

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

# ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Ma	ar 20, 2017	7 Rootsmeter		438320	Ta (K) -	293
Operator	Tisch	Orifice I.I		0005	Pa (mm) -	759.46
PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3960	3.2	2.00
2	NA	NA	1.00	0.9970	6.4	4.00
3	NA	NA	1.00	0.8910	7.8	5.00
4	NA	NA	1.00	0.8500	8.7	5.50
5	NA	NA	1.00	0.6990	12.7	8.00

## DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
1.0120	0.7249	1.4257		0.9958	0.7133	0.8784
1.0078	1.0108	2.0163		0.9916	0.9946	1.2423
1.0058	1.1288	2.2543		0.9896	1.1107	1.3889
1.0047	1.1820	2.3643		0.9885	1.1630	1.4567
0.9993	1.4296	2.8514		0.9832	1.4066	1.7568
Qstd slop intercept coefficie	- (b) -	2.02533 -0.03593 0.99983	а.е. r	Qa slope intercept coefficie	= (b) =	1.26823 -0.02214 0.99983
y axis =	SQRT [H2O (I	Pa/760) (298/	[ Fa)]	y axis =	SQRT [H20 (7	[a/Pa)]

## CALCULATIONS

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

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

For subsequent flow rate calculations:

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



Location Equipment no. ACL1 HVS014

Calibration Date	:	
Calibration Due Date	: ]	

07-Aug-17 07-Oct-17

# CALIBRATION OF CONTINUOUS FLOW RECORDER

Temperature, T <sub>a</sub>		304			Ambient Condition										
			304 Kelvin <b>Pressure, P</b> a 1006 mmHg												
Orifice Transfer Standard Information															
Equipment No.		Ori001		Slope, m <sub>c</sub>	2.0253		Intercept, bc	-0.03593							
Last Calibration Date		20-Mar-1	7		( H	x P <sub>a</sub> / 1	013.3 x 298 / T	a) <sup>1/2</sup>							
Next Calibration Date		20-Mar-18	8		=	m <sub>c</sub>	$x Q_{std} + b_c$								
Calibration of TSP															
Calibration	Mar	nometer Re	ading	Q	std	Cont	inuous Flow	IC							
Point	Н (	inches of v	vater)	(m <sup>3</sup> /	/ min.)	Re	corder, W	$(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$							
	(up)	(down)	(difference)	X-4	axis		(CFM)	Y-axis							
1	1.4	1.4	2.8	0.8	3328		40	39.4604							
2	2.2	2.2	4.4	1.0	)395		47	46.3660							
3	3.4	3.4	6.8	1.2	2879		55	54.2580							
4	4.6	4.6	9.2	1.4	1951		61	60.1771							
5	5.7	5.7	11.4	1.6	623		64	63.1366							
By Linear Regression of Y on X															
SI	ope, m	=	29.0	719	Int	ercept, b	= 15.9	9466							
Correlation Coefficient* = 0.9959															
Calibration Accepted = Yes/ <del>No</del> **															

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

:

:

Calibrated by Date Jackey MA 07-Aug-17 Checked by Date Pauline Wong 07-Aug-17

:



Location Equipment no. ACL1 HVS014

Calibration	Date
Calibration	Due Date

04-Sep-17 04-Nov-17

# CALIBRATION OF CONTINUOUS FLOW RECORDER

-

Territoria T	1	30		Ambient Con	attion ssure, P,	the second se	1006	an and the		
Temperature, T,		30	•	Reivin	issule, Pa		1006	mmHg		
			Orifice T	ransfer Standa	ard Information					
Equipment No.		Ori001		Slope, me 2.02533 Intercept, bc -0.035						
Last Calibration Date		20-Mar-	17	(H x P <sub>a</sub> / 1013.3 x 298 / T <sub>a</sub> ) <sup>1/2</sup>						
Next Calibration Date		20-Mar-1	18		=	$m_c \times Q_{std} + b_c$				
THE STREET			24,81	Calibration o	fTSP			- 3.5		
Calibration	Ma	nometer R	eading	Q std		Continuous Flow		IC		
Point	н	H (inches of water)			n)	Recorder, W		(W(P_/1013.3x298/T_) <sup>10</sup> /35.31)		
1 Unit		(		(m <sup>a</sup> / mi		2012/2010/00/2012/2012/2012/2012/2012/2	(110.9.10			
	(up)	(down)	(difference)	X-axis	5	(CFM)		Y-axis		
1	1.5	1.5	3.0	0.861	4	40		39.4604		
2	2.4	2,4	4.8	1.084	9	46		45.3794		
3	3.6	3.6	7.2	1.324	7	56		55.2445		
4	4.7	4.7	9.4	1.511	1	62		61.1636		
5	6.0	6.0	12.0	1.705	1	65		64.1231		
ly Linear Regression of Y or	١X									
	Slope, m	=	30.9	541	Intercept,	b = 1:	2.9132			
Correlation C	oefficient*	=	0.99	912		-				
Calibration	Accepted	=	Yes/	Ne**						
				10.00						

