

### RECALIBRATION DUE DATE:

January 24, 2019

# Certificate of Calibration

Calibration Certification Information

Cal. Date: January 24, 2018

Rootsmeter S/N: 438320

Ta: 293 Pa: 756.9 °K

Operator: Jim Tisch

Calibration Model #: TE-5025A

Calibrator S/N: 3166

mm Hg

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)	
1	1	2	1	1.4430	3.2	2.00	
2	3	4	1	1.0270	6.4	4.00	
3	5	6	1	0.9220	7.9	5.00	
4	7	8	1	0.8780	8.7	5.50	
5	9	10	1	0.7270	12.6	8.00	

		Data Tabulat	ion		
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	√∆H(Ta/Pa)
1.0087	0.6990	1.4233	0.9958	0.6901	0.8799
1.0044	0.9780	2.0129	0.9915	0.9655	1.2443
1.0024	1.0872	2.2505	0.9896	1.0733	1.3912
1.0013	1.1404	2.3603	0.9885	1.1259	1.4591
0.9961	1.3701	2.8467	0.9834	1.3526	1.7598
CARGON 1/2-1	m=	2.12231		m=	1.32895
QSTD	b=	-0.06016	QA	b=	-0.03719
	r=	0.99999	~ .	r=	0.99999

	Calculation	ns		
Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	Va=	ΔVol((Pa-ΔP)/Pa)	
Qstd=	Vstd/∆Time	Qa= Va/ΔTime		
	For subsequent flow ra	te calculatio	ns:	
Qstd=	$1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$	Qa=	1/m(( √ΔH(Ta/Pa))-t	

	Standard Conditions
Tstd:	298.15 °K
Pstd:	760 mm Hg
	Key
ΔH: calibrator	manometer reading (in H2O)
ΔP: rootsmete	er manometer reading (mm Hg)
Ta: actual abs	olute temperature (°K)
Pa: actual bar	ometric pressure (mm Hg)
b: intercept	
m: slope	

#### RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30



	Calibi	ration D	ata for i	righ voi	ume Sam	ipier ( i	SP Sample	r)	
Location		CMA1b				Calibra	ition Date	#1	19-Oct-18
Equipment no.		HVS001					19-Dec-18		
CALIBRATION OF CONTI	NUOUS FL	OW RECOR	RDER						
				Ambient C	ondition				
Temperature, T <sub>a</sub>		297.2	2	Kelvin	Pressure, P.	6		1017	mmHg
			Orifice	Transfer Sta	indard Inform	ation			
Equipment No.		Ori002	/ <u> </u>	Slope, m <sub>e</sub> 2.12231 Intercept, bc			-0.06016		
Last Calibration Date	est Calibration Date 19-Jan-18				(H	xP <sub>a</sub> /1	013.3 x 298 /	Ta) 1/	2
Next Calibration Date		19-Jan-19	9			me	$x Q_{std} + b_c$		
				Calibratio	n of TSP			207	
Calibration	Ma	nometer Re	ading	Q <sub>std</sub>		Continuous Flow			IC
Point H (inches of water)		(m <sup>3</sup> / min.)		Recorder, W		(W(P_/1013.3k298/T_) <sup>10</sup> /35.31			
	(up)	(down)	(difference)	X-axis (C		(CFM)	Y-axis		
1	1.7	1.7	3.4	0.9000		27		27.0883	
2	2.5	2.5	5.0	1.0	0854	33		33.1079	
3	4.0	4.0	8.0	1.3	8654	43		43.1406	
4	5.3	5.3	10.6	1,5	5674	49		49.1602	
5	6.6	6.6	13.2	3.7	458	55		55,1799	
By Linear Regression of Y	an X								
	Slope, m	*	33;	2775	Int	ercept, b	= -2	8174	
Correlation (	Coefficient*		0.9	1997					
Calibratio	n Accepted		Yes	/No**					
* if Correlation Coefficient	< 0.990, che	eck and reca	elibration aga	sin.					
** Delete as appropriate.									
M. Harr	n man data d	information	the emission	ut mfamen	no of the co	hantad Mad	n Volume Sample		_
Remans :	C HARRYS	N C YASTO AND			20 000	50 50	10	nas dec	n
re-assigned f			with respect	to the update	s in quality ma			-	v man veri ince
Calibrated by	_	Ray Lee				Checke	ed by	_	Pualine Wong
Date		19-Oct-18				Date		11	19-Oct-18

Location	:	CMA1b	Calbration Date :	19-Dec-18				
Equipment no.	:	HVS001	Calbration Due Date:	18-Feb-19				
CALIBRATION OF CONTINUOUS FLOW RECORDER								
Ambient Condition								

Orifice Transfer Standard Information									
Equipment No.	Ori3166	Slope, m <sub>c</sub>	2.12231	Intercept, bc	-0.06016				
Last Calibration Date	24-Jan-18	(HxP <sub>a</sub> /1013.3 x 298/T <sub>a</sub> ) <sup>1/2</sup>							
Next Calibration Date	24-Jan-19	$= m_c x Q_{std} + b_c$							

Kelvin Pressure, Pa

1020

mmHg

293

Calibration of TSP										
Calibration	Ма	nometer	Reading	Q <sub>std</sub>	Continuous Flow	IC				
Point	H (inches of water)			(m <sup>3</sup> / min.)	Recorder, W	W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.3 <sup>1</sup>				
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis				
1	1.6	1.6	3.2	0.8812	26	26.3074				
2	2.7	2.7	5.4	1.1362	34	34.4020				
3	4.0	4.0	8.0	1.3768	45	45.5321				
4	5.2	5.2	10.4	1.5658	48	48.5676				
5	6.3 6.3 12.6		1.7207	54	54.6385					
5 11 5 1 11					_					

By Linear Regression of Y on X

Temperature, T<sub>a</sub>

Slope, m = 33.7706 Intercept, b = -3.2329

Correlation Coefficient\* = 0.9933

Calibration Accepted = Yes/Ne\*\*

Remarks :			

Calibrated by : Henry Lau Checked by : Chan Ka Chun

 $<sup>\</sup>ensuremath{^{*}}$  if Correlation Coefficient < 0.990, check and recalibration again.

