

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 Tabulation										
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) (y-axis)					
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					
	m=	2.12231		m=	1.32895					
QSTD	b=	-0.06016	QA [b=	-0.03719					
	r=	0.99999	7.	r=	0.99999					

Vetd-	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	M- TANGUE ADVID 1		
		Va= ΔVol((Pa-ΔP)/Pa)		
Qstd=	Vstd/∆Time	Qa= Va/ΔTime		
Q3tu-	For subsequent flow ra	THE PARTY OF THE P		

	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)
	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

FAX: (513)467-9009



TESTING	Jano		ata 101 i	ngn von	unic Oan	ipici (i	or Gampier	,		
Location		CMA1b				Calibra	tion Date	: <u> </u>	23-Aug-18	
Equipment no.		HVS001				Calibra	tion Due Date	:	23-Oct-18	
CALIBRATION OF CONT	TINUOUS FL	OW RECO	RDER							
				Ambient C	ondition					
Temperature, T _a		300.	7	Kelvin	Pressure, Pa	ı	1	011	mmHg	
			Orifice	Transfer Sta	ndard Inform	ation				
Equipment No.		Ori002		Slope, m _c	2.122	31	Intercept, bc	Intercept, bc -0.06016		
Last Calibration Date		19-Jan-1	8		(H	013.3 x 298 /	T _a) 1/	2		
Next Calibration Date		19-Jan-1	9	$m_c \times Q_{std} + b_c$						
				Calibration	n of TSP					
Calibration	Ма	nometer Re	eading	Q _{std} Continuous Flow					IC	
Point	н	(inches of v	water)	(m³ / min.) Rec			corder, W	(W(P	_a /1013.3x298/T _a) ^{1/2} /35.31)	
	(up)	(down)	(difference)	X-a	X-axis ((CFM)		Y-axis	
1	1.5	1.5	3.0	0.8	397	24		23.8602		
2	2.5	2.5	5.0	1.0	758		32		31.8135	
3	3.9	3.9	7.8	1.3	366		42		41.7553	
4	5.0	5.0	10.0	1.5	097		48		47.7203	
5	6.1	6.1	12.2	1.6	645		53		52.6912	
By Linear Regression of `	on X									
	Slope, m	=	35.	3840	Int	ercept, b =	= -5	.9099		
Correlation	Coefficient*	=	0.9	9996						
Calibrati	on Accepted	=	Yes	s/No**						
* if Correlation Coefficien	t < 0.990, ch	eck and rec	alibration aga	ain.						
** Delete as appropriate.										
As per clier Remarks :	nt's provided	information	, the equipme	ent reference i	no. of the cali	brated High	Volume Sampler	has bee	en	
1/cilidiks .										

 re-assigned from EL452 to HVS001 with respect to the update in quality management system.

 Calibrated by
 Ray Lee
 Checked by
 : Pauline Wong

 Date
 : 23-Aug-18
 Date
 : 23-Aug-18



Location		CMA1b			Calibi	ration Date	ŦĪ.	19-Oct-18	
Equipment no. :		HVS001			Calibr		19-Dec-18		
CALIBRATION OF CONTIN	VUOUS FL	OW RECO	RDER						
		911 112 9 91	392813	Ambient Cond	ition		200		
Temperature, T,		297.2	2	0.00	ssure, P.	1	017	mmHg	
			Orifice	Transfer Standar	rd Information				
Equipment No.		Ori002) "	Slope, m _c	2.12231	Intercept, bc		-0.06016	
Last Calibration Date	e 19-Jan-16			V.7.033.IL	(H×P _a /	T. J 1/2			
Next Calibration Date		19-Jan-19)			c x Q _{atd} + b _c			
		7.07		Calibration of	TSP				
Calibration Point	Manometer Reading H (inches of water)		90000000	35 1445 1 2255		Continuous Flow Recorder, W		IC (W(P ₂ /1013.3x298/T ₂) ¹⁰ /35.31	
	(up)	(down)	(difference)	X-axis		(CFM)	Y-axis		
1	1,7	1.7	3.4	0.9000	13	27	27.0883		
2	2.5	2.5	5.0	1.0854	8	33		33.1079	
3	4.0	4.0	8.0	1.3654	0	43		43.1406	
4	5.3	5,3	10.6	1,5674		49		49.1602	
5	6.6	6.6	13.2	1.7458		55		55.1799	
By Linear Regression of Y o	n X Slope, m		33.	2775	Intercept, b	= -2	8174		
Correlation C	cefficient*	(2a)	0.9	997					
Calibration	Accepted		Yes	No**					
* if Correlation Coefficient <	0.990, che	eck and reca	elibration aga	in.					
** Delete as appropriate.									
Remarks : As per client's	provided	information,	the equipme	nt reference no. o	of the calibrated His	gh Volume Sampler	has been		
re-assigned fr	om EL452	to HVS001	with respect	to the update in o	quality management	(system,			
Calibrated by		Ray Lee			Check	ced by		Pualine Wong	
Date	3	9-Oct-18			Date			19-Oct-18	



