-mm-yy)	Time	Э		pient dition	Concentration ¹ (mg/m ³)	Total Count ²	Count/ Minute ³
				Temp (°C)	R.H. (%)	Y-axis		X-axis
1	02-06-12	13:15 -	14:15	27.9	63	0.04073	1746	29.10
2	02-06-12	14:15 -	15:15	27.9	63	0.04154	1778	29.63
3	02-06-12	15:15 -	16:15	28.1	64	0.04269	1830	30.50
4	02-06-12	16:15 -	17:15	28.1	64	0.04136	1769	29.48

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®

2. Total Count was logged by Laser Dust Monitor

3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X		
Slope (K-factor):	0.0014	
Correlation coefficient:	0.9963	
Validity of Calibration Record:	1 June 2013	

1 June 2013

Remarks:

QC Reviewer: YW Fung

Signature:

Date: 4 June 2012

AECOM





CERTIFICATE OF CALIBRATION

Certificate No.:	11CA1221 01-01		Page 1	Page 1 of 2		
Item tested			a and a second a second a			
Description: Manufacturer: Typc/Model No.: Serial/Equipment No.: Adaptors used:	Sound Level Meter Rion Co., Ltd. NL:31 00320534 / N.007.0 -	1	Microphone Rian Co., Ltd. UC-53A 90526 -	Preamp Rion Co., Ltd. NH-21 03581		
Item submitted by						
Customer Name: Address of Customer: Request No.: Date of receipt:	AECOM ASIA CO., - - 21-Dec-2011	LTD.	ł	·		
Date of test:	23-Dec-2011		/	an mart a la an 2 , a la anna ann anna ann ann an Mhairteann an Mhairteann ann anna ann anna ann ann ann ann a		
Reference equipment	used in the calibr	ation				
Description: Multi function sound calibrator Signal generator Signal generator	Model: B&K 4226 DS 360 DS 360	Serial No. 2288444 33873 61227	Expiry Date: 09-May-2012 30-May-2012 30-May-2012	Traceable to: CIGISMEC CEPREI CEPREI		
Ambient conditions		*** ***** *****************************				
Temperature: Relative humidity: Air pressure:	(22 ± 1) ℃ (60 ± 10) % (1000 ± 5) hPa					
Test specifications				• • • • • • • • • • • • • • • • • • • •		
1, The Sound Level Me	ter has been calibrate n procedure SMTP00-		the requirements as speci	fied in BS 7580: Part 1: 1997		

- The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of +20%.
- The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:

l/Feng Jun Qi

16-Jan-2012 Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

Date:

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Form No.CARP152 1/issue 1/Rev.C/01/02/2007



综合試驗有限公司 SOILS & MATERIALS ENGINEERING CO., LTD.

G/F, 9/F, 12/F, 13/F, & 20/F, Leader Centre 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. 香港貨竹坑道37號利達中心地下,9樓,12樓,13樣及20樓 E-mall: smec@cigismec.com Website: www.cigismec.com

Tel. : (852) 2873 6860 Fax : (852) 2555 7533



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:	11CA1221 01-01	Page	2	of	2	
1, Electrical Tests		1999-1999 - Constant and a state of the second s				

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Uncertanity (dB) / Coverage Factor
Self-generated noise	A	Pass	0.3
	C	Pass	0.8 2.1
	Lin	Pass	1.6 2.2
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3
	Reference SPL on all other ranges	Pass	0.3
	2 dB below upper limit of each range	Pass	0.3
	2 dB above lower limit of each range	Pass	0.3
Linearity range for SPL	At reference range , Step 5 dB at 4 kHz	Pass	0.3
Frequency weightings	A	Pass	0.3
	С	Pass	0.3
	Lin	Pass	0.3
Time weightings	Single Burst Fast	Pass	0.3
	Single Burst Slow	Pass	0.3
Peak response	Single 100µs rectangular pulse	Pass	0.3
R.M.S. accuracy	Crest factor of 3	Pass	0.3
Time weighting I	Single burst 5 ms at 2000 Hz	N/A	N/A
	Repeated at frequency of 100 Hz	N/A	N/A
Time averaging	1 ms burst duty factor 1/10 ³ at 4kHz	Pass	0.3
	1 ms burst duty factor 1/10 ⁴ at 4kHz	Pass	0.3
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4
Overload indication	SPL	Pass	0.3
	Leq	Pass	0.4

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Uncertanity (dB) / Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3
	Weighting A at 8000 Hz	Pass	0.5

3, Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explightly stated.