<sup>\*\*</sup> Delete as appropriate.



Location	CMA2a Calibration Date				3	19-Oct-18				
Equipment no. : HV		HVS002				Calibra	ation Due Date		19-Dec-18	
CALIBRATION OF CO	NTINUOUS FL	OW RECO	RDER							
		297	0	Ambient C	Pressure, P.		_	1017	0383923	
remperature, T,		297	2:	Retvin	Pressure, P.	<u> </u>		1017	mmHg	
			Orifice	Transfer Sta	ndard Inform	nation				
Equipment No.	III.	Ori002		Slope, m <sub>c</sub>	2.122	31	Intercept, bo		-0.06016	
Last Calibration Date	te	19-Jan-1	8		(H	IxPa/	1013.3 x 298	(T.)	1/2	
Next Calibration Da	9			m,	$x Q_{std} + b_c$					
		7		Calibratio	n of TSP					
Calibration	Mar	Manometer Reading		Q stri		Con	Continuous Flow		IC	
Point	н	inches of	water)	(m <sup>9</sup> / min.)		R	Recorder, W		(W)Py1013.3x298/T <sub>a</sub> ) <sup>12</sup> /35.2	
	(up)	(down)	(difference)	X-	X-axis		(CFM)		Y-axis	
1	1.6	1,6	3.2	0.8	8740		27		27.0883	
2	2.6	2.6	5.2	1,1	1063		34		34.1112	
3	4.0	4.0	8.0	1.3	9654		42		42.1373	
4	5.2	5.2	10.4	1.5	5528		50		50.1635	
5	6.5	6,5	13.0	1.7	328		54		54.1766	
y Linear Regression o	f Y on X					71				
	Slope, m		32.	4470	In	dercept, b	•	1,4980		
Correlation	on Coefficient*		0.9	975						
Calibra	stion Accepted	=	Yes	/No**						
		9789 WH (\$4.00	ROVA WILLIAMS	970-9						
if Correlation Coefficie	int < 0.990, ch	eck and rec	alibration aga	ain.						
* Delete as appropriate	i)									
Remarks : As per cli	ent's provided	information	, the equipme	ent reference	no of the ca	librated Hig	h Volume Sample	er has be	nen .	

Checked by

Date

Pualine Wong

19-Oct-18

re-assigned from EL449 to HVS002 with respect to the update in quality management system

Ray Lee

19-Oct-18

Calibrated by

Date

Location :	ioratio	CMA2a	a ror ring	ii voidiii	io odini	•	ation Date	:	19-Dec-18
Equipment no. :		HVS002				Calbr	ation Due Dat	( :	18-Feb-19
CALIBRATION OF CONTI	NUOUS F	LOW RE	CORDER						
	<u> </u>		An	nbient Cond	lition		1		
Temperature, T <sub>a</sub>		29	93	Kelvin	Pressure,	Pa		1020	mmHg
			Orifice Tran	sfer Standa	rd Informat	ion			
Equipment No.		Ori31	66	Slope, m <sub>c</sub>	2.122	31	Intercept,	bc	-0.06016
Last Calibration Date	24-Jan-18				(HxF	P <sub>a</sub> / 10	13.3 x 298	/ T a	) 1/2
Next Calibration Date	Calibration Date 24-Jan-19 = $m_c \times Q_{std} + b_c$								
			Ca	libration of	TSP				
Calibration	Ma	nometer	Reading	Q <sub>std</sub>		Continuous Flow			IC
Point	н	(inches c	of water)	(m <sup>3</sup> / min.)		Recorder, W		(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.3	
	(up)	(down)	(difference)	X-axis		(CFM)		Y-axis	
1	1.5	1.5	3.0	0.8541		28			28.3311
2	2.2	2.2	4.4	1.02	284		32		32.3784
3	3.7	3.7	7.4	1.32	253		40		40.4730
4	4.5	4.5	9.0	1.45	586	44		44.5203	
5	6.0	6.0	12.0	1.67	799		52		52.6149
By Linear Regression of Y	on X								
	Slope, m	=	29.0	948	Inte	rcept, b	= 2	2.7348	
Correlation Co	efficient*	=	0.99	063					
Calibration A	Accepted	=	Yes/f	<del>\0</del> **	•				
* if Correlation Coefficient <	< 0.990, c	heck and	recalibration a	ıgain.					
** Delete as appropriate.									
Remarks :									
Calibrated by	F	Henry Lau				Checl	ked by	:	Chan Ka Chun
Date :	1	9-Dec-18				Date		:	19-Dec-18