TESTING	Calibr	ation D	ata for F	ııgn vol	ume Sam	ipier (18	P Sampler)		
Location :		CMA2a				Calibration	on Date	:	23-Aug-18	
Equipment no.		HVS002				Calibration	on Due Date	:	23-Oct-18	
CALIBRATION OF CONTI	NUOUS FL	OW RECO	RDER							
				Ambient C	ondition					
Temperature, T _a		300.	7	Kelvin	Pressure, Pa	l	10	011	mmHg	
			Orifice 1	Transfer Sta	ndard Inform	ation				
Equipment No.		Ori002		Slope, m _c	2.122	31	Intercept, bc		-0.06016	
Last Calibration Date		19-Jan-1	8		(H	x P _a / 10	13.3 x 298 / ⁻	3.3 x 298 / T _a) ^{1/2}		
Next Calibration Date		19-Jan-1	9	$m_c \times Q_{std} + b_c$						
				Calibration	n of TSP					
Calibration	Mai	nometer Re	eading	Q _{std}		Contin	uous Flow		IC	
Point	Н (inches of v	water)	(m ³ / min.)		Rec	order, W	(W(P	_a /1013.3x298/T _a) ^{1/2} /35.31)	
	(up)	(down)	(difference)	X-axis		(CFM)			Y-axis	
1	1.6	1.6	3.2	0.8663		28			27.8368	
2	2.2	2.2	4.4	1.0110			35		34.7961	
3	3.7	3.7	7.4	1.3	026	44			43.7436	
4	4.6	4.6	9.2	1.4	492	51			50.7028	
5	5.9	5.9	11.8	1.6	375		54		53.6854	
By Linear Regression of Y	on X									
	Slope, m	=	34.0	0314	Int	tercept, b =	-0.	4992		
Correlation (Coefficient*	=	0.9	914	•					
Calibratio	n Accepted	=	Yes	/ No **						
* if Correlation Coefficient	< 0.990, che	eck and rec	alibration aga	in.						
** Dalata an annuaniata										
** Delete as appropriate.										
Remarks : As per client	s provided i	ntormation	the equipme	nt reference	no. of the cali	brated High \	olume Sampler h	nas bee	<u></u>	
re-assigned f	from EL449	to HVS002	with respect	to the update	in quality ma	nagement sys	stem.			
Calibrated by		Ray Lee				Checked	by	:	Pualine Wong	
Date :	2	3-Aug-18				Date		:	23-Aug-18	



Equipment no.	16	- 3	HVS002				Calibrat	ion Due Date	19-Dec-18		
Equipment no.	-		IVOUL					ion Dua Date	-	10-000-30	
CALIBRATION OF	CONTINU	JOUS FLO	OW RECOR	IDER							
		200000		00100	Ambient C	Condition		e de la compansión de l	7		
Temperature, T,			297.2	6	Kelvin	Pressure, P	4		1017	mmHg	
				Orifice 1	Fransfer Sta	ndard Inforr	nation				
Equipment I	No.		Ori002		Slope, m _c	2.12	231	Intercept, bc		-0.06016	
Last Calibration	Date		19-Jan-18	8		()	1xPa/10	013.3 x 298/	T.) 1/	2	
Next Calibration	n Date		19-Jan-19	6		300		$x Q_{sto} + b_c$	50072000		
					Calibratio	n of TSP					
Calibration	n	Mar	ometer Re	ading	C	stel	Conti	nuous Flow		IC	
Point		н (inches of w	rater)	(m ⁰ / min		Red	corder, W	(W)P,	/1013.3x298/T _a) ¹² /35.31	
		(up)	(down)	(difference)	X	X-axis		(CFM)		Y-axis	
1		1.6	1,6	3.2	0.8740			27		27.0683	
2		2.6	2.6	5.2	10	1063	34		34.1112		
3		4.0	4.0	8.0	13	9654		42	42.1373		
4		5.2	5.2	10.4	1.5	5528		50		50:1635	
5		6.5	6,5	13.0	t.:	1328		54		54.1766	
By Linear Regress	on of Y or	X		10			'Al-				
		Slope, m			1470	, i	ntercept, b =	9	4980		
Con	elation Co	efficient*	(*)	0.9	975						
c	alibration /	Accepted		Yes	'No**						
						=					
of Correlation Coe	fficient < f	000 cho	ork and roce	allbration and	in.						
# Loneston Coe	incaint ~ t	ASSIV. CH	ick and rece	sitration age							
* Delete as appro	priate.										
Remarks : As p	er client's y	provided i	nformation,	the equipme	nt reference	no of the ca	dibrated High	Volume Sample	r has bee	an	

