10 5 7 3	78T 291 98: 17-Ma: 17-Ma : 17-Ma : 17-Ma	Orifice Transfer 8 Slope, mc 19-11	Qstd = {[DH x (F	Interce = [DH x (Pa/760) x Pa/760) x (298/Ta)] ¹	754.7 Appt, bc (298/Ta)] 1/2 1/2 -bc} / mc S Flow Recorder Continuous Flo	-0.0251
Serial No: Last Calibration Date Next Calibration Date Plate No. Plate No. DH (o in. of 18 8 13 7 10 5 7 3	98: 17-Ma: 17-Ma	Orifice Transfer 8 Slope, mc y-11 y-12 Calibration Orfice (x (Pa/760) x (298/Ta)) 2.87	nt Condition , Pa (mmHg) Standard Information 2.01182 mc x Qstd + bc = Qstd = {[DH x (Fine of TSP Sampler] Qstd (m³/min) X-axis	n Interce = [DH x (Pa/760) x (298/Ta)] ¹ - Pa/760) x (298/Ta)] ¹ - HVS	754.7 ppt, bc (298/Ta)] ^{1/2} (298/Ta)] 1/2 -bc} / mc S Flow Recorder Continuous Flo	
Serial No: Last Calibration Date Next Calibration Date Resistance Plate No. 18 8 13 7 10 5 7 3	98: 17-Ma: 17-Ma	Orifice Transfer 8 Slope, mc y-11 y-12 Calibration Orfice (x (Pa/760) x (298/Ta)) 2.87	, Pa (mmHg) Standard information 2.01182 mc x Qstd + bc = Qstd = {[DH x (Find of TSP Sampler] Qstd (m³/min) X-axis	Interce = [DH x (Pa/760) x (298/Ta)] Pa/760) x (298/Ta)] HV3	opt, bc (298/Ta)] ^{1/2} (298/Ta)] from the continuous Flower contin	
Serial No: Last Calibration Date Next Calibration Date Resistance Plate No. 18 8 13 7 10 5 7 3	98: 17-Ma: 17-Ma	Orifice Transfer 8 Slope, mc y-11 y-12 Calibration Orfice 1 x (Pa/760) x (298/Ta)] 1/2 2.87	Standard Informatio 2.01182 mc x Qstd + bc : Qstd = {[DH x (Fine of TSP Sampler]} Qstd (m³/min) X axis	Interce = [DH x (Pa/760) x (298/Ta)] Pa/760) x (298/Ta)] HV3	opt, bc (298/Ta)] ^{1/2} (298/Ta)] from the continuous Flower contin	
Resistance Plate No. 18 8 13 7 10 5 7 3	: 17-Ma : 17-Ma : 17-Ma riflice), water [DH	8 Slope, mc y-11 y-12 Calibration Orfice 1 x (Pa/760) x (298/Ta)] 2.87	2.01182 mc x Qstd + bc : Qstd = {[DH x (F	Interce = [DH x (Pa/760) x (298/Ta)] Pa/760) x (298/Ta)] HV3	(298/Ta)] 1/2 -bc} / mc S Flow Recorder Continuous Flo	
Resistance Plate No. 18 8 13 7 10 5 7 3	: 17-Ma : 17-Ma : 17-Ma riflice), water [DH	8 Slope, mc y-11 y-12 Calibration Orfice 1 x (Pa/760) x (298/Ta)] 2.87	2.01182 mc x Qstd + bc : Qstd = {[DH x (F	Interce = [DH x (Pa/760) x (298/Ta)] Pa/760) x (298/Ta)] HV3	(298/Ta)] 1/2 -bc} / mc S Flow Recorder Continuous Flo	
Resistance Plate No. 18 8 13 7 10 5 7 3	: 17-Ma : 17-Ma : 17-Ma riflice), water [DH	y-11 ly-12 Calibration Orfice (x (Pa/760) x (298/Ta)) ^{1/2} 2.87	mc x Qstd + bc : Qstd = {[DH x {F	= [DH x (Pa/760) x (298/Ta)] ¹ HVS	(298/Ta)] 1/2 -bc} / mc S Flow Recorder Continuous Flo	
Next Calibration Date Resistance Plate No. DH (o in. of in. o	rifice), water [DH	Calibration Orfice I x (Pa/760) x (298/Ta)] ^{1/2} 2.87	Qstd = {[DH x {F n of TSP Sampler Qstd (m³/min) X- axis	Pa/760) x (298/Ta)] ¹ HVS	S Flow Recorder Continuous Flo	
Resistance Plate No. 18 8 13 7 10 5 7 3	rifice), water [DH	Calibration Orfice (x (Pa/760) x (298/Ta)) 2.87	of TSP Sampler Qstd (m³/min) X axis	HV:	S Flow Recorder Continuous Flo	
Plate No. DH (0 in. of 18 8 13 7 10 5 7 3	water lDF	Orfice (x (Pa/760) x (298/Ta)) ^{1/2} 2.87	Qstd (m³/min) X axis	Flow Recorder	Continuous Flo	
Plate No. DH (0 in. of 18 8 13 7 10 5 7 3	water lDF	Orfice (x (Pa/760) x (298/Ta)) ^{1/2} 2.87	Qstd (m³/min) X axis	Flow Recorder	Continuous Flo	P ¹
Plate No. DH (0 in. of 18 8 13 7 10 5 7 3	water lDF	2.87	axis	· .		
13 7 10 5 7 3	.4		1 1/1	1 Ion 1 toootao.		
13 7 10 5 7 3		27/	1 1 1 1	45.0	45.3	16
10 5 7 3	.4	∠.1 ↔	1.38	40.0	40.3	12
		2.34	1,18	34.0	34.2	.7
	.7	1.94	0.98	24.0	24.1	9
	.2	1.49	0.76	15.0	15.1	2
By Linear Regression of Slope , mw = 43.1 Correlation Coefficient*	0821	0,9931	Intercept, bw =	-17.	4550	
*If Correlation Coefficient						
ii oonolaaan oo						
			int Calculation			
From the TSP Field Calibr			44			
From the Regression Equ	ation, the "Y" va	lue according to				
		mw x Ostd + bw =	IC x [(Pa/760) x (298/	Ta) ^{1/2}		
Therefore, Set Point; IC =	(mw x Qstd + t	ow)x[(760/Pa)x(Ta	/ 298)] ^{1/2} =		38.25	