Date

	Calibi	ation L	ata for I	ligh Vol	ume San	ipier (I	SP Sample	ir)			
Location		CMA3a				Calibration Date : 19-Oct-18					
Equipment no.	1	HV\$012		Calibration Due Date : 19-Dec-							
	unione ei										
CALIBRATION OF CONT	NUOUS FL	OW RECO	KDEK		No. of the last of						
	_	Table 1		Ambient C	1		1	1017	100000		
Temperature, T,	_	297.	-	Kelvin	Pressure, P.			1017	mmHg		
			Orifice	Transfer Sta	indard Inform	ation					
Equipment No.		Ori002		Slope, m.	2.122	31	Intercept, bo	8	-0.06016		
Last Calibration Date	alibration Date 19-Jan-18				(HxPa/1013.3 x 298/Ta) 1/2						
Next Calibration Date		19-Jan-1	9			m <sub>c</sub>	$x Q_{std} + b_c$				
				Calibratio	n of TSP	711					
Calibration	Manometer Reading		0	tete	Cont	linuous Flow	T	IC			
Point H (inches of water)		(m <sup>3</sup> / min.)		Re	corder, W	(W(P,/1013.3×296/T,) <sup>19</sup> /35.31)					
	(up)	(down)	(difference)	х-	xis (CFM)		(CFM)		Y-axis		
1	1.4	1.4	2.8	0.6	0.8194		32		32.1046		
2	2.2	2.2	4.4	1.0	0199		38		38.1243		
3	3,4	3.4	6.8	1.2	2611		44		44.1439		
4	4.3	4.3	8.6	1.4	1146		50		50.1635		
5	5.4	5.4	10.8	1.5	5819		56		56.1831		
By Linear Regression of Y	on X										
	Slope, m	1	31.	1434	Int	ercept, b	= 6	1682			
Correlation	Coefficient*	1=1	0.9	9966							
Calibratio	n Accepted		Yes	/Ne**							
		-									
* if Correlation Coefficient	< 0.990, ch	eck and rec	alibration age	ain,							
** Delete as appropriate.											
Remarks : As per client	's provided	information	the equipme	ent reference	no of the cal	brated High	h Volume Sample	r has bee	n		
re-assigned	from EL333	to HVS012	with respect	to the update	e in quality ma	nagement :	system.				
Calibrated by	. I	Ray Lee				Checke	d by	ŧ0	Pualine Wong		
Date	- 8	9-Oct-18				Date			19-Oct-18		

Date

C	alibra	ט ווסוו	ata for Hi	gn volume	Sample	er (13P	Sample	r)	
Location :		СМАЗа				Calbrat	ion Date	:	19-Dec-18
Equipment no.		HVS012				Calbrat	ion Due Date	: .	18-Feb-19
CALIBRATION OF CONTIN	NUOUS F	LOW RE	CORDER						
				Ambient Condition	on		Ī		
Temperature, T <sub>a</sub>			293	Kelvin	Pressure,	Pa		1020	mmHg
			Orifice Tr	ansfer Standard	Information	า			
Equipment No.		Ori31	66	Slope, m <sub>c</sub>	2.122	31	Intercept, b	эс	-0.06016
Last Calibration Date		24-Jan	-18		( H x P <sub>a</sub>	/ 1013.	3 x 298 / 7	Γ <sub>a</sub> ) <sup>1</sup>	/2
Next Calibration Date		24-Jan	-19		=	m <sub>c</sub> x	$Q_{std} + b$	С	
				Calibration of TS	SP .				
Calibration	Ма	nometer	Reading	Q <sub>std</sub>		Continu	ous Flow		IC
Point	н	(inches c	of water)	(m <sup>3</sup> / min.)		Recorder, W		(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /3	
	(up)	(down)	(difference)	X-axis	;	(CFM)			Y-axis
1	1.2	1.2	2.4	0.7669	)		20		20.2365
2	2.0	2.0	4.0	0.9819	)		28		28.3311
3	3.5	3.5	7.0	1.2897	7		37		37.4375
4	4.5	4.5	9.0	1.4586	5		41		41.4848
5	5.5	5.5	11.0	1.6096	3		50		50.5912
By Linear Regression of Y	on X								
\$	Slope, m	=	33	3.7811	Inte	rcept, b =		5.6420	
Correlation Co	efficient*	=	0	.9918	-				
Calibration A	ccepted	=	Ye	es/ <del>No</del> **	-				
* if Correlation Coefficient <	0.990, c	heck and	recalibration a	ıgain.					
** 5									
** Delete as appropriate.									
Remarks :									
Calibrated by	H	lenry Lau				Checke	d by	: -	Chan Ka Chun
Data :	1	9-Dec-18				Date		:	19-Dec-18