\* If Correlation Coefficient < 0.990, check and recalibration again.

\$

Calibrated by Date

Jackey MA 04-Sep-17 :----

Checked by Date

Pauline Wong 04-Sep-17 ۰\_\_



Location Equipment no. ACL1 HVS014

Calibration Date	:	
Calibration Due Date	: ]	

28-Sep-17 28-Nov-17

# CALIBRATION OF CONTINUOUS FLOW RECORDER

				Ambient C							
Temperature, T <sub>a</sub>		303		Kelvin	Pressure, P <sub>a</sub>		10	009 mmHg			
			Orifice T	ransfer Sta	ndard Informa	ation					
Equipment No.		Ori001		Slope, m <sub>c</sub>	2.0253		Intercept, bc	-0.03593			
Last Calibration Date		20-Mar-1	7		(H)	к Р <sub>а</sub> / 1	013.3 x 298 / T	a) <sup>1/2</sup>			
Next Calibration Date		20-Mar-1	8		=	m <sub>c</sub>	$x Q_{std} + b_{c}$				
Calibration of TSP											
Calibration	Ма	nometer Re	eading	Q	std	Cont	inuous Flow	IC			
Point	н	inches of v	vater)	(m <sup>3</sup> /	/ min.)	Re	ecorder, 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	0.8	3354		40	39.5843			
2	2.3	2.3	4.6	1.(	0657		48	47.5012			
3	3.6	3.6	7.2	1.3	3288		56	55.4181			
4	4.7	4.7	9.4	1.5	5158		62	61.3557			
5	5.8	5.8	11.6	1.6	6819		65	64.3245			
By Linear Regression of Y o	n X		•	•	·						
	Slope, m	=	29.7	318	Inte	ercept, b	= 15.4	4159			
Correlation Coefficient* = 0.9966											
Calibration	Accepted	=	Yes/	No**							
L											

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

:

Calibrated by Date Jackey MA 28-Sep-17 Checked by Date Pauline Wong 28-Sep-17

:



Location : \_\_\_\_\_ Equipment no. : \_\_\_\_\_

ACL2a HVS011 Calibration Date Calibration Due Date 07-Aug-17 07-Oct-17

# CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition										
Temperature, T <sub>a</sub>	304	Kelvin <b>Pressure, P</b> a 1006 mmHg								
	Orifice Tr	ansfer Stan	dard Information							
Equipment No.	Ori001	Slope, m <sub>c</sub>	2.02533	Intercept, bc	-0.03593					
Last Calibration Date	20-Mar-17		(H x P <sub>a</sub> / 10	)13.3 x 298 / T	a) <sup>1/2</sup>					
Next Calibration Date20-Mar-18 $m_c \times Q_{std} + b_c$										

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	1.5	1.5	3.0	0.8614	30	29.5953					
2	2.4	2.4	4.8	1.0849	36	35.5143					
3	3.7	3.7	7.4	1.3428	45	44.3929					
4	4.8	4.8	9.6	1.5269	51	50.3120					
5	6.1	6.1	12.2	1.7191	56	55.2445					
By Linear Regression of Y	on X										
	Slope, m	=	30.68	331 In	tercept, b =	2.9088					
Correlation Coefficient*		=	0.99	88							
Calibration	Calibration Accepted = Yes/N		lo**								

\* 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 EL111 to HVS011 with respect to the update in quality management system.

Calibrated by:Jackey MAChecked by:Pauline WongDate:07-Aug-17Date:07-Aug-17



Location Equipment no.