Station	Tung Chung Dev	elopment Pier (A	MS2)	Operator:	Shum Ka	ım Yuen	
Cal. Date:	11-May-12			Next Due Date:	11-Ju	ı l-1 2	
Equipment No.:	A-001-78T			Serial No.	33	33	
			Ambient	Condition			
Temperati	ure, Ta (K)	300.9	Pressure, F	Pa (mmHg)		756.4	·
•							
			Orifice Transfer S	tandard Informatio	n		
Seria	al No:	843	Slope, mc	2.00834	Interce		-0.02923
Last Calibr	ration Date:	15-Nov-11			= [DH x (Pa/760) x		
Next Calib	ration Date:	15-Nov-12		Qstd = {[DH x (Pa/760) x (298/Ta)]	^{/2} -bc} / mc	
-		4					
			Calibration of	of TSP Sampler			
		Í	Orfice		HV	S Flow Recorde	ar er
Resistance Plate No.	DH (orifice), in. of water	[DH x (Pa/7	760) x (298/Ta)] ^{1/2}	Qstd (m³/min) X - axis	Flow Recorder Reading (CFM)		Flow Recorder (CFM) Y-axis
18	8.2		2.84	1.43	44.0	4;	3.68
13	7.3		2.68	1.35	41.0	4(0.71
10	5.5		2.33	1.17	35.0	34	4.75
7	3.9		1.96	0.99	26.0	2!	5.81
5	2.0		1,40	0.71	17.0	16	6.88
By Linear Regr Slope , mw =	ression of Y on X 38.1104			intercept, bw =	-10.	7655	
Correlation Co.	efficient* =		.9955	•			
*If Correlation C	oefficient < 0.990,	check and reca	ibrate.				
			Set Point	Calculation			
From the TSP F	Field Calibration Cu	urve. take Qstd =					
	ssion Equation, th			•			
, tom the region	Colon Equation, an	O 1 MAINT MODE	,			. '	
		mv	v x Qstd + bw = IC	x [(Pa/760) x (298/	Ta)] ^{1/2}		
Therefore, Set I	Point: IC = (mw x l	Ostd + bw) x l()	760 / Pa) x (Ta / 29	98)1 ^{1/2} =		39.06	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	4		, , , , , , , , , , , , , , , , , , , ,	73		<u> </u>	<u></u>
							
Remarks:							
				<u> </u>			
QC Reviewer:	k H is	WEK	Signature:	H/ke		Date:	Haz-12
AO LONONOL.	13:14	41127	2	- I III Theregoe			

D:\HVS Calibration Certificate (Existing)\

Pressure, Orifice Transfer S Slope, mc Calibration of the control of the contro		Interce = [DH x (Pa/760) x (Pa/760) x (298/Ta)] ¹	751.6 Ppt, bc -0.025
Pressure, Orifice Transfer S Slope, mc Calibration of the control of the contro	t Condition Pa (mmHg) standard Informatio 2.01182 mc x Qstd + bc Qstd = {[DH x (I	interce = [DH x (Pa/760) x (Pa/760) x (298/Ta)] ¹ HVS Flow Recorder	751.6 Pept, bc -0.025 (298/Fa)] 1/2 1/2 -bc) / mc S Flow Recorder
Pressure, Orifice Transfer S Slope, mc Calibration of the control of the contro	Pa (mmHg) Standard Informatio 2.01182 mc x Qstd + bc Qstd = {[DH x (I	Interce = [DH x (Pa/760) x (Pa/760) x (298/Ta)] ¹ HVS Flow Recorder	ept, bc -0.025 (298/Ta)] ^{1/2} ^{1/2} -bc) / mc S Flow Recorder
Orifice Transfer S Slope, mc Calibration of the control of the co	2.01182 mc x Qstd + bc Qstd = {[DH x (I	Interce = [DH x (Pa/760) x (Pa/760) x (298/Ta)] ¹ HVS Flow Recorder	ept, bc -0.025 (298/Ta)] ^{1/2} ^{1/2} -bc) / mc S Flow Recorder
Calibration (Priice 60) x (298/Ta)] ^{1/2} 2.82	2.01182 mc x Qstd + bc Qstd = {[DH x (I of TSP Sampler Qstd (m³/min) X axis	Interce = [DH x (Pa/760) x (Pa/760) x (298/Ta)] ¹ HVS Flow Recorder	(298/Ta)] 1/2 1/2 -bc) / mc S Flow Recorder
Calibration (Priice 60) x (298/Ta)] ^{1/2} 2.82	2.01182 mc x Qstd + bc Qstd = {[DH x (I of TSP Sampler Qstd (m³/min) X axis	Interce = [DH x (Pa/760) x (Pa/760) x (298/Ta)] ¹ HVS Flow Recorder	(298/Ta)] 1/2 1/2 -bc) / mc S Flow Recorder
Calibration of the control of the co	mc x Qstd + bc Qstd = {[DH x (I Df TSP Sampler Qstd (m³/min) X axis	= [DH x (Pa/760) x (Pa/760) x (298/Ta)] ¹ HVS Flow Recorder	(298/Ta)] 1/2 1/2 -bc) / mc S Flow Recorder
orfice 60) x (298/Ta)] ^{1/2} 2.82	Qstd = {[DH x (I of TSP Sampler Qstd (m³/min) X - axis	Pa/760) x (298/Ta)] ¹ HVS Flow Recorder	S Flow Recorder
orfice 60) x (298/Ta)] ^{1/2} 2.82	Of TSP Sampler Qstd (m³/min) X axis	HVS	S Flow Recorder
orfice 60) x (298/Ta)] ^{1/2} 2.82	Qstd (m³/min) X : axis	Flow Recorder	
60) x (298/Ta)] ^{1/2}	axis	Flow Recorder	
2.82	axis		Continuous Flow Recorde
	1 1 1 1	1	Reading IC (CFM) Y-axis
2.58	1.41	44.0	44.11
2.58		40.0	40.10
2.33		32.0	32.08
1.93 0.		24.0	- 24.06
1.52	0.77	16.0	16.04
	Intercept, bw =	-18.7	7205
9927	_		
brate.			
A STATE OF THE PARTY OF T	t Calculation		
1.30m³/min			
ding to			
		w_1×1/2	
o Contal a bour on IC			
x Qstd + bw = IC	X [(Pai/6U) X (296i	1 a)]	
x Qstd + bw = I C		(a) <u>[</u>	39.06
	9927 brate. Set Poin	Intercept, bw = 9927 brate. Set Point Calculation 1.30m³/min	Intercept, bw =

tation	Site Boundary of	Site Office (WA2	!} (AMS3A)	Operator:	Shum Ka	m Yuen	
al. Date:	11-May-12			Next Due Date:	11-Ju	I-12	
quipment No.:	A-001-79T			Serial No.	338	34	*****
				Condition			
	T	0000				756.4	
Temperatu	ire, Ta (K)	300.9	Pressure, P	a (numy)		100.4	
			Orlfice Transfer St	andard Information	n		
Seria	l No:	843	Slope, mc	2.00834	Interce		-0.02923
Last Calibr	ation Date:	15-Nov-11		mc x Qstd + bc =	= [DH x (Pa/760) x	[298/Ta)] 1/2	
Next Calib	ration Date:	15-Nov-12		Qstd = {[DH x (F	Pa/760) x (298/Ta)]	^{/2} -bc} / mc	
		•	A 111 - 11	aren e - L			
10000	T CONTRACTOR		SEAN PROPERTY OF STATE OF STAT	f TSP Sampler	LIV!	Flow Recorde	
Resistance Plate No.	DH (orifice), in. of water		Orfice (60) x (298/Ta)] ^{1/2}	Qstd (m³/min) X axis	Flow Recorder Reading (CFM)	Continuous F Reading IC (0	low Recorder
18	8.1		2.83	1.42	47.0	46	66
13	6.8	2.59		1.30	41.0	40	.71
10	5.3		2.29	1.15	33.0	32	.76
, 0			1.96	0.99	23.0	22	.83
7	1 3.9	1	טע.ן	1 0.00			
7 5	3.9 2.5		1.57	0.80	15.0	14	.89
5 By Linear Regi	2.5 ression of Y on X 51.9317		1.57		15.0	14 2 64 5	.89
5 By Linear Regulation & Stope , mw = Correlation Co	2.5 ression of Y on X 51.9317 refficient* =	0	1.57 9.9961	0.80	15.0		.89
5 Sy Linear Regulation of the control of the contr	2.5 ression of Y on X 51.9317	0	1.57 9.9961	0.80	15.0		.89
5 Sy Linear Regulation of the control of the contr	2.5 ression of Y on X 51.9317 refficient* =	0	1.57 9.9961 librate.	0.80	15.0		.89
5 by Linear Registrope, mw = Correlation Co If Correlation C	2.5 ression of Y on X 51.9317 refficient* = coefficient < 0.990,	check and reca	1.57 3.9961 librate.	0.80	15.0		.89
5 By Linear Regional Stope, mw = Correlation Confection Correlation Correlati	2.5 ression of Y on X 51.9317 refficient* =	check and reca	1.57 9.9961 librate. Set Point = 1.30m ³ /min	0.80	15.0		
by Linear Regional Stope, mw = Correlation Confection C	2.5 ression of Y on X 51.9317 refficient* = coefficient < 0.990,	check and reca	1.57 9.9961 Set Point 1.30m³/min arding to	Intercept, bw =	-27.3		
5 By Linear Regional Stope, mw = Correlation Confection Confectio	2.5 ression of Y on X 51.9317 refficient* = coefficient < 0.990,	check and reca	1.57 9.9961 Set Point 1.30m³/min arding to	0.80	-27.3		
5 By Linear Regional Stope, mw = Correlation Confection Confection Confection Confection Confection the TSP Form the Regree	2.5 ression of Y on X 51.9317 refficient* = coefficient < 0.990, rield Calibration Coession Equation, the	check and reca urve, take Qstd = e "Y" value acco	1.57 9.9961 Set Point 1.30m³/min arding to	Intercept, bw = Calculation x [(Pa/760) x (298/	-27.3		