Checked by

Date

Pualine Wong

19-Oct-18

Ray Lee

19-Oct-18

Calibrated by

Date



Location	: _	CMA3a	Calibration Date	:	23-Aug-18
Equipment no.	: _	HVS012	Calibration Due Date	:	23-Oct-18

CALIBRATION OF CONTINUOUS FLOW RECORDER

Temperature, T _a	300.7	101	1 mmHg							
Orifice Transfer Standard Information										
Equipment No.	Ori002	Slope, m _c	2.12231	Intercept, bc	-0.06016					

Ambient Condition

 Equipment No.
 Ori002
 Slope, m_c
 2.12231
 Intercept, bc
 -0.06016

 Last Calibration Date
 19-Jan-18
 (H x P_a / 1013.3 x 298 / T_a)
 1/2

 Next Calibration Date
 19-Jan-19
 m_c x Q_{std} + b_c

	Calibration of TSP											
Calibration	Maı	nometer Re	eading	Q _{std}	Continuous Flow	IC						
Point	н (inches of v	vater)	(m ³ / min.)	Recorder, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)						
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis						
1	1.3	1.3	2.6	0.7837	28	27.8368						
2	2.3	2.3	4.6	1.0330	35	34.7961						
3	3.2	3.2	6.4	1.2134	41	40.7611						
4	4.2	4.2	8.4	1.3860	47	46.7261						
5	5.4	5.4	10.8	1.5678	52	51.6970						
By Linear Regression of Y	on X											
	Slope, m	=	30.9	9858 Int	tercept, b = 3	3.2800						
Correlation C	oefficient*	=	0.99	991								
Calibration	Calibration Accepted =		Yes/	No**								

^{*} if Correlation Coefficient < 0.990, check and recalibration again.

As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been Remarks :

re-assigned from EL333 to HVS012 with respect to the update in quality management system.

 Calibrated by
 :
 Ray Lee
 Checked by
 :
 Pauline Wong

 Date
 :
 23-Aug-18
 Date
 :
 23-Aug-18

^{**} Delete as appropriate.



Date

	Cambr	ation L	ata for i	ligh Vol	ume San	ipier (I	SP Sample	17)		
Location		CMA3a				Calibra	tion Date	8	19-Oct-18	
Equipment no.	1	HV\$012		Calibration Due Date 19-Dec-1						
CALIBRATION OF CONTI	NUUUS FL	OW RECO	KDEK							
	_			Ambient C	Lanca de la company		1	1017	202020	
Temperature, T,		297.	-	Kelvin	Pressure, P.			1017	mmHg	
			Orifice	Transfer Sta	indard Inform	ation				
Equipment No.		Ori002		Slope, m _e	2,122	31	Intercept, bo	8	-0.06016	
Last Calibration Date	on Date 19-Jan-18			(HxPa/1013.3 x 298/Ta) 1/2						
Next Calibration Date		19-Jan-1	9							
				Calibratio	n of TSP					
Calibration	Manometer Reading		a	Q _{ste} Continu		tinuous Flow	T	IC		
Point H (inches of		water)	(m ³	min.)	Re	corder, W	(W/P,	/1013.3×296/T ₄) ⁽² /35.31)		
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-axis		
1	1.4	1.4	2,8	0.6	194 32		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	811		44		44.1439	
4	4.3	4.3	8.6	1.4	1146		50		50.1635	
5	5.4	5.4	10.8	81.5	5819		56		56.1831	
By Linear Regression of Y	on X									
	Slope, m	2 13#B ₂	31.	1434	Int	ercept, b	= 6	1682		
Correlation (Coefficient*		0.9	9966	8		/		-5	
Calibratio	n Accepted		Yes	/Ne**						
		- 5			-					
* if Correlation Coefficient	< 0.990, che	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 (rom EL333	to HVS012	with respect	to the update	e in quality ma	nagement :	system.			
Calibrated by	3	Ray Lee				Checke	d by	ŧ3	Pualine Wong	
Distr.	9	9-Oct-18			Date				19-Oct-18	



Location	: _	CMA4a	Calibration Date		23-Aug-18
Equipment no.	: _	HVS004	Calibration Due Date	:	23-Oct-18

Ambient Condition

CALIBRATION OF CONTINUOUS FLOW RECORDER

Temperature, T _a	300.7	Kelvin	Pressure, P _a	1011	mmHg			
	Orif	fice Transfer Sta	andard Information					
Equipment No.	Ori002	Slope, m _c	2.12231	Intercept, bc	-0.06016			
Last Calibration Date	19-Jan-18		(H x P _a /	1013.3 x 298 / T _a)	1/2			
Next Calibration Date	19-Jan-19		$m_c \times Q_{std} + b_c$					