ACL2a HVS011 Calibration Date Calibration Due Date

28-Sep-17 28-Nov-17

# CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition										
Temperature, T <sub>a</sub>	304	Kelvin <b>Pressure, P</b> a 1006 mmHg								
	Orifice Transfer Standard Information									
Equipment No.	Ori001	Slope, m <sub>c</sub> 2.02533         Intercept, bc         -0.03593								
Last Calibration Date	Last Calibration Date 20-Mar-17 (H x P <sub>a</sub> / 1013.3 x 298 / T <sub>a</sub> ) <sup>1/2</sup>									
Next Calibration Date20-Mar-18m c X Q std + b 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	$(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$					
	(up)	(up) (down) (difference)		X-axis	(CFM)	Y-axis				
1	1.5	1.5	3.0	0.8614	30	29.5953				
2	2.3	2.3	4.6	1.0624	37	36.5009				
3	3.7	3.7	7.4	1.3428	46	45.3794				
4	4.8	4.8	9.6	1.5269	52	51.2985				
5	6.0	6.0	12.0	1.7051	56	55.2445				
By Linear Regression of Y	on X									
	Slope, m	=	30.82	208 In	tercept, b =	3.5456				
Correlation Coefficient*		=	0.99							
Calibration Accepted =		Yes/	<del>10</del> **							

\* 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 EL111 to HVS011 with respect to the update in quality management system.

 Calibrated by
 :
 Jackey MA
 Checked by
 :
 Pauline Wong

 Date
 :
 28-Sep-17
 Date
 :
 28-Sep-17



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# CERTIFICATE OF CALIBRATION

Certificate No.:	17CA0524 01		Page	1 of 2
Item tested				
Description: Manufacturer: Type/Model No Serial/Equipment No Adaptors used:	Sound Level Mete Larson Davis LxT1 0004796	r (Type 1)	Microphone PCB 377B02 155507	Preamp PCB PRMLxT1L 042621
ltem submitted by				
Customer Name: Address of Customer: Request No.: Date of receipt:	Lam Enviromenta - 24-May-2017	Service Ltd.		
Date of test:	25-May-2017			
Reference equipment	used in the calib	ration		
Description: Multi function sound calibrator Signal generator	Model: B&K 4226 DS 360	Serial No. 2288444 61227	Expiry Date: 18-Jun-2017 01-Apr-2018	Traceable to: CIGISMEC CEPREI
Ambient conditions				
Temperature: Relative humidity: Air pressure:	21 ± 1 °C 50 ± 10 % 1010 ± 5 hPa			
Test specifications				

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

## Test results

This is to certify that the Sound Level Meter conforms to B3 7580. Part 1, 1997 for the conditions under which the test was performed.

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

Actual Measurement data are documented on worksheets.

Approved Signatory:

Huang Ju Feng Jung

26-May-2017

Company Chop:



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

Date:

C Solis & Materials Engineering Co. Ltd

Form No CARP152-Missue 1/Rev C/01/02/2007



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

香 善 黄 竹 坑 道 3 7 號 利 達 中 心 1 2 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

(Continuation Page)

Certificate No.:

17CA0524 01

Page 2

e 2 of 2

### 1, Electrical Tests

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

Test:	Subtest:	Status:	Expanded Uncertanity (dB)	Coverage Factor
Self-generated noise	А	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	
	A 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	03	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>4</sup> 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	Pass	0.3	
	Weighting A at 8000 Hz	Pass	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.

	2.1	- End -	A /
Calibrated by:	1	Checked by:	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Date:	Kai Shipng Jie 25-May-2017	Date:	Pung Chi Yip 26-May-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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Form No CARP152-2/Issue 1/Rev C/01/02/2007



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# CERTIFICATE OF CALIBRATION

Certificate No.:	17CA0904 02		Page	1	of	2
Item tested						
Description: Manufacturer: Type/Model No.: Serial/Equipment No.: Adaptors used:	Sound Level Mete B & K 2250-L 3006790 -	r (Type 1)	Microphone B & K 4950 2827240		Preamp B & K ZC0032 21213	
Item submitted by						
Customer Name: Address of Customer: Request No.: Date of receipt:	Lam Geotechnics - - 04-Sep-2017	Limited				
Date of test:	09-Sep-2017					
Reference equipment	used in the calib	ration				
Description: Multi function sound calibrator Signal generator Signal generator	Model: B&K 4226 DS 360 DS 360	Serial No. 2288444 33873 81227	Expiry Date: 08-Sep-2018 25-Apr-2018 01-Apr-2018		Traceab CIGISME CEPREI CEPREI	ST 575.5
Ambient conditions						
Temperature: Relative humidity: Air pressure:	21 ± 1 °C 50 ± 10 % 1015 ± 5 hPa					
Test specifications						