D:\HVS Calibration Certificate (Existing)\6\

)_ D_4=:	tiong hong onyo	ity Marriott Hotel	(* 111101)	_ Operator: _	Choi W		
al. Date:	14-Mar-12			Next Due Date:	14-Ma	ay-12	
quipment No.:	A-001-80T			Serial No.	338	85	
			Ambient	Condition			
Temperatu	ге, Та (К)	291.3	Pressure, F	a (mmHg)		754.7	
		(rifice Transfer St	andard Informatio	n		
Serial	No:	988	Slope, mc	2.01182	Interce	-	-0.0251
Last Calibra	ation Date:	17-May-11			= [DH x (Pa/760) x		•
Next Calibra	ation 'Date:	17-May-12		Qstd = {{DH x (F	Pai760) x (298/Ta)]	^{1/2} -bc} / mc	
		•				10-20-20-00-00-00-00-00-00-00-00-00-00-00	
			Calibration o	f TSP Sampler			
	·	0	rfice		HVS	S Flow Recorder	
Resistance Plate No.	DH (orifice), in. of water	[DH x (Pa/78	60) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X axis	Flow Recorder Reading (CFM)	Continuous Flo Reading IC (C	
18	7.6		2.78	1.39	42.0	42.3	33 -
13	6.5	-	2.57		36.0	36.2	28
10	5.3	2.32		1.17	30.0	30.2	24
7	3.9	1.99		1.00	24.0	24.	19
5	3.6		1.91	0.96	22.0	22.	17
	ession of Y on X			Intercept, bw =	-21 .	7914	
•	45.4356			micropi, an			
Slope , mw =		 0.0	9927	intercept, an			
Slope , mw = Correlation Coe							
Slope , mw = Correlation Coe	fficient* = pefficient < 0.990,	check and recalib	orate. Set Point	Calculation			
Slope , mw = Correlation Coe	fficient* =	check and recalib	orate. Set Point				
Slope , mw = Correlation Coe If Correlation Co	fficient* = pefficient < 0.990,	check and recalit	Set Point 1.30m ³ /min				
Slope , mw = Correlation Coe If Correlation Co	eld Calibration Cu	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to	Calculation			
Slope , mw = Correlation Coe If Correlation Co	eld Calibration Cu	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to				
Slope , mw = Correlation Coe If Correlation Co From the TSP Fi From the Regres	eld Calibration Cosion Equation, the	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to x Qstd + bw = IC	Calculation × [(Pa/760) x (298/		36.09	
Slope , mw = Correlation Coe If Correlation Co From the TSP Fi From the Regres	eld Calibration Cosion Equation, the	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to	Calculation × [(Pa/760) x (298/		36.98	
Slope , mw = Correlation Coe If Correlation Co From the TSP Fi From the Regres	eld Calibration Cosion Equation, the	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to x Qstd + bw = IC	Calculation × [(Pa/760) x (298/		36.98	
Slope , mw = Correlation Coe If Correlation Co From the TSP Fi From the Regres	eld Calibration Cosion Equation, the	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to x Qstd + bw = IC	Calculation × [(Pa/760) x (298/		36.98	
Slope , mw = Correlation Coe If Correlation Coe From the TSP Fi From the Regres Therefore, Set P	eld Calibration Cosion Equation, the	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to x Qstd + bw = IC	Calculation × [(Pa/760) x (298/		36.98	
Slope , mw = Correlation Coe If Correlation Coe From the TSP Fi From the Regres Therefore, Set P	eld Calibration Cosion Equation, the	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to x Qstd + bw = IC	Calculation × [(Pa/760) x (298/		36.98	
Slope , mw = Correlation Coe If Correlation Co From the TSP Fi From the Regres	eld Calibration Cosion Equation, the	check and recalit urve, take Qstd = e "Y" value accord	Set Point 1.30m ³ /min ding to x Qstd + bw = IC	Calculation × [(Pa/760) x (298/		36.98	

Station	Hong Kong SkyC	ity Marriott Hotel ((AMS7)	Operator:	Shum Kam Yuen		
Cal. Date:	11-May-12			Next Due Date:	11-Ju	ul-12	_
Equipment No.:	A-001-80T			Serial No.	33	85	_
			Ambient	Condition			
Temperatu	re Ta (K)	300.9	Pressure, F			756.4	
Tomporate	10, 14 (14)			. (·····
		0	rifice Transfer S	tandard Informatio	n a seminar se		
Seria	l No:	843	Slope, mc	2.00834	Interce	ept, bc	-0.02923
Last Calibr	ation Date:	15-Nov-11		mc x Qstd + bc	= [DH x (Pa/760) x	(298/Ta)] ^{1/2}	
Next Calibr	ation Date:	15-Nov-12		Qstd = {[DH x (I	Pa/760) x (298/Ta)]	^{1/2} -bc} / mc	
		,					
			Galibration of	fTSP Sampler			
		O ₁	fice		HV	S Flow Recorder	
Resistance Plate No.	DH (orifice), in. of water	_ [DH x (Pa/76	0) x (298/Ta)] ^{1/2}	Qstd (m ³ /min) X · axis	Flow Recorder Reading (CFM)	Continuous Flo Reading IC (CF	
18	7.7		2.75	1.39	44.0	43.6	8
13	6.7	1	2.57	1.2 9	38.0	37.7	3
10	5.5		2.33	1.17	32.0	31.7	7
7	4.1	2	2.01	1.02	26.0	25.8	1
5	3.6		1.88	0.95	22.0	21.8	4
Slope , mw =	ession of Y on X 48.0909	PANE.		Intercept, bw =	-23.	8334	
Correlation Cod	efficient* =	0.9	917				
If Correlation Co	oefficient < 0.990,	check and recalib	rate.				
			Set Point	Calculation	Manufacture and the second		
rom the TSP F	ield Calibration Cu	ırve, take Qstd = 1	SELECTION OF THE SELECT				
		e "Y" value accord					
	,		•				
		mw:	x Qstd + bw = IC	x [(Pa/760) x (298/	Γa)] ^{1/2}		
Thorofore Set F	Point: IC = 1 mw v	Qstd + bw) x [(76	:0/Paly/Ta/20	98 11 ^{1/2} =		38.96	
moreiore, ocl f	onit, io - (inst x	GOOD ON JA IL TO	OTTO INC TOTAL	,		90.00	_
Remarks:							
				11.		.)	J
QC Reviewer:	K. H. (SHEK	Signature:	Tike.		Date:	101 12