	Calibration of TSP									
Calibration	Maı	nometer Re	eading	Q _{std}	Continuous Flow	IC				
Point	Н (inches of v	vater)	(m ³ / min.)	Recorder, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)				
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis				
1	1.4	1.4	2.8	0.8122	22	21.8718				
2	2.0	2.0	4.0	0.9652	29	28.8310				
3	3.6	3.6	7.2	1.2853	42	41.7553				
4	4.7	4.7	9.4	1.4646	48	47.7203				
5	5.8	5.8	11.6	1.6238	54	53.6854				
By Linear Regression of Y	on X									
	Slope, m	=	38.	9454 In	tercept, b = -9.	1384				
Correlation C	oefficient*	=	0.9	9990						
Calibration	Accepted	=	Yes	/ No **						

^{*} if Correlation Coefficient < 0.990, check and recalibration again.

Remarks : As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been

re-assigned from EL390 to HVS004 with respect to the update in quality management system.

 Calibrated by
 Ray Lee
 Checked by
 : Pauline Wong

 Date
 23-Aug-18

 Date
 : 23-Aug-18

^{**} Delete as appropriate.



Location	8 8	CMA48				Calibration	Date	Œ	19-Oct-18
Equipment no.		IVS004				Calibration	Due Date	:	19-Dec-18
CALIBRATION OF COL	NTINUOUS FLO	W RECO	RDER						
		- 10		Ambient C	ondition				
Temperature, T _a		297.	2	Kelvin	Pressure, P.		19	017	mmHg
			Orifice	Transfer Star	ndard Informati	on			
Equipment No.		Ori002		Slope, m _c	2.12231		Intercept, bc		-0.06016
Last Calibration Dat	te	19-Jan-1	8		(Hx	P. / 101	3.3 x 298/	T .) 1/2	
Next Calibration Da	te	19-Jan-1	9			m _c x	Q _{std} + b _c		
				Calibration	n of TSP				
Calibration	Man	ometer Re	eading	Q	ated	Continu	ous Flow		IC
Point	H (i	nches of v	water)	(m ² /	min.)	Recorder, W		(W(P ₂ /1	013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-a	ixis	(C	FM)		Y-axis
1	1.5	1.5	3.0	0.8	471	1	22		22.0719
2	2.2	2.2	4.4	1.0	199		31		31.1014
3	3.4	3.4	6.8	1.2	811		11		41.1341
4	4.7	4.7	9.4	1,4	777		50		50.1635
5	6.0	6.0	12.0	1.6	659		56		56.1831
	If Y on X Slope, m on Coefficient*	*	0.9	5384 9974 /No**	Interc	cept b =	-12	.0983	- 16
re-assign	ent's provided in ed from EL390	nformation	, the equipme	ent reference i	no. of the calibration of the ca		em.	has been	Pualine Wong
Calibrated by	-	9-Oct-18	0			Date			19-Oct-18



Location	:	CMA5b	Calibration Date	:	23-Aug-18
Equipment no.		HVS010	Calibration Due Date	: -	23-Oct-18

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition							
Temperature, T _a	300.7	Kelvin	Pressure, P _a	1011	mmHg		

Orifice Transfer Standard Information								
Equipment No.	Ori002	Slope, m _c	2.12231	Intercept, bc	-0.06016			
Last Calibration Date	Last Calibration Date 19-Jan-18 (H x P _a / 1013.3 x 298 / T _a) 1/2							
Next Calibration Date	19-Jan-19		= n	$n_c \times Q_{std} + b_c$				

	Calibration of TSP								
Calibration	Ма	nometer Re	eading	Q _{std}	Continuous Flow	IC			
Point	H (inches of water)		(m ³ / min.)	Recorder, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)				
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis			
1	1.5	1.5	3.0	0.8397	34	33.8019			
2	2.1	2.1	4.2	0.9884	40	39.7669			
3	3.4	3.4	6.8	1.2499	48	47.7203			
4	4.4	4.4	8.8	1.4180	54	53.6854			
5	5.6	5.6	11.2	1.5960	59	58.6562			
By Linear Regression of Y	on X								

By Linear Regression of Y on X

32.7067 6.8765 Slope, m Intercept, b =

Correlation Coefficient* 0.9988

Calibration Accepted Yes/No**

Remarks: As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been

re-assigned from EL222 to HVS010 with respect to the update in quality management system

Ray Lee 23-Aug-18 Pauline Wong Calibrated by Checked by 23-Aug-18 Date Date

^{*} if Correlation Coefficient < 0.990, check and recalibration again.

^{**} Delete as appropriate.