The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No.CARP152-2/Issue 1/Rev.C/01/02/2007



G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. 香港黄竹坑道37號利達中心地下,9樓,12樓,13樓及20樓 E-mail: smec@cigismec.com Website: www.cigismec.com

Tel : (852) 2873 6860 Fax : (852) 2555 7533



CERTIFICATE OF CALIBRATION

Certificate No.:	12CA1008 02			Page	1	of	2	
Item tested								14
Description: Manufacturer: Type/Model No.: Serial/Equipment No.: Adaptors used:	Sound Level Meter Rion Co., Ltd. NL-31 00320528 / N. 0 0 7 -))))	Microphone Rion Co., Ltd. UC-53A 90565 -		Preamp Rion Co NH-19 75883 -		
Item submitted by								
Customer Name: Address of Customer: Request No.: Date of receipt:	AECOM ASIA CO. - - 08-Oct-2012	, LTD.						
Date of test:	08-Oct-2012							
Reference equipment	used in the calibr	ation						
Description: Multi function sound calibrator Signal generator Signal generator	Model: B&K 4226 DS 360 DS 360	Serial No. 2288444 33873 61227		Expiry Date: 22-Jun-2013 29-May-2013 29-May-2013		Traceat CIGISME CEPREI CEPREI		
Ambient conditions							83	
Temperature: Relative humidity: Air pressure:	(22 ± 1) °C (60 ± 10) % (1000 ± 5) hPa							
T								

Test specifications

- 1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- 2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
- The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:

Huang Jian Min/Feng Jun Qi

08-Oct-2012 Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

Date:

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綜合試驗有限公司 SOILS & MATERIALS ENGINEERING CO., LTD.

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

12CA1008 02

Page 2

of 2

1, Electrical Tests

The electrical tests were perfomed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Uncertanity (dB) / Coverage Fa	ctor
Self-generated noise	A	Pass	0.3	
3	С	Pass	0.8 2.1	
	Lin	Pass	1.6 2.2	
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
• • •	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
Frequency weightings	A	Pass	0.3	
	С	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100µs rectangular pulse	Pass	0.3	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	N/A	N/A	
	Repeated at frequency of 100 Hz	N/A	N/A	•
Time averaging	1 ms burst duty factor 1/10 ³ at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 ⁴ at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Uncertanity (dB) / Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3
and a set of the set o	Weighting A at 8000 Hz	Pass	0.5

3, Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated



The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No.CARP152-2/Issue 1/Rev.C/01/02/2007



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CERTIFICATE OF CALIBRATION

Certificate No.:	12CA0321 01-02			Page	1	of	2	
Item tested								`a.
Description:	Sound Level Meter	(Type 1)		Microphone				
Manufacturer:	B&K		,	B&K				
Type/Model No.:	2250-L			4950				
Serial/Equipment No.:	2681366 / N.011.01	1	,	2665582				
Adaptors used:	E i		,					
Item submitted by								
Customer Name:	AECOM ASIA CO I	TD						
Address of Customer:	-							
Request No.:	-							
Date of receipt:	21-Mar-2012							
Date of test:	23-Mar-2012							
Reference equipment	used in the calibr	ation						
Description:	Model:	Serial No.		Expiry Date:		Tracea	ble to:	
Multi function sound calibrator	B&K 4226	2288444		09-May-2012		CIGISM	EC	
Signal generator	DS 360	33873		30-May-2012		CEPREI		
Signal generator	DS 360	61227		30-May-2012		CEPREI		
Ambient conditions								
Temperature:	(22 ± 1) °C							
Relative humidity:	$(60 \pm 10)\%$							
	(1005 ± 5) hPa							
Air pressure: Test specifications	(1005 ± 5) hPa							