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 TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Operator		Rootsmeter Orifice I.		438320 0988	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	AN AN AN AN	1.00 1.00 1.00 1.00	1.3900 0.9830 0.8800 0.8380 0.6920	3.2 6.4 7.9 8.8 12.7	2.00 4.00 5.00 5.50 8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		۷a	(x axis) Qa	(y axis)
0.9934 0.9891 0.9870 0.9859 0.9807	0.7146 1.0062 1.1216 1.1765 1.4172	1.4125 1.9976 2.2334 2.3424 2.8251		0.9957 0.9915 0.9893 0.9882 0.9830	0.7163 1.0086 1.1243 1.1793 1.4205	0.8866 1.2538 1.4018 1.4703 1.7732
Qstd slop intercept coefficie	t (b) =	2.01182 -0.02516 0.99999		Qa slope intercept coefficie	t (b) =	1.25977 -0.01579 0.99999
y axis =	SQRT [H20 (Pa/760) (298/	ra)]	y axis =	SQRT [H2O (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 = $1/m\{[SQRT H2O(Ta/Pa)] - b\}$



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 TRANSFER STANDARD CERTIFICATION WORKSHEET TE-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 slo	t (b) =	2.00834 -0.02923 0.99994		Qa slope intercept coefficie	t (b) =	1.25759 -0.01835 0.99994
y axis =	SQRT [H2O (1	Pa/760)(298/	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 = $1/m\{ [SQRT(H2O(Pa/760)(298/Ta))] - b \}$

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

Type:				Laser De	ust Moni	itor		
Manu	facturer/Brand:			SIBATA				
Model	No.:			LD-3				
, ,	ment No.:			A.005.07				
Sensit	livity Adjustment	Scale Sett	ing: _	557 CPI	И	AT 4 H C		
Opera	ntor:			Mike She	k (MSKI	M)		
Standa	rd Equipment	······································				The state of the s	**************************************	
								····
Equip			precht & Pa					
Venue			erport (Pui)	Ying Seco	ondary So	chool)		
Model			es 1400AB					W
Serial	No:	Con		0AB2198				
		Sen		00C1436	59803	K _o : <u>12500</u>		
Last C	Calibration Date*:	_4 Ju	ne 2011			-		
*Remar	ks: Recommend	ed interval	for hardwa	re calibra	tion is 1 y	year		
Calibra	tion Result	•		<u>, , , , , , , , , , , , , , , , , , , </u>				
			. '/ 4			0=		
	ivity Adjustment					CF		
Sensi	tivity Adjustment	Scale Sett	ing (After C	alibration):	_557 CF	M	
Hour	Date	T	me	1 1	pient	Concentration	Total	T C
nour	(dd-mm-yy)	F (iiie		dition	(mg/m ³)	Total Count ²	Count/ Minute
	(uu-iiiii-yy)			Temp	R.H.	Y-axis	Count	X-axis
				(°C)	(%)	1-0019		V-0VI2
1	05-06-11	09:30	- 10:30	31.3	67	0.04118	1540	25.67
2	05-06-11	10:30	- 11:30	31.3	67	0.04354	1637	27.28
3	05-06-11	11:30	- 12:30	31.3	67	0.04633	1730	28.83
4	05-06-11	12:30	- 13:30	31.4	6 6	0.04271	1603	26.72
Note:	1. Monitoring d	ata was m	easured by	Rupprec	ht & Pata	ashnick TEOM®		
	2. Total Count							
	3. Count/minut							
	ar Regression of	Y or X						
•	(K-factor):		0.0016				-	
Correl	ation coefficient:		0.9958					
Validit	y of Calibration F	Record:	4 June 20	012	•			
	•							
Remark	s:		<u></u>		·			
							•	
	•							
L								
QC Re	eviewer: YW F	ung	Signa	iture: V	V	Date	e: 8 June	e 2011
	··· •				·		3 2 2 2 1 7 7	

			٠.	Laser Di	ist Moi	nitor		
	cturer/Brand:		-	SIBATA		· · · · · · · · · · · · · · · · · · ·		
Model N			-	LD-3				
	ent No.:	Caala Cattin	-	A.005.08		······································		
Sensitiv	rity Adjustment	Scale Settin	ig:	702 CP	W			•
Operato	or:		-	Mike She	k (MSK	(M)		
tandard	d Equipment							
Equipme	ent:	Ruppi	recht & Pa	atashnick	TEOM®	3		
Venue:			port (Pui					
Model N	No.:		s 1400AB			<u> </u>		
Serial N		Contro		0AB2198	99803			
		Senso	***************************************	00C1436	59803	K _o : 125	500	***************************************
Last Ca	libration Date*:	4 June	e 2011					
Remarks	s: Recommend	led interval f	or hardwa	re calibra	tion is 1	year		
alibratio	on Result	* · · · · · · · · · · · · · · · · · · ·						
		_						
	ity Adjustment					702	CPM	
Sensitiv	ity Adjustment	Scale Settin	ig (After C	alibration) :	702	CPM	
	***************************************			,			·	
Hour	Date	Tim	i e	Amb		Concentration ¹	Total	Count/
†	(dd-mm-yy)			Cond		(mg/m ³)	Count ²	Minute ³
				Temp	R.H.	Y-axis		X-axis
	00 07 18	00.00		(°C)	(%)	0.04040	4007	00.70
1	02-07-10	09:00 -	10:00	31.1	70_	0.04313	1607	26.78
2 .	02-07-10	10:00 -	11:00	31.1	70	0.04137	1550	25.83
3	02-07-10	11:00 -	12:00	31.2 31.2	71	0.04552	1713	28.55
4	02-07-10	12:00 -	13:00		71	0.04736	1771	29.51
ote:	1. Monitoring o	iata was me	asured by	/ Kuppred	nt & Pa	tashnick TEOM®		
	2. Total Count							
	3. Count/minut	ie was caicu	lated by (i ota: Cou	nuouj			
v Linear	Regression of	Y or Y						
	K-factor):	1017	0.0016					
	tion coefficient:		0.9949		<u>-</u>	,		
Contelat	uori coemicielit.	-	U.3343			•		
Validity	of Calibration F	Record:	1 July 20	112		· _		
•		_						
temarks:	-							
		***************************************						<u> </u>
torriorrio.								