Location	s 8	CMA4a			- 0	Calibration Date	: 19-Oct-18
Equipment no.	:	HVS004			C	Calibration Due Date	: 19-Dec-18
CALIBRATION OF CO	NTINUOUS FLO	DW RECO	RDER				
				Ambient Co	ondition		
Temperature, T <sub>a</sub>		297.	2	Kelvin I	Pressure, P <sub>e</sub>		1017 mmHg
			Orifice	Transfer Stan	dard Information	n	
Equipment No.		Ori002		Slope, m <sub>c</sub>	2.12231	Intercept, bo	-0.06016
Last Calibration Da	te	19-Jan-1	9		(HxF	, / 1013.3 x 298/	(Ta) 1/2
Next Calibration Da	te	19-Jan-1	9		Alaceran	$m_c \times Q_{std} + b_c$	
				Calibration	of TSP		
Calibration	Mar	ometer Re	eading	Q,	etel	Continuous Flow	IC
Point	H (	nches of v	water)	(m <sup>2</sup> / )	min.)	Recorder, W	(W(P <sub>2</sub> /1013.3x298/T <sub>2</sub> ) <sup>12</sup> /35.31)
1000000	(up)	(down)	(difference)	X-a:	xis	(CFM)	Y-axis
1	1.5	1.5	3.0	0.84	171	22	22.0719
2	2.2	2.2	4.4	1.01	199	31	31.1014
3	3.4	3.4	6.8	1.26	311	41	41,1341
4	4.7	4.7	9.4	1.47	777	50	50.1635
5	6.0	6.0	12.0	1.66	359	56	56.1831
By Linear Regression o	of Y on X				7		
	Slope, m		41.6	5384	Interce	pt, b = -1	2.0983
Correlati	on Coefficient*	*	0.9	974			
Calibr	ation Accepted		Yes	/No**			
* if Correlation Coefficie	ent < 0.990, che	ck and rec	alibration aga	in.			
** Delete as appropriat	96						
Remarks : As per cl	ient's provided i	nformation	the equipme	ent reference n	no. of the calibrat	ed High Volume Sample	r has been
re-assign	ed from EL390	to HVS004	with respect	to the update	in quality manage	ement system.	
Calibrated by	1 1	Ray Lee				Checked by	: Pusline Wong
Date	1	9-Oct-18				Date	: 19-Oct-18

Location	:	CMA4a	Calbration Date :	19-Dec-18
Equipment no.	:	HVS004	Calbration Due Date :	18-Feb-19

### CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition							
Temperature, T <sub>a</sub>	293	Kelvin	Pressure, P <sub>a</sub>	1020	mmHg		

Orifice Transfer Standard Information								
Equipment No.	Ori3166	Slope, m <sub>c</sub>	2.12231	Intercept, bc	-0.06016			
Last Calibration Date	24-Jan-18		(HxP <sub>a</sub> /1013.3 x 298/T <sub>a</sub> ) <sup>1/2</sup>					
Next Calibration Date	Next Calibration Date 24-Jan-19 = $m_c \times Q_{std} + b_c$							

	Calibration of TSP									
Calibration	Manometer Reading		Manometer Reading Q <sub>std</sub> Continuous		Continuous Flow	IC				
Point	H (inches of water)		(m³ / min.) Recorder, W		(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)					
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis				
1	1.5	1.5	3.0	0.8541	24	24.2838				
2	2.0	2.0	4.0	0.9819	31	31.3666				
3	3.6	3.6	7.2	1.3076	40	40.4730				
4	4.2	4.2	8.4	1.4101	47	47.5558				
5	5.7	5.7	11.4	1.6381	56	56.6622				

Rv	Linear	Regression	of \	/ on	¥
DУ	Lilleai	Regression	UI I	OH	$^{\wedge}$

Calibration Accepted = 0.9932

Yes/Ne\*\*

19-Dec-18

Date

Remarks :					
Calibrated by	:	Henry Lau	Checked by	:	Chan Ka Chun

Date

19-Dec-18

 $<sup>\</sup>ensuremath{^{*}}$  if Correlation Coefficient < 0.990, check and recalibration again.

<sup>\*\*</sup> Delete as appropriate.



IESTINS	Calibr	ation D	ata for I	ligh Vol	ume Sar	npler (1	SP Sample	r)	
Location		CMA5b				Calibra	ation Date	13	19-Oct-18
Equipment no.		HVS010				Calibr	ation Due Date	-	19-Dec-18
CALIBRATION OF CONTIL	NUOUS FL	OW RECO	RDER						
4.				Ambient C	Condition				
Temperature, T <sub>a</sub>		297.	2	Kelvin	Pressure, P			1017	mmHg
			Orifice	Transfer Sta	ndard Inform	nation			
Equipment No.		Ori002		Slope, m <sub>e</sub>	2.122	231	Intercept, bo		-0.06016
Last Calibration Date	-	19-Jan-1	8		(+	IXP.	1013.3 x 298/	T.) 1/2	P
Next Calibration Date		19-Jan-1	9		10.100	m,	$x Q_{std} + b_c$		
				Calibratio	n of TSP			711	
Calibration	Mar	nometer Re	ading	0	***	Con	tinuous Flow		IC
Point	н	inches of v	vater)	(m <sup>9</sup>	min.)	n.) Recorder, W		(WIP,/	1013.3×298/T <sub>2</sub> ) <sup>41</sup> /35.31)
	(up)	(down)	(difference)	х-	axis		(CFM)		Y-axis
1	1.3	1.3	2.6	0.7	1906		33		33.1079
2	2.0	2.0	4.0	0.5	7738		38		38.1243
3	3.2	3.2	6.4	15	2243		45		45.1472
4	4.2	4.2	8.4	1.3	1984		50		50.1635
5	5.3	5.3	10.6	1.5	674		55		55.1799
By Linear Regression of Y	on X								
	Slope, m	· +	28.	3797	In	tercept, b	= 10	5471	
Correlation C	Coefficient*	=	0.9	999					
Calibration	Accepted		Yes	No"					
* if Correlation Coefficient <	0.990, ahe	eck and rec	alibration aga	sin.					
** Delete as appropriate.									
Remarks : As per client's	s provided	information,	the equipme	nt reference	no. of the ca	librated Hig	h Volume Sample	r has bee	n
re-assigned for	rom EL222	to HVS010	with respect	to the update	e in quality ma	anagement	system.		
Calibrated by	H	Ray Lee				Check	ed by		Pualine Wong
Date		9-Oct-18				Date			19-Oct-18