Location		CMA5b				Calibra	ation Date	38	19-Oct-18	
Equipment no.	- 9	HVS010				Calibr	ation Due Date	1	19-Dec-18.	
CALIBRATION OF CONTIN	mone et	OW DECOS	enep							
CACIBRATION OF CONTIN	IUUUS FL	OW RECO	TUEN							
La constant	-	Succe		Ambient C				20101	escape	
Temperature, T _a	l:	297.2		Kelvin	Pressure, P.	N		1017	mmHg	
			Orifice	Fransfer Sta	indard Inform	ation				
Equipment No.		Ori002		Slope, m _e	2.1223	31	Intercept, bc		-0.06016	
Last Calibration Date		19-Jan-18			(H	xP,/	1013.3 x 298/	Ta) 1/2		
Next Calibration Date		19-Jan-19			0.600	m,	c x Q _{stat} + b _c	ra to se		
				Calibratio	n of TSP					
Calibration	Mar	nometer Re	ading	0	ste .	Con	tinuous Flow		1C	
Point	H (inches of water		vater)	ter) (m ² /		Recorder, W		(WIP)	1013.3x298/T ₄) ¹⁰ /35.31)	
	(up)	(up) (down) (diffe		X-axis		(CFM)			Y-axis	
1	1.3	1.3	2.6	0.7	7906	906 33			33.1079	
2	2.0	2.0	4.0	0.5	1738		38	10	38.1243	
3	3.2	3.2	6.4	36	2243		45		45.1472	
4	4.2	4.2	8.4	1.3	1984		50		50.1635	
5	5.3	5.3	10.6	33	5674		55		55.1799	
By Linear Regression of Y o	in X									
	Slope, m	17	28.3	3797	Int	ercept, b	= 10	5471		
Correlation C	cefficient*	-	0.9	999						
Calibration	Accepted		Yes/	No"	-					
				3000	ä					
* if Correlation Coefficient <	0.990, che	ck and reca	slibration aga	in.						
** Delete as appropriate.										
0.040-024009-0340	provided i	nformation,	the equipme	nt reference	no. of the cali	brated Hig	gh Volume Sampler	has bee	ń	
re-assigned fr	om EL222	to HVS010	with respect	to the update	e in quality ma	nagement	system.			
Calibrated by	5]	Ray Lee				Check	ed by	8	Pualine Wong	
	7	9-Oct-18				Date			19-Oct-18	



Location	:	CMA6a	Calibration Date	: _	23-Aug-18
Equipment no.	:	HVS013	Calibration Due Date	:	23-Oct-18

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition							
Temperature, T _a	300.7	Kelvin Pressure , P _a	1011	mmHg			

Orifice Transfer Standard Information					
Equipment No.	Ori002	Slope, m _c	2.12231	Intercept, bc	-0.06016
Last Calibration Date	19-Jan-18		(H x P _a /	1013.3 x 298 / T _a)	1/2
Next Calibration Date	19-Jan-19		= m	$_{\rm c}$ x Q $_{\rm std}$ + $_{\rm c}$	

Calibration of TSP						
Calibration	Mai	nometer Re	ading	Q _{std}	Continuous Flow	IC
Point	Н ((inches of v	vater)	(m ³ / min.)	Recorder, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis
1	1.5	1.5	3.0	0.8397	32	31.8135
2	2.3	2.3	4.6	1.0330	39	38.7728
3	3.3	3.3	6.6	1.2318	44	43.7436
4	4.4	4.4	8.8	1.4180	50	49.7087
5	4.9	4.9	9.8	1.4948	54	53.6854
By Linear Regression of Y on X						

Slope, m	=	31.9490	Intercept, b =	5.0955	

Calibration Accepted = 0.9965

Yes/Ne**

Remarks: As per client's provided information, the equipment reference no. of the calibrated High Volume Sampler has been

re-assigned from EL551 to HVS013 with respect to the update in quality management system.

 Calibrated by Date
 :
 Ray Lee
 Checked by Date
 :
 Pauline Wong

 Date
 :
 23-Aug-18

^{*} if Correlation Coefficient < 0.990, check and recalibration again.

^{**} Delete as appropriate.