Type:				CIDATA	IST MON	tor		
Manufacturer/Brand: Model No				<u>SIBATA </u> LD-3				
Model No.:					**************************************			
Equipment No.:				A.005.09				
Sensitivity Adjustment Scale Setting:		ting: _	797 CP#	<u>//</u>				
Operator:				Mike She	k (MSKN	<u>/)</u>		
Standaı	rd Equipment			-	,		· · · · · · · · · · · · · · · · · · ·	
Equipn	nent:	Rup	precht & Pa	tashnick '	TEOM®			
Venue			erport (Pui \			chool)		
Model	•		ies 1400AB					
Serial No: Control:				AB21989	9803			
Obilai i				OC14365		K _o : 12500		
			ine 2011	,0017000		16. 7200		
	s: Recommend	ed interva	l for hardwar	e calibrat	tion is 1 y	/ear	**************************************	
	vity Adjustment vity Adjustment					797 CP		
Hour	Date	T	ime	Amb	ent	Concentration	Total	Count
	(dd-mm-yy)			Cond	lition	(mg/m ³)	Count ²	Minute
	, ,,,			Temp	R.H.	Y-axis		X-axis
-	,			(°C)	(%)			
1	05-06-11	13:30	- 14:30	31.4	66	0.04416	1758	29.30
2	05-06-11	14:30	- 15:30	31.5	66	0.04752	1889	31.48
3	05-06-11	15:30	- 16:30	31.5	66	0.04371	1748	29.13
4	05-06-11	16:30	- 17:30	31.5	67	0.04543	1808	30.13
Note:		ata was n	neasured by	Rupprec	nt & Pata	shnick TEOM®	1	
	2. Total Count 3. Count/minut r Regression of	was logge e was cal	ed by Laser I culated by (T	Oust Mon	itor			
	(K-factor):		0.0015					
Correla	ation coefficient:		0.9953				-	
Validity	of Calibration F	Record:	4 June 20)12				•
Remarks	3:				······			
				-	***************************************			
QC Re	viewer: YW F	ung	Signa	ture:		/ Date	e: 8 June	e 20 11

Type:					ıst Monit	for	0	
	acturer/Brand:			BATA				
Model No.: Equipment No.: Sensitivity Adjustment Scale Setting: Operator:			LD					
			***************************************	05,11				
			_799	9 CPI	<i>I</i>	,		
			Mil	e She	k (MSKN	0		
Standa	rd Equipment							
Equip	namt.	Rupprecht	& Patas	hnick '	TEOM®	•		
Venue		Cyberport				hool)		
Model		Series 140		7 0000	naary oo	11001)	,, W.D.	
Serial		Control:		321989	00803		-	
Seria	NO.	Sensor:	12000			K _o : 12500		
Last C	alibration Date*:			714000	19000			·
	r			***				
*Remar	ks: Recommend	ed interval for ha	rdware c	alibrai	ion is 1 y	ear		
Calibra	tion Result							
Soneit	ivity Adjustment	Scale Setting (Be	afore Cal	libratio	·o)-	799 CP	hA .	
		Scale Setting (Af				799 CP		
Serial	wity Adjustment	State Setting (A	tel Cano	auon	1-		141	
Hour	Date	Time		Amh	pient	Concentration ¹	Total	Count/
1 loui	(dd-mm-yy)	11110			dition	(mg/m ³)	Count ²	Minute ³
	(dd-min-yy)		. 7	emp	R.H.	Y-axis	000,11	X-axis
ŀ				(°C)	(%)	1 axis		, and
1	02-07-11	09:30 - 10		31.1	70	0.04305	1718	28.63
2	02-07-11			31.1	71	0.04257	1703	28.38
3	02-07-11		2:30	31.2	71	0.04424	1763	29.38
4	02-07-11	12:30 - 13	3:30	31.2	71	0.04632	1855	30.92
Note:	1. Monitoring o	lata was measur	ed by Ru	pprec	ht & Pata	shnick TEOM®		
		was logged by La						
	3. Count/minut	te was calculated	by (Tota	al Cou	nt/60)			
Decline.	Decreesies of	V an V						
	ar Regression of	0.00	145					
	(K-factor):							
Correi	ation coefficient:	0.88	101					
Validit	y of Calibration F	Record: 1 Ju	ly 2012		***************************************			
Remark	(S:	····				-		
					•	·		
I	<u></u>							
					ħ/	/		
OC R	eviewer YW I	-ิเเกต !	Signatur	a:	V / /	Date	e: 4 July	2011

cale Setting:	SIBATA		tor		
cale Setting:					
cale Setting:	LD-3B	.,	No. of the same		
cale Setting:	A.005.12	***************************************			
	805 CPI	VI			
	Mike She	k (MSKN	<u>1)</u>		
Runnracht	& Patachnick	TEOM®			
			chool)		
		many oc	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
		99803			
			K.: 12500		
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	110. 72000		
interval for har	dware calibra	tion is 1 y	/ear		
		,	•		
Time	Ami	pient	Concentration ¹	Total	Count
	Cone	dition	(mg/m ³)	Count ²	Minute
	Temp	R.H.	Y-axis		X-axis
	(°C)	(%)			
	.00 04.4	70			
09:30 - 10	:30 31.1	70	0.04305	1843	30.72
10:30 - 11	:30 31.1	71	0.04257	1843 1826	30.43
10:30 - 11 11:30 - 12	:30 31.1 :30 31.2	71 71			30.43
10:30 - 11 11:30 - 12 12:30 - 13	:30 31.1 :30 31.2 :30 31.2	71 71 71	0.04257 0.04424 0.04632	1826	30.43 31.55
10:30 - 11 11:30 - 12 12:30 - 13	:30 31.1 :30 31.2 :30 31.2 ed by Rupprec aser Dust Mon	71 71 71 ht & Pata itor	0.04257 0.04424	1826 1893	30.72 30.43 31.55 33.23
10:30 - 11 11:30 - 12 12:30 - 13 a was measure as logged by La was calculated or X	:30 31.1 :30 31.2 :30 31.2 ed by Rupprec aser Dust Mon by (Total Cou	71 71 71 ht & Pata itor	0.04257 0.04424 0.04632	1826 1893	30.43 31.55
10:30 - 11 11:30 - 12 12:30 - 13 a was measure as logged by La was calculated or X	:30 31.1 :30 31.2 :30 31.2 ed by Rupprec aser Dust Mon by (Total Cou	71 71 71 ht & Pata itor	0.04257 0.04424 0.04632	1826 1893	30.43 31.55
10:30 - 11 11:30 - 12 12:30 - 13 a was measure as logged by La was calculated or X	:30 31.1 :30 31.2 :30 31.2 ed by Rupprec aser Dust Mon by (Total Cou	71 71 71 ht & Pata itor	0.04257 0.04424 0.04632	1826 1893	30.43 31.55
10:30 - 11 11:30 - 12 12:30 - 13 a was measure as logged by La was calculated or X 0.00 0.99	:30 31.1 :30 31.2 :30 31.2 ed by Rupprec aser Dust Mon by (Total Cou	71 71 71 ht & Pata itor	0.04257 0.04424 0.04632	1826 1893	30.43 31.55
	Cyberport (Series 1400 Control: Sensor: 4 June 201 interval for har cale Setting (Be	Cyberport (Pui Ying Second Series 1400AB Control: 140AB21989 Sensor: 1200C14369 4 June 2011 Interval for hardware calibration cale Setting (Before Calibration Time American Concord Temp	Series 1400AB Control: 140AB219899803 Sensor: 1200C143659803 4 June 2011 Interval for hardware calibration is 1 y sale Setting (Before Calibration): cale Setting (After Calibration): Time Ambient Condition Temp R.H.	Cyberport (Pui Ying Secondary School) Series 1400AB Control: 140AB219899803 Sensor: 1200C143659803 K _o : 12500 4 June 2011 Interval for hardware calibration is 1 year cale Setting (Before Calibration): 805 CP cale Setting (After Calibration): 805 CP Time Ambient Concentration Condition (mg/m³) Temp R.H. Y-axis	Cyberport (Pui Ying Secondary School) Series 1400AB Control: 140AB219899803 Sensor: 1200C143659803 K _o : 12500 4 June 2011 Interval for hardware calibration is 1 year cale Setting (Before Calibration): 805 CPM cale Setting (After Calibration): 805 CPM Time Ambient Concentration Total Count ² Condition (mg/m³) Total Count ² Temp R.H. Y-axis