- The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 1, and the lab calibration procedure SMTP004-CA-152
- The electrical tests were performed using an electrical signal substituted for the microphone which was removed and 2, replaced by an equivalent capacitance within a tolerance of +20%.
- The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference 3, between the free-field and pressure responsess of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:

Date: eng Jun Qi Huang Jian

23-Mar-2012 Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

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Form No.CARP152-1/Issue 1/Rev.C/01/02/2007



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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

12CA0321 01-02

Page 2

2

of

1, Electrical Tests

The electrical tests were perfomed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Uncertanity (dB) / Coverage Fact	or
Self-generated noise	A	Pass	0.3	
0	С	Pass	0.8 2.1	
	Lin	Pass	1.6 2.2	
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
electronical and the meaning of the second	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
Frequency weightings	A	Pass	0.3	
	С	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
na na stranovni v stranovni og stranovni og stranovni og stranovni stranovni stranovni stranovni stranovni stra Fil	Single Burst Slow	Pass	0.3	
Peak response	Single 100µs rectangular pulse	N/A	N/A	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
0 0	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/10 ³ at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 ⁴ at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
Noner and an	Leq	Pass	0.4	

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Uncertanity (dB) / Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3
	Weighting A at 8000 Hz	Pass	0.5
	an and the Exception of the Constant Constant Constants of the Constant of the Constant Const		

3, Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.



The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No.CARP152-2/Issue 1/Rev.C/01/02/2007





CERTIFICATE OF CALIBRATION

Certificate No.:	11CA1221 01-02	Page:	1	of	2
Item tested					·····
Description:	Acoustical Calibrator (Class 1)				
Manufacturer:	Rion Co., Ltd.				
Type/Model No .:	NC-73				
Serial/Equipment No.:	10307216 / N.004.06				
Adaptors used:					
Item submitted by					
Curstomer:	AECOM ASIA CO., LTD.				
Address of Customer:	-				
Request No.:	12, I				
Date of receipt:	21-Dec-2011				
Date of test:	16-Jan-2012				

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	18-May-2012	SCL
Preamplifier	B&K 2673	2239857	14-Dec-2011	CEPREI
Measuring amplifier	B&K 2610	2346941	15-Dec-2011	CEPREI
Signal generator	DS 360	61227	30-May-2012	CEPREI
Digital multi-meter	34401A	US36087050	09-Dec-2011	CEPREI
Audio analyzer	8903B	GB41300350	27-May-2012	CEPREI
Universal counter	53132A	MY40003662	30-May-2012	CEPREI

Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	$65 \pm 5 \%$
Air pressure:	1005 ± 5 hPa

Test specifications

1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.

2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.

3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on page 2 of this certificate.

Huang Jian I

in/Feng Jun Qi





Comments: The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

Date:

16-Jan-2012

Soils & Materials Engineering Co., Ltd.

Approved Signatory:

Form No.CARP156-1/Issue 1/Rev.D/01/03/2007



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G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Rong. 香港黃竹坑道37號利達中心地下,9樓,12樓,13樓及20樓 E-mail: smec@cigismec.com Website: www.cigismec.com Tel : (852) 2873 6860 Fax : (852) 2555 7533



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

11CA1221 01-02

Page: 2

of 2

1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

			(Output level in dB re 20 µPa
Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Uncertainty dB
1000	94.00	93.92	0.10

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz	STF = 0.002 dB	
Estimated uncertainty	0.005 dB	
	5)I	

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz	Actual Frequency = 990.6 Hz	
Estimated uncertainty	0.2 Hz	Coverage factor k = 2.2

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz	TND = 0.7%
Estimated uncertainty	0.7%

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 % A coverage factor of 2 is assumed unless explicitly stated.