Location	8. 1	CMA6a			Cal	libration Date	3	19-Oct-18
Equipment no.		HVS013			Cal	libration Due Date	4	19-Dec-18
CALIBRATION OF CON	TINUOUS FL	OW RECO	RDER					
				Ambient C	ondition			
Temperature, T		297.	2	Kelvin	Pressure, P.		1017	mmHg
			Orifice	Transfer Star	ndard Information			
Equipment No.		Ori002		Slope, m.	2.12231	Intercept, bo	8	-0.08016
Last Calibration Date	9	19-Jan-1	8		(HxPa	/ 1013.3 x 298	(Ta) 1/	2
Next Calibration Date	•	19-Jan-1	9		49 40	m _c x Q _{std} + b _c	-50.000	
			,	Calibration	n of TSP			
Calibration	Mai	nometer R	eading	Q	ate .	Continuous Flow	1	IC
Point	H	inches of v	vater)	(m ² /	min,)	Recorder, W	(W(P,	/1013.3×298/7 ₄) ¹⁰ /35.31)
	(up)	(dawn)	(difference)	X-a	ixis	(CFM)		Y-axis
1	1.4	1.4	2.8	0.8	194	30		30.0981
2	2.3	2.3	4,6	1.0	422	36		36,1177
3	3.7	3.7	7.4	1.3	143	44		44.1439
4	4.8	4.8	9.6	1.4	930	48		48 1570
5	6.1	6,1	12.2	1.6	795	54		54.1766
By Linear Regression of	Y on X Slope, m	•	27.	7403	Intercept	, b =	7.3172	
Correlatio	n Coefficient*		0.9	9992	9 F			
Calibra	tion Accepted	=3	Yes	/No**	i.			
* If Correlation Coefficier	nt < 0.990 etc	ack and rec	alibration an	ain.				
a consider commen	(4, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	our area cou	ester obtant eigi	507.				
** Delete as appropriate	Ď							
Remarks : As per olie	int's provided	information	, the equipmi	ant reference	no, of the calibrated	High Volume Sample	ir has bed	in
re-assigne	d from EL551	to HVS013	with respect	to the update	in quality managen	nent system.		
Calibrated by	8: _ 8	Ray Lee			Ch	ecked by	ā	Pualne Wong
Date	8 3	19-Oct-18	124		Da	te	34	19-Oct-18



港黄竹坑道37號利建中心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

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Item tested

Description

Sound Level Meter (Type 1)

Microphone

Manufacturer. Type/Model No.: Larson Davis

PCB

Serial/Equipment No.:

377B02 171529

Adaptors used:

0003737

Item submitted by

Customer Name:

Lam Geotechnics Ltd.

Address of Customer:

LxT1

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 CEPREI

Ambient conditions

Temperature: Air pressure:

21 ± 1 °C

Relative humidity:

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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CERTIFICATE OF CALIBRATION

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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 C	Pass	0.3	
		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 1/10 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	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

0.000

Checked by:

Lam Tze Wai

Date:

Fung Chi Yip 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 152-2/16 sue 1/Rev C/01/02/2007



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CERTIFICATE OF CALIBRATION

Certificate No.:

17CA1110 02

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Item tested

Description: Manufacturer Acoustical Calibrator (Class 1)

Type/Model No.

Rion Co., Ltd. NC-73

Serial/Equipment No.:

NG-73 10707358

Adaptors used

...

Item submitted by

Curstomer:

Lam Geotechnics Ltd.

Address of Customer

0.0

Request No.: Date of receipt:

10-Nov-2017

Date of test:

14-Nov-2017

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	11-Apr-2018	SCL
Preamplifier	B&K 2673	2239857	05-May-2018	CEPREI
Measuring amplifier	B&K 2610	2346941	03-May-2018	CEPREI
Signal generator	DS 360	61227	01-Apr-2018	CEPREI
Digital multi-meter	34401A	US36087050	25-Apr-2018	CEPREI
Audio analyzer	8903B	GB41300350	21-Apr-2018	CEPREI
Universal counter	53132A	MY40003662	22-Apr-2018	CEPREI

Ambient conditions

Temperature: Relative humidity: 21 ± 1 °C 50 ± 10 %

Air pressure:

1010 ± 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.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference
 pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure
 changes.

Test results

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

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

WFeng Jun Qi

Huang dis

Approved Signatory:

Date: 1

15-Nov-2017

Company Chop:

STOS * CITY STOS

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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CERTIFICATE OF CALIBRATION

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17CA1110 02

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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 dB	Measured Output Sound Pressure Level d8	(Output level in d8 re 20 µPa) Estimated Expanded Uncertainty d8
1000	94.00	93.93	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 = 0.008 dB

Estimated expanded 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 = 991.5 Hz

Estimated expanded uncertainty

0.1 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 = 0.3 %

Estimated expanded uncertainty

0.7 %

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

allorated by:

Checked by:

Date:

14-Nov-2017

Date:

Fung Chi Yip 15-Nov-2017

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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CERTIFICATE OF CALIBRATION

Certificate No.:

17CA1020 02

Page:

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Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer: Type/Model No.: Larson Davis CAL200

Serial/Equipment No... Adaptors used:

13437

Item submitted by

Curstomer:

Lam Geotechnics Ltd.

Address of Customer: Request No.

.