Туре:			Laser Du	st Monit	tor			
Manuf	acturer/Brand:		SIBATA					
Model	No.:	•	_ <i>LD-3B</i>					
Equipr	nent No.:		A.005.13	а				
Sensit	ivity Adjustment	Scale Setting:	643 CP	1			-	
Opera	tor:		_Mike She	k (MSKN	<u>/)</u>			
Standa	rd Equipment							
Equip	nent:	Rupprecht (& Patashnick_	TEOM®				
Venue			Pui Ying Seco		chool)			
Model		Series 1400						
Serial		Control:	140AB21989	9803				
OCHO		Sensor:		1200C143659803 Ko: 12500				
Last Calibration Date*: 4 June 2011								
'Remarl	ks: Recommend	ed interval for har	dware calibra	ion is 1 y	/ear	•		
Calibra	tion Result							
0 4		Cools Cotting (Po	fore Calibratia	w).	643 CP	> 1.7:		
Sensit	ivity Adjustment	Scale Setting (Be	or Calibration	111 <i>).</i> 1.	643 CP			
Sensit	ivity Adjustment	Scale Setting (Aft) -		141		
11	Data	Time	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	pient	Concentration ¹	Total	Coun	
Hour	Date	inne		dition	(mg/m ³)	Count ²	Minute	
	(dd-mm-yy)		Temp	R.H.	Y-axis	Count	X-axi	
			(°C)	(%)	I-dais		N-GX.	
1	05-06-11	11:00 - 12	200 31.4	67	0.04513	1933	32.2	
2	05-06-11	12:00 - 13		67	0.04392	1833	31.3	
3	05-06-11	<u> </u>	:00 31.5	66	0.04751	2042	34.0	
4	05-06-11		00 31.5	66	0.04476	1918	31.9	
Note:		data was measure				1		
Note:	7. Monitoring t	was logged by La	eer Dust Mon	itor	2011110K 12-01W			
	2. Total Count	te was calculated	hy (Total Cou	nt/60\				
	3. Countinu	te was calculated	by (10tal 000	110007			-	
Ry Line	ar Regression of	f Y or X						
	(K-factor):	0.00	14		•			
_	ation coefficient:							
Corre	auon coembient	0.33	7 0	······································				
Välidit	y of Calibration I	Record: 4 Jul	ne 2012					
	,							
			-					
Remark	s:	· .	•				·	
				**************************************	2		·	
				1/1				
		F	``	V/	D-1	o 1	0.2044	
QC R	eviewer: YW	Fung S	Signature:		Date	e, ouun	e 2011	



G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. 香港黄竹坑這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



CERTIFICATE OF CALIBRATION

Certificate No.:

11CA1221 01-01

Page

2

Item tested

Description: Manufacturer: Sound Level Meter (Type 1)

Microphone Rion Co., Ltd. Preamp Rion Co., Ltd

Type/Model No.:

Rion Co., Ltd. NL 31

UC-53A NH-21

90526

03581

Adaptors used:

Serial/Equipment No.:

00320534 / N.007.02A

Item submitted by

Customer Name:

AECOM ASIA CO., LTD.

Address of Customer:

Request No.: Date of receipt:

21-Dec-2011

Date of test:

23-Dec-2011

Reference equipment used in the calibration

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) °C (60 ± 10) % (1000 ± 5) hPa

Test specifications

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%.

3. 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.

/Feng Jun Qi

Actual Measurement data are documented on worksheets.

Approved Signatory:

Date:

16-Jan-2012

Company Chop:

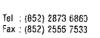
Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

Soils & Materia's Engineering Co., Ltd.

Form No.CARP152 1/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號利業中心地下,9樓,12樓,13樓及20樓 E-mail: smec@cigismec.com Websita; www.cigismec.com





CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

11CA1221 01-01

Page

2

1. **Electrical Tests**

> 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 telerances.

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 expligitly stated.

Calibrated by:

Date:

Fung Chi Yip 3-Dec-2011

Checked by:

Date:

16-Jan-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.

End

© Soils & Materials Engineering Co., Ltd

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



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

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



CERTIFICATE OF CALIBRATION

Certificate No.:

11CA0830 02

Page

2

Item tested

Description:

Sound Level Meter (Type 1)

Microphone

Preamp

Manufacturer:

Rion Co., Ltd.

Rion Co., Ltd.

Rion Co., Ltd.

Type/Model No.:

NL-31

UC-53A

NH-19

Serial/Equipment No.: Adaptors used:

00320528 / N.007.03A

90565

75883

Item submitted by

Customer Name:

AECOM ASIA CO., LTD.

Address of Customer:

Request No.: Date of receipt:

30-Aug-2011

Date of test:

31-Aug-2011

Reference equipment used in the calibration

Description: Multi function sound calibrator Signal generator

Model: B&K 4226 DS 360

DS 350

Serial No. 2288444 33873

61227

Expiry Date: 09-May-2012 30-May-2012 30-May-2012

Traceable to: CIGISMEC CEPREI

CEPRE

Signal generator **Ambient conditions**

Temperature:

(23 ± 1) °C $(60 \pm 5) \%$

Relative humidity: Air pressure:

(1000 ± 5) hPa

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 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.

eng Jun Q

Actual Measurement data are documented on worksheets.

Approved Signatory:

Date:

31-Aug-2011

Company Chop:

Comments: The results reported illuthis 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



G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road. Aberdeen, Hong Kong. 香港賣竹坑道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.:	11CA0830 02	Page	2	of	2
	Commission of the standard Association and the standard standard standard of the standard standard of the standard stand				

1, Electrical Tests

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		
Solf-generated noise	Α	Pass	0.3		
	С	Pass	0.8 2.1		
	Lin	Pass	1.6 2.2		
Linearity range for Lec	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 1/103 at 4kHz	Pass	0.3		
	1 ms burst duty factor 1/104 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		
	Leg	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 explicitly stated.

Calibrated by:

Date:

 \sim

Fung Chi Yip 1 1-Aug-2011 Checked by

Date:

J.Q. Feng / 31-Aug-20/1

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.

End

Soils & Materials Engineering Co., Ltd.

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



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CERTIFICATE OF CALIBRATION

Certificate No.:

11CA0711 01-05

Page:

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1

2

Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer: Type/Model No.: Rion Co., Ltd. NC-73

Serial/Equipment No.:

10307223 / N.004.08

Adaptors used:

Item submitted by

Curstomer:

AECOM ASIA CO. LTD.