The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No.CARP156-2/Issue 1/Rev.C/01/05/2005



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CERTIFICATE OF CALIBRATION

Certificate No.;	12CA0321 01-04		Page:	l of 2
Item tested			anna a ann an Anna Anna ann a' sua an an an ann an ann an an an an an ann an a	
Description: Manufacturer: Type/Model No.: Serial/Equipment No.: Adaptors used:	Acoustical Calibrator Rion Co., Ltd. NC-73 10185482 / N.004.00	•		
Item submitted by				2
Curstomer: Address of Customer: Request No.: Date of receipt:	AECOM ASIA CO., I - - 21-Mar-2012	.TD.		
Date of test:	21-Mar-2012			
Reference equipment	used in the calibra	tion		
Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter Audio analyzer Universal counter	Modei: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B 53132A	Serial No. 2412857 2239857 2346941 61227 US36087050 GB41300350 MY40003662	Expiry Date: 18-May-2012 05-Jan-2013 29-Dec-2012 30-May-2012 16-Dec-2012 27-May-2012 30-May-2012	Traceable to: SCL CEPREI CEPREI CEPREI CEPREI CEPREI CEPREI
Ambient conditions			and a community of a constraint of a second and a constraint of a second and a constraint of a second a constraint of a constr	,,,,,,_,_,_,_,_,_,,_,
Temperature: Relative humidity: Air pressure:	21 ± 1 ℃ 60 ± 10 % 1005 ± 5 hPa			
Test specifications	<u></u>	······································		
and the lab calibratic2, The calibrator was te3, The results are roun	In procedure SMTP004- sted with its axis vertice ded to the nearest 0.01	-CA-156. al facing downwards a dB and 0.1 Hz and ha	It the specific frequency	ed in IEC 60942 1997 Annex B using insert voltage technique or variations from a reference t is insensitive to pressure
Test results	9 			
Details of the performed met Approved Signatory: <u>Hu</u> Comments: The results rep carry no implication regardin	eng tien Min/Feng Jun Qi orted in this certificate r	Date: 23-Mar-2	2012 Company Ch	0/05 ¥ 0

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Form No.CARP156-1/issue 1/Rev.D/01/03/2007



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CERTIFICATE OF CALIBRATION

(Continuation Page)

 Certificate No.:
 12CA0321 01-04
 Page:
 2
 of
 2

1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

Output Sound Pressure Level Setting	Measured Oulput Sound Pressure Level	Estimated Uncertainty
dB	dB	dB
94.00	93.59	0.10
	Level Setting dB	Level Setting Sound Pressure Level dB d3

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz	STF = 0.002 dB
Estimated uncertainty	0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz	Actual Frequency = 990.9 Hz	
Estimated uncertainty	0.2 Hz	Coverage factor $k = 2.2$

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz	TND = 0.6%
Estimated uncertainty	0.7%

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

•	1	- End -	al
Calibrated by:	my	Checked by:	
Date:	Fung Chí Yip 21-Már-2012	Date:	Chan Chun Lam 23-Mar-2012

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

Work Order: Amendment: Date of Issue: Client: HK1218922 1 13/08/2012 AECOM ASIA COMPANY LIMITED

Description: Brand Name: Model No.: Serial No.: Equipment No.: Date of Calibration: YSI Sonde YSI YSI 6820-C-M W.026.09 W.026.09 17 July, 2012

Date of next Calibration:

17 October, 2012

Parameters:

Conductivity

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
142.6	136.8	-4.1
6667	6747	1.2
12890	12470	-3.3
58670	57330	-2.3
	Tolerance Limit (%)	10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 45000: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.91	4.06	0.15
5.01	5.15	0.14
6.97	6.88	-0.09
		945
	Tolerance Limit (±mg/L)	0.20

Salinity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
	the second	
0	0.03	
10	10.22	2.2
20	19.06	-4.7
30	29.76	-0.8
	Tolerance Limit (±%)	10.0

Mr Chan Kwok)Fai, Godfrey aboratory Manage - Hong Kong

Work Order: Amendment: Date of Issue: Client:

Description: Brand Name: Model No.: Serial No.: Equipment No.: Date of Calibration: 1 13/08/2012 AECOM ASIA COMPANY LIMITED

YSI Sonde YSI YSI 6820-C-M W.026.09 W.026.09 17 July, 2012

HK1218922

Date of next Calibration:

17 October, 2012

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
21.0	21.14	0.1
27.5	26.60	-0.9
33.0	32.05	-1.0
	Tolerance Limit (°C)	2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.1	
4	4.1	2.5
10	10.0	0.0
20	20.0	0.0
50	49.7	-0.6
100	98.7	-1.3
	Tolerance Limit (±%)	10.0

McChan Kwok/Fai, Godfrey Laboratory Manager - Hong Kong

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

E

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

MITED

Date of next Calibration:

16 January, 2013

Parameters:

Conductivity

Method Ref: APHA (21st edition		7 1 (0()
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), 45000: G

etilou kei: Al HA (21st euklon); 19000. 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

Method Kel. Al HA (215t cutton); 25205			
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	

Mr Chan Kwok Fai, Godfrey Laboratory Manager - Hong Kong Page 2 of 3

Work Order: Date of Issue: Client:

HK1227690 17/10/2012 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 23.0 31.0	18.81 22.75 30.65	0.3 -0.3 -0.4
51.0	Tolerance Limit (°C)	2.0

Turbidity

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

Method Ref. ATTA (21st cutton), 2150b			
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	
· · · · · · · · · · · · · · · · · · ·			

Mr Chan Kwok Fai, Godfrey Laboratory Manager - Hong Kong

Work Order:	HK1
Amendment no.:	1
Date of Issue:	16/
Client:	AEC

221702

08/2012 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:	16 August, 2012	Date of next Calibration:	16 November, 2012

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B			
Expected Reading (uS/cm)	Tolerance (%)		
146.9 6667 12890 58670	152.9 6342 12110 56140	4.1 -4.9 -6.1 -4.3	
	Tolerance Limit (%)	10.0	

Dissolved Oxygen

Method Ref: APHA (21st edition), 45000: G

Displayed Reading (mg/L)	Tolerance (mg/L)	
5.65	0.00	
6.66	0.16	
7.00	0.16	
10 001926282		
Tolerance Limit (±mg/L)	0.20	
	Displayed Reading (mg/L) 5.65 6.66 7.00	

pH Value

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

Method Ren ATTACETSCE ar 1900thb		
Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0 7.0 10.0	3.97 6.92 9.92	-0.03 -0.08 -0.08
	Tolerance Limit (±unit)	0.2

Salinity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.08	
10	9.85	-1.5
20	19.27	-3.7
30	29.22	-2.6
Tal marks		
	Tolerance Limit (±%)	10.0

Mr Chan Kwok/Fai, Godfrey Laboratory Wanager - Hong Kong

Work Order: Amendment no.: Date of Issue: Client:

HK1221702

16/08/2012 AECOM ASIA COMPANY LIMITED

Description:	YS
Brand Name:	YS
Model No.:	YS
Serial No.:	12
Equipment No.:	W
Date of Calibration:	16

SI Sonde V2 SI SI 6820 V2 2A101545 .026.35 6 August, 2012

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Date of next Calibration:

16 November, 2012

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)
22.5 25.5 30.0	22.2 25.0 31.1	-0.3 -0.5 1.1
	Tolerance Limit (°C)	2.0

Turbidity

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

Method Rel. AFHA (21st edition), 2150b		
Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	
4	3.9	-2.5
10	9.8	-2.0
20	20.1	0.5
50	50.2	0.4
100	98.9	-1.1
0 babatas		
	Tolerance Limit (±%)	10.0

Mr Chan Kwok Fai, Godfrey Laboratory Manager - Hong Kong

Work Order:	HK1221702
Date of Issue:	16/08/2012
Client:	AECOM ASIA COMPANY LIMITED