Location	:	CMA5b	Calbration Date	:	19-Dec-18	
Equipment no.	: _	HVS010	Calbration Due Date	:	18-Feb-19	_

### CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition							
Temperature, T <sub>a</sub>	293	Kelvin	Pressure, P <sub>a</sub>	1020	mmHg		

Orifice Transfer Standard Information								
Equipment No. Ori3166 Slope, m <sub>c</sub> 2.12231 Intercept, bc -0.06016								
Last Calibration Date	24-Jan-18		(HxP <sub>a</sub> /1013.3 x 298/T <sub>a</sub> ) <sup>1/2</sup>					
Next Calibration Date	24-Jan-19		= <b>m</b>	$_{c}$ x Q $_{std}$ + b $_{c}$				

	Calibration of TSP										
Calibration	Manometer Reading		Q <sub>std</sub>	Continuous Flow	IC						
Point	H (inches of water)		inches of water) (m <sup>3</sup> / min.)		Recorder, W	(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)					
	(up)	(down)	difference	X-axis	(CFM)	Y-axis					
1	1.5	1.5	3.0	0.8541	25	25.2956					
2	2.8	2.8	5.6	1.1566	34	34.4020					
3	3.6	3.6	7.2	1.3076	38	38.4493					
4	4.8	4.8	9.6	1.5055	46	46.5439					
5	6.0	6.0	12.0	1.6799	54	54.6385					

By Linear Regression of Y on X

Slope, m = 35.1088 Intercept, b = -5.8015

Correlation Coefficient\* = 0.9935

Calibration Accepted = Yes/Ne\*\*

Remarks :			
·			•
_			

Calibrated by : Henry Lau Checked by : Chan Ka Chun

<sup>\*</sup> if Correlation Coefficient < 0.990, check and recalibration again.

<sup>\*\*</sup> Delete as appropriate.



Location		CMA6a				Calibration Date	: 19-Oct-18
Equipment no.		HVS013		Calibration Due			19-Dec-18
CALIBRATION OF CONTIN	IUOUS FL	OW RECO	RDER				
				Ambient C	Condition		
Temperature, T <sub>a</sub>		297.	2	Kelvin	Pressure, P.		1017 mmHg
5:	W	3-1-	Orifice	Transfer Sta	andard Information	1	
Equipment No.		Ori002		Slope, m.	2.12231	Intercept, bc	-0.06016
Last Calibration Date		19-Jan-1	8		(HxF	/ 1013.3 x 298/	T <sub>a</sub> ) 1/2
Next Calibration Date		19-Jan-1	9		10)	$m_c \times Q_{std} + b_c$	2054
				Calibratio	on of TSP		
Calibration	Ma	nometer R	eading	c	) sid	Continuous Flow	IC
Point	н	inches of	water)	(m <sup>3</sup>	/ min.)	Recorder, W	(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>10</sup> /35.31)
620474645	(up)	(dawn)	(difference)	x-	axis	(CFM)	Y-axis
1	1.4	1,4	2.8	0.0	8194	30	30.0981
2	2.3	2.3	4,6	1.0	0422	36	36.1177
3	3.7	3.7	7.4	1.3	3143	44	44.1439
4	4.8	4.8	9.6	1.0	4930	48	48.1570
5	6.1	6.1	12.2	1.6	6795	54	54.1766
By Linear Regression of Y	on X						
	Slope, m		27.	7403	Interce	pt, b = 7	7.3172
Correlation C	coefficient*		0.9	9992		8	
Calibration	Accepted	=	Yes	/No**			
* if Correlation Coefficient <	0.990, ch	eck and rec	alibration aga	ain.			
** Delete as appropriate.							
Remarks : As per client's	s provided	information	, the equipme	ent reference	no, of the calibrat	ed High Volume Sample	r has been
re-assigned fr	rom EL551	to HVS01:	with respect	to the updat	e in quality manag	ement system.	
Calibrated by		Ray Lee				Checked by	: Pualine Wong
Date	3	19-Oct-18			31	Date	: 19-Oct-18

Location	:	CMA6a	Calbration Date	:	19-Dec-18
Equipment no.	:	HVS013	Calbration Due Date	:	18-Feb-19

### CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition						
Temperature, T <sub>a</sub>	293	Kelvin	Pressure, P <sub>a</sub>	1020	mmHg	

Orifice Transfer Standard Information								
Equipment No.	Ori3166	Slope, m <sub>c</sub>	2.12231	Intercept, bc	-0.06016			
Last Calibration Date	24-Jan-18		(HxP <sub>a</sub> /1013.3 x 298/T <sub>a</sub> ) <sup>1/2</sup>					
Next Calibration Date	24-Jan-19		= <b>m</b>	$_{c}$ x Q $_{std}$ + $_{c}$				

	Calibration of TSP										
Calibration	Manometer Reading		Q <sub>std</sub>	Continuous Flow	IC						
Point	H (inches of water)		(m <sup>3</sup> / min.)	Recorder, W	(W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31)						
	(up)	(down)	(difference	X-axis	(CFM)	Y-axis					
1	1.4	1.4	2.8	0.8261	28	28.3311					
2	2.3	2.3	4.6	1.0509	33	33.3902					
3	3.7	3.7	7.4	1.3253	41	41.4848					
4	4.8	4.8	9.6	1.5055	46	46.5439					
5	6.0	6.0	12.0	1.6799	54	54.6385					

By Linear Regression of Y on X

Slope, m = 30.1687 Intercept, b = 2.3363

Correlation Coefficient\* = 0.9927

Calibration Accepted = Yes/No\*\*

Remarks:			

Calibrated by : Henry Lau Checked by : Chan Ka Chun

<sup>\*</sup> if Correlation Coefficient < 0.990, check and recalibration again.