Date of receipt:

20-Oct-2017

Date of test:

23-Oct-2017

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	11-Apr-2018	SCL
Preamplifier	B&K 2673	2239857	05-May-2018	CEPREI
Measuring amplifier	B&K 2610	2346941	03-May-2018	CEPREI
Signal generator	DS 360	61227	01-Apr-2018	CEPREI
Digital multi-meter	34401A	US36087050	25-Apr-2018	CEPREI
Audio analyzer	8903B	GB41300350	21-Apr-2018	CEPREI
Universal counter	53132A	MY40003662	22-Apr-2018	CEPREI

Ambient conditions

Temperature:

22 ± 1 °C 50 ± 10 %

Relative humidity: Air pressure:

1000 ± 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.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference
 pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure
 changes:

Test results

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

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

Min/Feng Jun Qi

Approved Signatory:

Date:

24-Oct-2017

Company Chop:

SENGINES RESIDENCE CONTROL OF THE STRONG CO

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 CARP156-1/Issue 1/Rev D/01/03/2007



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CERTIFICATE OF CALIBRATION

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Certificate No :

17CA1020 02

Page:

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	Output Sound Pressure	Measured Output	Coulput level in dB re 20 µPa) Estimated Expanded Uncertainty dB
Shown	Level Setting	Sound Pressure Level	
Hz	dB	d8	
1000	94.0	93.90	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 = 0.011 dB

Estimated expanded uncertainty

0.005 dB

Actual Output Frequency 3.

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 = 1000.2 Hz

Estimated expanded uncertainty

0.1 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 expanded uncertainty

0.7%

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:

Lai Shing Jie 23-Oct-2017

Date:

Fung Chi Yip 24-Oct-2017

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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CERTIFICATE OF CALIBRATION

Certificate No.:

18CA1023 02

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Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer: Type/Model No.. Larson Davis CAL200 13437

Serial/Equipment No.: Adaptors used:

10

Item submitted by

Curstomer:

Lam Geotechnics Ltd.

Address of Customer:

-

Request No.: Date of receipt:

23-Oct-2018

Date of test:

24-Oct-2018

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	20-Apr-2019	SCL
Preamplifier	B&K 2673	2239857	27-Apr-2019	CEPREI
Measuring amplifier	B&K 2610	2346941	08-May-2019	CEPREI
Signal generator	DS 360	33873	24-Apr-2019	CEPREI
Digital multi-meter	34401A	US36087050	23-Apr-2019	CEPREI
Audio analyzer	8903B	GB41300350	23-Apr-2019	CEPRÉI
Universal counter	53132A	MY40003662	24-Apr-2019	CEPREI

Ambient conditions

Temperature:

20 ± 1 °C

Relative humidity:

50 ± 10 %

Air pressure:

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

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.

Feng J nqi

Approved Signatory:

Date:

24-Oct-2018

Company Chop:

SENGINESTING COMPA

Comments: The results reported in this cellificate 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.CARP156-1/Issue 1/Rev.D/01/03/2007



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CERTIFICATE OF CALIBRATION

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Certificate No.:

18CA1023 02

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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	Output Sound Pressure	Measured Output	Estimated Expanded
Shown	Level Setting	Sound Pressure Level	Uncertainty
Hz	dB	dB	dB
1000	94.00	93.77	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 = 0.015 dB

Estimated expanded 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 = 1000.2 Hz

Estimated expanded uncertainty

0.1 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 = 0.5%

Estimated expanded uncertainty

0.7 %

Date:

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

Checked by:

Shek Kwong Tal

Date:

Fung Chr Yip

24-Oct-201

24-Oct-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.CARP156-2/Issue 1/Rev.C/01/05/2005



Information supplied by customer:

CONTACT: MR. SAM LAM WORK ORDER: HK1810875

CLIENT: LAM GEOTECHNICS LIMITED

DATE RECEIVED: 29/08/2018 DATE OF ISSUE: 31/08/2018

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

WANCHAL 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:	30/08/2018	

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:

31/08/2018



WORK ORDER: HK1810875 DATE OF ISSUE: 31/08/2018

CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter	
Brand Name:	Xin Rui	
Model No.:	WGZ-3B	
Serial No.:	1403009	
Equipment No.:		
Date of Calibration:	30/08/2018	
Date of next Calibation:	30/11/2018	

Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance
0	0.00	
4	3.90	-2.5%
10	10.28	2.8%
40	41.1	2.8%
100	101	1.2%
400	396	-1.0%
1000	1001	0.1%
NATIONAL TRANSPORT OF THE PARTY OF THE CO.	Tolerance Limit (±)	10%

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

This report may not be reproduced except with prior written approval from Pilot Testing Limited.