Address of Customer:

Request No.: Date of receipt:

11-Jul-2011

Date of test:

13-Jul-2011

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	18-May-2012	SCL
Preamplifier	B&K 2673	2239657	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: Relative humidity:

Air pressure:

22 ± 1 °C $55 \pm 5 \%$ 990 ± 5 hPa

Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B 1, and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique. 2.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference 3, 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.

Hyang Jian

Approved Signatory:

Date:

13-Jul-2011

Company Chop:

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

@ Soits & Materials Engineering Co., Ltd

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



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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

11CA0711 01-05

Page:

of

2

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

Frequency	Output Sound Pressure	Measured Output	(Output level in dB re 20 μPa) Estimated Uncertainty dB
Shown	Level Setting	Sound Pressure Level	
Hz	dB	dB	
1000	94.00	93.70	0.10

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 = 989.2 Hz

Estimated uncertainty

0.2 Hz

Coverage factor k = 2.2

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.

Calibrated by:

End

Checked by:

Date:

Date:

Chan Chun Lan 13-Jul-2011

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.

Soils & Materials Engineering Co., Ltd.

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



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CERTIFICATE OF CALIBRATION

Certificate No.	

12CA0321 01-04

Page:

of

Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer:

Rion Co., Ltd. NC-73

Type/Model No.: Serial/Equipment No.:

10186482 / N.004.09

Adaptors used:

_

Item submitted by

Curstomer:

AECOM ASIA CO., LTD.

Address of Customer:

-

Request No.: Date of receipt:

21-Mar-2012

Date of test:

21-Mar-2012

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	18-May-2012	SCL
Preamplifier	B&K 2673	2239857	05-Jan-2013	CEPREI
Measuring amplifier	B&K 2610	2346941	29-Dec-2012	CEPREI
Signal generator	DS 360	61227	30-May-2012	CEPREI
Digital multi-meter	34401A	US36087050	16-Dec-2012	CEPREI
Audio analyzer	8903B	GB41300350	27-May-2012	CEPREI
Universal counter	53132A	MY40003662	30-May-2012	CEPREI

Ambient conditions

Temperature:

21 ± 1 °C

Relative humidity: Air pressure: 60 ± 10 % 1005 ± 5 hPa

Test specifications

- 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

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

m Min/Feng Jun Qi

Approved Signatory:

Date:

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.

Soils & Meterials Engineering Co., Ltd.

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

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综合試驗有限公司

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.	Certi	tifica	te N	lo.:
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12CA0321 01-04

Page:

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.

Frequency Shown Hz	Output Sound Pressure Level Setting	Measured Oulput Sound Pressure Level d8	(Output level in dB re 20 µPa) Estimated Uncertainty dB
 1000	94.00	93.59	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

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%

Date:

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.

Calibrated by:

End

Date:

Checked by:

21-Mar-2012()

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.

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Form No.CARP156-2/issue 1/Rev.C/01/05/200



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:

MR MIKE SHEK

CLIENT:

AECOM ASIA COMPANY LIMITED

ADDRESS:

11/F, TOWER 2, GRAND CENTRAL PLAZA,

138 SHATIN RURAL COMMITTEE ROAD,

SHATIN, N.T., HONG KONG.

PROJECT:

WORK ORDER: HK1204978

LABORATORY:

HONG KONG

DATE RECEIVED: DATE OF ISSUE:

21/02/2012

23/02/2012

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test:

Conductivity, Dissolved Oxygen, pH, Salinity, Temperature and Turbidity

Description:

YSI Sonde

Brand Name:

YSI

Model No.: Serial No.:

YSI 6820 V2 12A010544

Equipment No.:

W.026.34

Date of Calibration: 21 February, 2012

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.

ISSUING LABORATORY: HONG KONG

Address

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hongkong@alsglobal.com

Mr Chan R Godfrey Laboratory Manager Hong Kong

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Page 1 of 3

ALERAS SS 11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong (1980) +852 2610 1044 (1980) +852 2610 2021 ALS FRENTHCHEM (NK) PTY LTD Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Bright of the state of

Work Order:

HK1204978

Date of Issue:

23/02/2012

Client:

AECOM ASIA COMPANY LIMITED



Description:

YSI Sonde

Brand Name:

YSI

Model No.:

YSI 6820 V2

Serial No.:

12A010544

Equipment No.:

W.026.34

Date of Calibration:

21 February, 2012

Date of next Calibration:

21 May, 2012

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	146	~0.6
6667	6514	-2.3
12890	12890	0.0
58670	57840	-1.4
	Tolerance Limit (%)	10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
6.33		0.13
[6.32	6.44	0.12
7.16	7.12	-0.04
8.13	8.12	-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	4.02	0.02
7.0	6.99	-0.01
10.0	9.93	-0.07
	Tolerance Limit (±unit)	0.2

Salinity

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

Method Ref. AFFIX (213) Edition), 2320B			
Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)	
o	0.08	***************************************	
10	10.32	3.2	
20	20.44	2.2	
30	30.93	3.1	
	Tolerance Limit (±%)	10.0	

Mr Chan Kwok Pai, Godfrey Laboratory Manager – Hong Kong

ALS Technichem (HK) Pty Ltd ALS Environmental

Page 2 of 3

Work Order:

HK1204978

Date of Issue:

23/02/2012

Client:

AECOM ASIA COMPANY LIMITED

Description:

YSI Sonde

Brand Name:

YSI

Model No.:

YSI 6820 V2

Serial No.:

12A010544

Equipment No.: Date of Calibration: W.026.34

21 February, 2012

Date of next Calibration:

21 May, 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)
14.6	14.33	-0.3
26.5	26.44	-0.1
32.0	31.46	-0.5
	Tolerance Limit (°C)	2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
	-0.2	
4	3.8	-5.0
10	9.6	-4.0
20	19.9	-0.5
50	54.8	9.6
100	109.2	9.2
	Tolerance Limit (±%)	10.0

My Chan Kwok Fail Godfrey Kaborator Manager - Hong Kong

ALS Technichem (HK) Pty Ltd ALS Environmental

Page 3 of 3



ALS Technichem (HK) Ptv Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:

MR MIKE SHEK

CLIENT:

AECOM ASIA COMPANY LIMITED

ADDRESS:

11/F, TOWER 2, GRAND CENTRAL PLAZA,

138 SHATIN RURAL COMMITTEE ROAD,

SHATIN, N.T., HONG KONG.

PROJECT:

WORK ORDER:

HK1212870

LABORATORY:

HONG KONG

DATE RECEIVED: DATE OF ISSUE:

17/05/2012 17/05/2012

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal aceptance criteria of ALS will be followed.

Scope of Test:

pH, Turbidity, Conductivity, Dissolved Oxygen, Salinity and Temperature

Description:

Sonde

Brand Name:

YSI 6820 V2

Model No.: Serial No.:

12A101544

Equipment No.:

R1

Date of Calibration: 17 May, 2012

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.