<sup>\*\*</sup> Delete as appropriate.



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

港黄竹坑道37號利達中心12樓 12/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. E-mail: smec@cigismec.com Website: www.cigismec.com

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



### CERTIFICATE OF CALIBRATION

Certificate No.:

18CA0322 01

Page

of

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Item tested

Description

Sound Level Meter (Type 1)

Microphone

Manufacturer: Type/Model No.: Larson Davis

PCB

Serial/Equipment No.:

LxT1 0003737 377B02 171529

Adaptors used:

Item submitted by

Customer Name:

Lam Geotechnics Ltd.

Address of Customer:

Request No.

Date of receipt:

22-Mar-2018

Date of test:

28-Mar-2018

Reference equipment used in the calibration

Description:

Model:

Serial No.

Expiry Date:

Traceable to:

Multi function sound calibrator Signal generator

B&K 4226 DS 360

2288444 61227

08-Sep-2018 01-Apr-2018

CIGISMEC CEPREL

Ambient conditions

Temperature:

21 ± 1 °C

Relative humidity: Air pressure:

50 ± 10 % 1005 ± 5 hPa

Test specifications

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%

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:

06-Apr-2018

Company Chop:

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 CARP157-1/Issue 1/Rev C/01/02/2007



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香港黄竹坑道37號利達中心12樓 12/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. E-mall: smec@cigismec.com Website; www.cigismec.com Tel: (852) 2873 6860 Fax: (852) 2555 7533



### CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

18CA0322 01

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#### 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:	Expanded Uncertanity (dB)	Coverage Factor
Self-generated noise	A C	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	
	C	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	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	
	Repeated at frequency of 100 Hz	Pass	0.3	
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	
	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	Expanded Uncertanity (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz Weighting A at 8000 Hz	Pass Pass	0.3 0.5	

#### 3, Response to associated sound calibrator

N/A

The expanded 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

by:

Date:

Fung Chi Yip

Checked by:

Lam Tze Wai

28-Mar-2018

Date:

06-Apr-2018

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 CARP 152-2/Issue 1/Rev C/01/02/2007



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



### CERTIFICATE OF CALIBRATION

Certificate No.:

18CA0510 04

Page

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Item tested

Description:

Sound Level Meter (Type 1) Larson Davis

Manufacturer: Type/Model No.:

LxT1

Serial/Equipment No.: Adaptors used:

0004796

Microphone PCB

377B02 155507

Preamp PCB

PRMLxT1L 042621

Item submitted by

Customer Name:

Lam Geotechnics Ltd.

Address of Customer.

Request No. Date of receipt:

10-May-2018

Date of test:

11-May-2018

Reference equipment used in the calibration

Description:

Signal generator

Multi function sound calibrator

Model: B&K 4226 DS 360

Serial No.

2288444 61227

Expiry Date:

08-Sep-2018 23-Apr-2019

Traceable to:

CIGISMEC CEPREI

Ambient conditions

Temperature:

21 ± 1 °C 50 ± 10 %

Relative humidity: Air pressure:

1005 ± 5 hPa

Test specifications

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

Actual Measurement data are documented on worksheets

Feno Jungi

Approved Signatory:

Date: 11-May-2018

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 CARP152-186566 1/Rev Ci01/02/2007



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



### CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

18CA0510 04

Page

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:	Expanded Uncertanity (dB)	Coverag Factor
Self-generated noise	Α	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	6.6
	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	
	C	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	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/103 at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz	Pass		
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.3	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.4	
	Leq	Pass	0.3	
	204	F a 5 5	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	Expanded Uncertanity (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz Weighting A at 8000 Hz	Pass Pass	0.3 0.5	

#### 3. Response to associated sound calibrator

N/A

The expanded 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:

Checked by:

Date:

1/1-May-2018

Date:

11-May-2018

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

C Sols & Materials Engineering Co., Ltd.

Form No CARP152-24ssue 1/Rev C/01/02/2007

# Calibration Certificate

Certificate Number 2018010851

Customer: LAM Environmental Services Ltd 11/F Centre Point 181-185 Gloucester Road Wanchai, , Hong Kong

CAL200 Model Number 13098 Serial Number Pass Test Results

Inoperable Initial Condition

Description Larson Davis CAL200 Acoustic Calibrator Procedure Number D0001.8386 Scott Montgomery Technician Calibration Date 29 Oct 2018

Calibration Due 23 Temperature 34 Humidity 101.2 kPa Static Pressure

°C ±0.3°C %RH ±3 %RH ± 1 kPa

Evaluation Method The data is aguired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliant to Manufacturer Specifications per D0001.8190 and the following standards: Compliance Standards