Information supplied by customer:

CONTACT: MR. SAM LAM

MR. SAM LAM WORK ORDER: HK1810676 LAM GEOTECHNICS LIMITED

DATE RECEIVED: 10/07/2018

DATE OF ISSUE: 12/07/2018

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

WANCHAI, HONG KONG

PROJECT: -

METHOD OF PERFORMANCE CHECK/ CALIBRATION:

Ref: APHA22nd ed 2130B

COMMENTS

CLIENT:

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:	11/07/2018	

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:

12/07/2018



WORK ORDER: HK1810676 DATE OF ISSUE: 12/07/2018

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:	11/07/2018	
Date of next Calibation:	11/10/2018	

Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance
0	0.00	
4	4.20	5.0%
20	19.92	-0.4%
40	36.00	-10.0%
100	98	-2.0%
400	383	-4.3%
800	726	-9.3%
000/	Tolerance Limit (±)	10%

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



Information supplied by customer:

CONTACT: MR. SAM LAM

WORK ORDER: HK1811031

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.:	0942542	
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.

Approved Signatory:

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

This report may not be reproduced except with prior written approval from Pilot Testing Limited.



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.

This report may not be reproduced except with prior written approval from Pilot Testing Limited.



EQUIPMENT PERFORMANCE CHECK / CALIBRATION REPORT

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HK1810679

Project Name

EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT

Date of Issue

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

HK1810679 HK1810679-01

Test Item Description

Sonde YSI

Manufacturer Model No. Serial No.

Professional Plus 14M100277

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

10/7/2018 11/7/2018

Test Item Calibration Date

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 Pliot 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:

11/7/2018



WORK ORDER: HK1810679 **DATE OF ISSUE: 11/7/2018**

CLIENT:

LAM ENVIRONMENTAL SERVICES LIMITED

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

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)
6.4	6.4	0.0
13.5	13.4	-0.1
26.9	26.7	-0.2
	olerance Limit	±2.0

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

Expected Reading (pH unit)	Reference Reading (pH unit)	Display Reading (pH unit)	Deviation (pH unit)
4.0	4.08	4.06	-0.02
7.0	7.02	7.13	0.11
10.0	10.00	9.97	-0.03
	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	12.8	12.6	-1.87
0.2000	23.7	23.6	-0.34
0.5000	57.3	56.8	-0.87
0.000	Tolerance Limit		±2.0

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

Reference DO reading (mg/L)	DO reading od DO probe (mg/L)	Deviation (mg/L)
7.37	7.49	0.12
6.41	6.49	0.08
5.55	5.68	0.13
0.00	Tolerance Limit	±0.20

- (1) Maxium tolerance and calibration frequency stated in the report, unless otherwwise 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 CHAL HONG KONG

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

Test Item Details

Test Item Description Sonde Manufacturer YSI Model No. Professi

 Model No.
 : Professional Plus

 Serial No.
 : 14M100277

(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
- 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



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	- N	±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	12.6	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 -



EQUIPMENT PERFORMANCE CHECK / CALIBRATION REPORT

Report No. : HK1810678

Project Name : EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT

Date of Issue : 12/7/2018

Customer : LAM ENVIRONMENTAL SERVICES LIMITED

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

Calibration Job No. : HK1810678 Test Item No. : HK1810678-01

Test Item Details

Test Item Description Sonde Manufacturer YSI

Model No. : Professional Plus Serial No. : 14K100322

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 : Test Item Calibration Date :

10/7/2018

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

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

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:

12/7/2018



WORK ORDER: **DATE OF ISSUE: 12/7/2018**

HK1810678

CLIENT:

LAM ENVIRONMENTAL SERVICES LIMITED

Equipment Type	Sonde	
Manufacturer	YSI	
Model No.	Professional Plus	
Serial No.	14K100322	
Date of Calibration	11-Jul-18	
Date of next Calibation	11-Oct-18	

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)
71	7.0	-0.1
13.8	13.9	0.1
27.0	26.8	-0.2
	olerance Limit	±2.0

-U Value (Mathed Dat: ADUA24e, 4500H-B)

Expected Reading (pH unit)	Reference Reading (pH unit)	Display Reading (pH unit)	Deviation (pH unit)
4.0	4.08	4.04	-0.04
7.0	7.02	7.16	0.14
10.0	10.00	10.01	0.01
10.0	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	12.8	12.8	-0.62
0.2000	23.7	23.7	0.17
0.5000	57.3	56.9	-0.70
0.0000	Tolerance Limit		±2.0

Discoluted Owners (DO) (Method Ref: ARHA 19e 4500-O C)

Reference DO reading (mg/L)	DO reading od DO probe (mg/L)	Deviation (mg/L)
7.22	7,14	-0.08
6.69	6.75	0.06
5.80	5.93	0.13
0.00	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 -



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 Manufacturer

Sonde YSI

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 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 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.

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



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

10-Jan-19

Parameters:

Date of next Calibation

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
1	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	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 -