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

## Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory: Huang Jim Win/Feng Jun Or

09-Sep-2017 Company Chop:



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

Date:

Consist & Materials Engineering Co. Ltd

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



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17CA0904 02

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# CERTIFICATE OF CALIBRATION

(Continuation Page)

Page of

#### **Electrical Tests** 1.

Certificate No.:

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
Test.	Sublest.	Status.	oncertainty (do)	1 00001
Self-generated noise	A	Pass	0.3	
	C	Pass	0.8	
	Lin	Pass	1.6	
Linearity range for Leg	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		Pass	0.3	
	A 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	
1.00000.0000000000000000000000000000000	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leg	Pass	0.4	

#### 2. Acoustic tests

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

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

#### Response to associated sound calibrator 3,

## 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



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.

### D Soils & Materials Engineering Co., Ltd.

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



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# CERTIFICATE OF CALIBRATION

Website: www.cigismec.com

Certificate No.:	16CA1117 01-02	2	Page:	1 of 2
Item tested				
Description:	Acoustical Calibr	rator (Class 1)		
Manufacturer:	Rion Co., Ltd.	CARLES ALL CARLES OF		
Type/Model No.:	NC-73			
Serial/Equipment No.:	10707358			
Adaptors used:				
Item submitted by				
Curstomer:	Lam Geotechnic	s Ltd.		
Address of Customer:	99990000000000000000000000000000000000			
Request No.:	-			
Date of receipt:	17-Nov-2016			
Date of test:	18-Nov-2016			
Reference equinment	used in the cali	bration		
reference equipment				
Description:	Model:	Serial No.	Expiry Date:	Traceable to:
884.000 AMAGANA ANG ANG ANG ANG ANG ANG ANG ANG AN	Model: B&K 4180	Serial No. 2412857		Traceable to: SCL
Description: Lab standard microphone Preamplifier	the second s		Expiry Date: 14-Apr-2017 28-Apr-2017	
Description: Lab standard microphone	B&K 4180	2412857	14-Apr-2017	SCL
Description: Lab standard microphone Preamplifier	B&K 4180 B&K 2673	2412857 2239857	14-Apr-2017 28-Apr-2017	SCL CEPREI
Description: Lab standard microphone Preamplifier Measuring amplifier	B&K 4180 B&K 2673 B&K 2610	2412857 2239857 2346941	14-Apr-2017 28-Apr-2017 26-Apr-2017	SCL CEPREI CEPREI
Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator	B&K 4180 B&K 2673 B&K 2610 DS 360	2412857 2239857 2346941 61227	14-Apr-2017 28-Apr-2017 26-Apr-2017 18-Apr-2017	SCL CEPREI CEPREI CEPREI

### Ambient conditions

Temperature:	23 ± 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.

 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.

Approved Signatory:
Huang-Jian Min/Feng Jun Qi
Date: 21-Nov-2016 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.

Il Soils & Materials Engineering Co., Ltd.

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



## 余合試驗有限公司 SOILS & MATERIALS ENGINEERING CO., LTD. 香港黄竹坑道 37號利達中心 12機

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

(Continuation Page)

Certificate No.:

16CA1117 01-02

Page: 2

2 of 2

### 1, Measured Sound Pressure Level

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

Frequency	Output Sound Pressure	Measured Output	Estimated Expanded
Shown	Level Setting	Sound Pressure Level	Uncertainty
Hz	dB	dB	dB
1000	94.00	94.12	0.10

# 2, Sound Pressure Level Stability - Short Term Fluctuations

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

At 1000 Hz	STF = 0.002 dB
Estimated 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 = 991.6 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.