ANSI \$1.40-2006 IEC 60942:2017

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Standards Used	1		
Cal Date	Cal Due	Cal Standard	
09/06/2018	09/06/2019	001021	
04/10/2018	04/10/2019	001051	
03/07/2018	03/07/2019	005446	
09/20/2018	09/20/2019	006506	
08/07/2018	08/07/2019	006507	
05/10/2018	05/10/2019	006510	
07/18/2018	07/18/2019	007368	
	Cal Date 09/06/2018 04/10/2018 03/07/2018 09/20/2018 08/07/2018 05/10/2018	09/06/2018 09/06/2019 04/10/2018 04/10/2019 03/07/2018 03/07/2019 09/20/2018 09/20/2019 08/07/2018 08/07/2019 05/10/2018 05/10/2019	Cal Date         Cal Due         Cal Standard           09/06/2018         09/06/2019         001021           04/10/2018         04/10/2019         001051           03/07/2018         03/07/2019         005446           09/20/2018         09/20/2019         006506           08/07/2018         08/07/2019         006507           05/10/2018         05/10/2019         006510







#### REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Information supplied by customer:

CONTACT: MR. SAM LAM WORK ORDER: HK1811147

CLIENT: LAM GEOTECHNICS LIMITED

DATE RECEIVED: 16/11/2018 DATE OF ISSUE: 19/11/2018

ADDRESS: 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,

WANCHAI, HONG KONG

PROJECT: -

#### METHOD OF PERFORMANCE CHECK/ CALIBRATION:

Ref: APHA22nd ed 2130B

#### COMMENTS

It is certified that the item under performance check/calibration 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 Pilot Testing Limited will be followed.

Scope of Test:	Turbidity	
Equipment Type:	Turbidimeter	
Brand Name:	Xin Rui	
Model No.:	WGZ-3B	
Serial No.:	1403009	
Equipment No.:		
Date of Calibration:	19/11/2018	

#### Remarks:

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

Approved Signatory:

Ms. Wong Po Yan, Pauline

Assistant Laboratory Manager

Issue Date:

19/11/2018



### REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

WORK ORDER: HK1811147 DATE OF ISSUE: 19/11/2018

CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter	
Brand Name:	Xin Rui	
Model No.:	WGZ-3B	
Serial No.:	1403009	
Equipment No.:	***	
Date of Calibration:	19/11/2018	
Date of next Calibation:	19/02/2019	

#### Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance	
0	0.00		
4	3.98	-0.5%	
10	10.12	1.2%	
40	43.50	8.8%	
100	103.00	3.0%	
400	396	-1.0%	
1000	925	-7.5%	
	Tolerance Limit (±)	10%	

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

WORK ORDER: HK1811031



#### REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Information supplied by customer:

CONTACT: MR. SAM LAM

CLIENT: LAM GEOTECHNICS LIMITED

DATE RECEIVED: 11/10/2018 DATE OF ISSUE: 12/10/2018

ADDRESS: 11/F, CENTRE POINT, 181-185, GLOUCESTER ROAD,

WANCHAI, HONG KONG

PROJECT: --

### METHOD OF PERFORMANCE CHECK/ CALIBRATION:

Ref: APHA22nd ed 2130B

#### COMMENTS

It is certified that the item under performance check/calibration 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 Pilot Testing Limited will be followed.

Scope of Test:	Turbidity	
Equipment Type:	Turbidity Meter	
Brand Name:	PCE Instruments	
Model No.:	PCE-TUM 20	
Serial No.:	Q942542	
Equipment No.:	***	
Date of Calibration:	12/10/2018	

Remarks:

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

	-
Anneowed	Signatory

Ms. Wong Po Yan, Pauline Assistant Laboratory Manager Issue Date: 12/10/2018

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Page 2/2



### REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

WORK ORDER: HK1811031 DATE OF ISSUE: 12/10/2018

CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidity Meter	
Brand Name:	PCE Instruments	
Model No.:	PCE-TUM 20	
Serial No.:	Q942542	
Equipment No.:		
Date of Calibration:	12/10/2018	
Date of next Calibation:	12/01/2019	

#### Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance	
0	0.00	***	
10	10.50	5.0%	
20	20.50	2.5%	
40	41.48	3.7%	
100	99	-1.0%	
400	401	0.3%	
800	788	-1.5%	
	Tolerance Limit (±)	10%	

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

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#### **EQUIPMENT PERFORMANCE CHECK / CALIBRATION REPORT**

Report No.

HK1811019

**Project Name** Date of Issue EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT

11/10/2018

Customer

LAM ENVIRONMENTAL SERVICES LIMITED

Address

11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG

Calibration Job No. Test Item No. **Test Item Details** 

HK1811019 HK1811019-01

**Test Item Description** 

Sonde YSI

Manufacturer Model No. Serial No.

Professional Plus 14K100322

Performance Method

Checked according to in-house method CAL005

(References: Temperature (Section 6 of Intermational Accreditation New Zealand Technical Gr No. 3 Second edition March 2008: Working Thermometer Calibration Procedure), pH value

(APHA 21e 4500H:B), Salinity (Refer to Conductivity APHA 19e 2510B)

Dissolved oxygen (APHA 19e 4500-O.C))

Test Item Receipt Date **Test Item Calibration Date**  9/10/2018 10/10/2018

- Notes: 1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
  - 2. Results relate to item(s) as received.
  - 3. ± indicates the tolerance limit.
  - 4. N/A = Not applicable
  - 5. APHA American Public Health Association, American Water Works Association and Water Environment Federation, Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WEF, USA
  - 6. DO, pH, salinity and temperature performance check was conducted by Pilot Testing Limited.
  - Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