ISSUING LABORATORY: HONG KONG

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Mr. Fung Lim Chee General Manager -

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Page 1 of 3

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www.alsqlobal.com

Work Order:

HK1212870

Date of Issue:

17/05/2012

Client:

AECOM ASIA COMPANY LIMITED



Description:

Brand Name:

Sonde

Model No.:

YSI

Serial No.:

6820 V2 12A101544

Equipment No.:

R1

Date of Calibration:

17 May, 2012

Date of next Calibration:

17 August, 2012

Parameters:

Conductivity

Method Ref: APHA (20th edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
142.6	149.0	4.5
6667	6176	-7.4
12890	12440	-3.5
58670	58420	-0.4
	Tolerance Limit (±%)	10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
6.13	6.30	0.17
7.66 8.06	7.51 8.14	-0.15 0.08
	Tolerance Limit (±mg/L)	0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)	
0	0.07	100 TOT	
10	9.97	-0.3	
20	19.76	-1.2	
30	30.17	0.6	
	Tolerance Limit (±%)	10.0	

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	18.41	-0.1
27.0	26.72	-0.3
30:0	29.95	-0.1
	Tolerance Limit (°C)	2.0

Mr. Fung Lim Chee, Richard

General Manager

Greater China & Hong Kong

Work Order:

HK1212870

Date of Issue:

17/05/2012

Client:

AECOM ASIA COMPANY LIMITED



Description:

Sonde

Brand Name:

YSI

Model No.: Serial No.: 6820 V2 12A101544

Equipment No.:

R1

Date of Calibration:

17 May, 2012

Date of next Calibration:

17 August, 2012

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0 7.0 10.0	4.16 7.16 10.10	0.16 0.16 0.10
	Tolerance Limit (±unit)	0.2

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.1	
4	4.3	7.5
10	10.5	5.0
20	20.4	2.0
50	51.6	3.2
100	97.5	-2.5
	Tolerance Limit (±%)	10.0

Mr. Fung Lim Chee, Richard General Manager

Greater China & Hong Kong



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:

MR MIKE SHEK

CLIENT:

AECOM ASIA COMPANY LIMITED

ADDRESS:

11/F, TOWER 2, GRAND CENTRAL PLAZA,

138 SHATIN RURAL COMMITTEE ROAD,

SHATIN, N.T., HONG KONG.

PROIECT:

WORK ORDER:

HK1204979

LABORATORY:

HONG KONG

DATE RECEIVED:

21/02/2012

DATE OF ISSUE:

22/02/2012

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test:

Conductivity, Dissolved Oxygen, pH, Salinity, Temperature and Turbidity

Description:

YSI Sonde

Brand Name:

YSI

Model No.:

YSI 6820 V2 12A010545

Serial No.: Equipment No.:

Date of Calibration: 21 February, 2012

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.

ISSUING LABORATORY: HONG KONG

Address

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Mr Chan work)Fai,\Godfrey Laboratory Manager - Hong Kong

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Page 1 of 3

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Work Order:

HK1204979

Date of Issue:

22/02/2012

Client:

AECOM ASIA COMPANY LIMITED

Description:

YSI Sonde

Brand Name:

Model No.:

YSI 6820 V2

Serial No.:

12A010545

Equipment No.:

Date of Calibration:

21 February, 2012

Date of next Calibration:

21 May, 2012

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	153	4.2
5667	6308	-5.4
12890	12570	-2.5
58670	56410	-3.9
	Tolerance Limit (%)	10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
6.32	6.47	0.15
7.16	7.06	-0.10
8.13	8.13	0.00
	Tolerance Limit (±mg/L)	0.20

pH Value

Method Ref: APMA 21St Eb. 45		
Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.98	-0.02
7.0	6.97	-0.03
10.0	9.92	-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	10.08	0.8
20	20.13	0.6
30	30.52	1.7
	Tolerance Limit (±%)	10.0

Godfrey - Hong Kong

Page 2 of 3

ALS Technichem (HK) Pty Ltd **ALS Environmental**

Work Order:

HK1204979

Date of Issue:

22/02/2012

Client:

AECOM ASIA COMPANY LIMITED



Description:

YSI Sonde

Brand Name:

YSI

Model No.: Serial No.: YSI 6820 V2

Equipment No.:

12A010545

Date of Calibration:

21 February, 2012

Date of next Calibration:

21 May, 2012

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

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

idide no. 3 Second edition March 2006, Working The Information Cambration Proceeding		Candiation Procedure,
Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
14.6	15.01	0.4
26.2	26.28	0.1
31.0	30.52	-0.5
	Tolerance Limit (°C)	2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
^	0.0	
V	0.2	
4	3.6	-10.0
10	9.6	-4.0
20	18.7	-6.5
50	50.1	0.2
100	96.9	-3.1
	Tolerance Limit (±%)	10.0

My Chan Kwok Eail Godfrey Laboratory Manager - Hong Kong

ALS Technichem (HK) Pty Ltd
ALS Environmental

Page 3 of 3



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:

MR MIKE SHEK

CLIENT:

AECOM ASIA COMPANY LIMITED

ADDRESS:

11/F. TOWER 2. GRAND CENTRAL PLAZA,

138 SHATIN RURAL COMMITTEE ROAD.

SHATIN, N.T., HONG KONG.

PROJECT:

WORK ORDER:

HK1212871

LABORATORY:

HONG KONG

DATE RECEIVED: DATE OF ISSUE:

17/05/2012 17/05/2012

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal aceptance criteria of ALS will be followed.

Scope of Test:

pH, Turbidity, Conductivity, Dissolved Oxygen, Salinity and Temperature

Description:

Sonde

Brand Name:

YSI 6820 V2

Model No.:

12A101545

Serial No.: Equipment No.:

R1

Date of Calibration: 17 May, 2012

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.

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd

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1-3 Wing Yip Street

Kwai Chung HONG KONG Phone:

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lichard General Manager

Greater China & Hong Kong

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Page 1 of 3

Work Order:

HK1212871

Date of Issue:

17/05/2012

Client:

AECOM ASIA COMPANY LIMITED



Description:

Sonde

Brand Name:

YSI

Model No.:

6820 V2

Serial No.: Equipment No.: 12A101545 R1

Date of Calibration:

17 May, 2012

Date of next Calibration:

17 August, 2012

Parameters:

Conductivity

Method Ref: APHA (20th edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
142.6	150.0	5.2
6667	6162	-7.6
12890	12140	-5.8
58670	58500	-0.3
	Tolerance Limit (±%)	10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
<i>د</i> ۱۵	6.28	0.15
6.13 7.66	7.56	-0.10
8.06	8.11	0.05

Salinity

Method Ref: APHA (21st edition), 25208

ethod Ker: APHA (21st editio	on), 25208	
Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.09	***
10	9.58	-4 .2
20	19.16	-4.2
30	29.42	-1.9
30	29.42	
	Tolerance Limit (±%)	10.0

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	18.43	-0.1
27.0	26.68	-0.3
30.0	29.90	-0.1
	Tolerance Limit (°C)	2.0

Mr. Fung Lim Chee, Richard General Manager 7

Greater China & Hong Kong

ALS Technichem (HK) Pty Ltd

ALS Environmental

Page 2 of 3

Work Order:
Date of Issue:

HK1212871

Client:

17/05/2012 AECOM ASIA COMPANY LIMITED



Description:

Sonde YSI

Brand Name: Model No.:

YSI 6820 V2

Serial No.:

12A101545

Equipment No.:

R1

Date of Calibration:

17 May, 2012

Date of next Calibration:

17 August, 2012

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.12	0.12
7.0	7.18	0.18
10.0	9.99	-0.01
	Tolerance Limit (±unit)	0.2

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
^	0.1	
4	4.2	5.0
10	10.7	7.0
20	20.2	1.0
50	51.5	3.0
100	99.4	-0.6
	Tolerance Limit (±%)	10.0

Mr. Fung Lim Chee, Richard General Manager -

Greater China & Hong Kong