YSI Sonde V2	
YSI	
YSI 6820 V2	
12A101545	
W.026.35	
16 August, 2012	Date of next Calibration:
	YSI YSI 6820 V2 12A101545 W.026.35

17 October, 2012

Parameters:

r di diffeter si			
Conductivity	Method Ref: APHA (21st edition Expected Reading (uS/cm)	n), 2510B Displayed Reading (uS/cm)	Tolerance (%)
	Expected Reading (us/cill)	Displayed Reading (us/cill)	Tolerance ()07
	146.9	152.9	4.1
	6667	6342	-4.9
	12890	12110	-6.1
	58670	56140	-4.3
		Tolerance Limit (%)	10.0
Dissolved Oxygen	Method Ref: APHA (21st editio	nn), 45000: G	
Dissolved oxygen	Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
	5.65	5.65	0.00
		6.66	0.16
	6.50		
	6.84	7.00	0.16
		Tolerance Limit (±mg/L)	0.20
pH Value	Method Ref: APHA 21st Ed. 45		Toloromco (nH unit)
	Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
	4.0	3.97	-0.03
	7.0	6.92	-0.08
	10.0	9.92	-0.08
	10.0	9.92	-0.08
		Tolerance Limit (±unit)	0.2
Salinity	Method Ref: APHA (21st edition	on), 2520B	
	Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
	0	0.08	
	10	9.85	-1.5
	20	19.27	-3.7
	30	29.22	-2.6

Tolerance Limit (±%)

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

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ALS Technichem (HK) Pty Ltd

Work Order: Date of Issue: Client:

Description: Brand Name: Model No.: Serial No.: Equipment No.: Date of Calibration:

HK1221702 16/08/2012 AECOM ASIA COMPANY LIMITED



YSI Sonde V2 YSI YSI 6820 V2 12A101545 W.026.35 16 August, 2012

Date of next Calibration:

17 October, 2012

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)
22.5	22.2	-0.3
25.5	25.0	-0.5
30.0	31.1	1.1
	Tolerance Limit (°C)	2.0

Turbidity

Method Ref: APHA (21st edition). 21308

IVI	Method Ref: APHA (21st edition), 2150B		
	Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
	0	0.0	
	4	3.9	-2.5
	10	9.8	-2.0
	20	20.1	0.5
	50	50.2	0.4
	100	98.9	-1.1
		at the second	
		Tolerance Limit (±%)	10.0

Mr Chan Kwok Fai, Godfrey Laboratory Wahager - Hong Kong

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



Description: Brand Name: Model No.: Serial No.:	YSI Sonde YSI 6820 V2 12D 100972		
Equipment No.: Date of Calibration:	W.026.36 09 October, 2012	Date of next Calibration:	09 January, 2013

Parameters:

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

Method Ren / Thir (E15t catton); E5105				
Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)		
142.6 6667	142.0 6537	-0.4 -1.9		
12890 58670	12260 56930	-4.9 -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 (±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 7.0	4.11 7.08	0.11 0.08	
10.0	9.94	-0.06	
	Tolerance Limit (±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 (±%)	10.0

Mr Chan Kwok Fai, Godfrey Laboratory Manager - Hong Kong

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



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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
		9
	Tolerance Limit (±%)	10.0

Mr Chan Kwok Fai, Godfrey Laboratory Manager Hong Kong

Work Order: Date of Issue: **Client:**

HK1219200 25/07/2012 AECOM ASIA COMPANY LIMITED

Description: Brand Name: Model No.: Serial No.: Equipment No.: Date of Calibration:

pH Meter Thermo Orion 230A+ 020365 W.039.04 24 July, 2012

Date of next Calibration:

24 October, 2012

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.96	-0.04
7.0	6.94	-0.06
10.0	9.82	-0.18
	Tolerance Limit (±unit)	0.2

Mrghan Kwok/Fai, Godfrey Laboratory Manager - Hong Kong

Work Order: Date of Issue: Client: HK1228018 20/10/2012 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 (±unit)	0.2

-01 Mr Chan Kwok Fai, Godfrey Laboratory Manager - Hong Kong