Approved Signatory

Ms. Wong Po Yan, Pauline (Assistant Laboratory Manager) Issue Date:

11/10/2018



#### REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1811019

DATE OF ISSUE: 11/10/2018

CLIENT: LAM ENVIRONMENTAL SERVICES LIMITED

Equipment Type	Sonde	
Manufacturer	YSI	
Model No.	Professional Plus	
Serial No.	14K100322	
Date of Calibration	10-Oct-18	
Date of next Calibation	10-Jan-19	

#### Parameters:

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

Reference Reading (*C)	Display Reading (°C)	Deviation (°C)
8.8	8.8	0.0
15.3	15.2	-0.1
25.4	25.3	-0.1
	Tolerance Limit	±2.0

pH Value (Method Ref: APHA21e, 4500H:B)

Expected Reading (pH unit)	Reference Reading (pH unit)	Display Reading (pH unit)	Deviation (pH unit)
4.0	4.01	3.98	-0.03
7.0	6.99	7.02	0.03
10.0	10.02	10.03	0.01
	Tolerance Limit		±0.20

Conductivity (Method Ref: APHA 19e, 2510)

KCI concentration (mol/L)	Reference Reading (ms/cm)	Display Reading (ms/cm)	Deviation (%)
0.0000	0.00	0.00	
0.1000	12.3	12.3	-0.16
0.2000	24.0	23.9	-0.33
0.5000	57.1	57.2	0.18
	Tolerance Limit		±2.0

Dissolved Oxygen (DO) (Method Ref: APHA 19e, 4500-O, C)

Reference DO reading (mg/L)	DO reading od DO probe (mg/L)	Deviation (mg/L)
7.00	7.01	0.01
6.41	6.43	0.02
4.46	4.41	-0.05
	Tolerance Limit	±0.20

Remarks:

- (1) Maxium tolerance and calibration frequency stated in the report, unless otherewise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.
- (2) Displayed reading presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.
- (3) Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

- End of Report -



#### **EQUIPMENT PERFORMANCE CHECK / CALIBRATION REPORT**

Report No. : HK1811027

Project Name : EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT

Date of Issue : 11/10/2018

Customer : LAM ENVIRONMENTAL SERVICES LIMITED

Address : 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG

Calibration Job No. : HK1811027 Test Item No. : HK1811027-01

Test Item Details

Test Item Description Sonde
Manufacturer YSI
Model No. Profession

 Model No.
 : Professional Plus

 Serial No.
 : 14M100277

Performance Method : Checked according to in-house method CAL005

(References: Temperature (Section 6 of Intermational Accreditation New Zealand Technical Gi No. 3 Second edition March 2008: Working Thermometer Calibration Procedure), pH value

(APHA 21e 4500H:B), Salinity (Refer to Conductivity APHA 19e 2510B)

Dissolved oxygen (APHA 19e 4500-O,C))

Test Item Receipt Date : 11/10/2018 Test Item Calibration Date : 11/10/2018

Notes: 1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.

2. Results relate to item(s) as received.

3. ± indicates the tolerance limit

4. N/A = Not applicable

 APHA - American Public Health Association, American Water Works Association and Water Environment Federation, Standard Methods for the Examination of Water and Wastewater, APHA-AWWA-WEF, USA

6. DO, pH, salinity and temperature performance check was conducted by Pilot Testing Limited.

 Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

Approved Signatory

Ms. Wong Po Yan, Pauline (Assistant Laboratory Manager) Issue Date: 11/10/2018



#### REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1811027 DATE OF ISSUE: 11/10/2018

CLIENT: LAM ENVIRONMENTAL SERVICES LIMITED

Equipment Type	Sonde	
Manufacturer	YSI	
Model No.	Professional Plus	
Serial No.	14M100277	
Date of Calibration	11-Oct-18	
Date of next Calibation	11-Jan-19	

#### Parameters:

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

Reference Reading (*C)	Display Reading (°C)	Deviation (°C)
7.0	6.9	-0.1
15.7	16.0	0.4
24.7	24.5	-0.2
T	olerance Limit	±2.0

pH Value (Method Ref: APHA21e, 4500H:B)

Expected Reading (pH unit)	Reference Reading (pH unit)	Display Reading (pH unit)	Deviation (pH unit)
4.0	3.99	3.98	-0.01
7.0	7.01	7.08	0.07
10.0	10.02	10.06	0.04
	Tolerance Limit		±0.20

Conductivity (Method Ref: APHA 19e, 2510)

KCI concentration (mol/L)	Reference Reading (ms/cm)	Display Reading (ms/cm)	Deviation (%)
0.0000	0.00	0.00	-02
0.1000	12.6	12.6	-0.55
0.2000	23.6	23.6	-0.08
0.5000	55.1	55.7	1.09
	Tolerance Limit		±2.0

Dissolved Oxygen (DO) (Method Ref: APHA 19e, 4500-O. C)

Reference DO reading (mg/L)	DO reading od DO probe (mg/L)	Deviation (mg/L)
6.97	6.92	-0.05
5.15	5.10	-0.05
3.97	4.08	0.11
	Tolerance Limit	±0.20

Remarks:

- (1) Maxium tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of Pilot Testing Limited will be followed.
- (2) Displayed reading presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.
- (3) Because of high sensitivity and ease of measurement, the conductivity method (according to APHA 19e 2510) is used to determine salinity.

- End of Report -