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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### 除合試驗 有限公司 SOILS & MATERIALS ENGINEERING CO., LTD. 香港黃竹坑道37號利達中心12樓 12/F. Leader Centre, 37 Wong Chuk Hang Road. Aberdeen, Hang Kong. E-mail: smec@cigismec.com Website: www.cigismec.com

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



# CERTIFICATE OF CALIBRATION

Certificate No.:	17CA0320 03		Page:	1	of	2
Item tested						
Description:	Acoustical Calib	rator (Class 1)				
Manufacturer:	Larson Davis	1				
Type/Model No.:	CAL200					
Serial/Equipment No.:	13098					
Adaptors used:	<b>X</b>					
Item submitted by						
Curstomer:	Lam Environmer	tal Service Ltd.				
Address of Customer:						
Request No.:						
Date of receipt:	20-Mar-2017					
Date of test:	23-Mar-2017					
Reference equipment	used in the cali	bration				
Description:	Model:	Serial No.	Expiry Date:		Traceab	le to:
Lab standard microphone	B&K 4180	2412857	14-Apr-2017		SCL	
Preamplifier	B&K 2673	2239857	28-Apr-2017		CEPREI	
Measuring amplifier	B&K 2610	2346941	26-Apr-2017		CEPREI	
Signal generator	DS 360	61227	18-Apr-2017	1	CEPREI	
Digital multi-meter	34401A	US36087050	18-Apr-2017	8	CEPREI	
Audio analyzer	8903B	GB41300350	19-Apr-2017	3	CEPREI	
Universal counter	53132A	MY40003662	19-Apr-2017		CEPREI	
Ambient conditions						
Temperature:	21 ± 1 °C					
Relative humidity:	60 ± 10 %					

Air pressure:

# **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.

1010 ± 5 hPa

Approved Signatory:

Huang Jian N HFeng Jun Qi

24-Mar-2017 Company Chop:



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

Date:

© Soils & Materials Engineering Co., Ltd.

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



## 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

(Continuation Page)

Certificate No.:

17CA0320 03

Page: of

2

#### 1, Measured Sound Pressure Level

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

Frequency	Output Sound Pressure	Measured Output	Estimated Expanded
Shown	Level Setting	Sound Pressure Level	Uncertainty
Hz	dB	dB	dB
1000	94.00	93.98	0.10

#### 2, Sound Pressure Level Stability - Short Term Fluctuations

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

At 1000 Hz	STF = 0.002 dB
Estimated expanded uncertainty	0.005 dB

#### 3, Actual Output Frequency

ł

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 %

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.

		- End -	1
Calibrated by:	7	Checked by:	1~1
Date:	Lai Stileng Jie 23-Mar-2017	Date:	Fung Chi Yip 24-Mar-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.

	C Sols & Materials Engineering Co., Ltd	
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Form No CARP156-2/Issue 1/Rev C/01/05/2005



Information supplied	d by customer:		
CONTACT:	MR. SAM LAM	WORK ORDER:	HK1710557
CLIENT:	LAM GEOTECHNICS LIMITED		
DATE RECEIVED:	11/07/2017		
DATE OF ISSUE:	18/07/2017		
ADDRESS:	11/F, CENTRE POINT, 181-185, G	LOUCESTER ROAL	D,
	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:	17/07/2017	

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:

18/07/2017

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Address: No.B12, 5th Floor, Block B, Tonic Industrial Centre, No.19 Lam Hing Street, Kowloon Bay, Kowloon Phone +852 2527 6691 | Email info@pilot-testing.com



WORK ORDER:	HK1710557
DATE OF ISSUE:	18/07/2017
CLIENT:	LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter	
Brand Name:	Xin Rui	
Model No.:	WGZ-3B	
Serial No.:	1403009	
Equipment No.:		
Date of Calibration:	17/07/2017	
Date of next Calibation:	17/10/2017	

### Parameters:

Turbidity

# Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance	
0	0.00		
4	3.88	-3.0%	
10	9.81	-1.9%	
40	39.2	-2.1%	
100	101	1.1%	
400	400	0.0%	
1000	1000	0.0%	
	Tolerance Limit (±)	10%	

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



Information supplied	f by customer:		
CONTACT:	MR. SAM LAM	WORK ORDER:	HK1710600
CLIENT:	LAM GEOTECHNICS LIMITED		
DATE RECEIVED:	28/07/2017		
DATE OF ISSUE:	31/07/2017		
ADDRESS:	11/F, CENTRE POINT, 181-185, G	LOUCESTER ROAL	D,
	WANCHAI, HONG KONG		
PROJECT:	i c <del>ene</del> a		

## 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.:	1309192	
Equipment No.:		
Date of Calibration:	31/07/2017	

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:

31/07/2017

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Address: No.B12, 5th Floor, Block B, Tonic Industrial Centre, No.19 Lam Hing Street, Kowloon Bay, Kowloon Phone +852 2527 6691 | Email info@pilot-testing.com



WORK ORDER:	HK1710600
DATE OF ISSUE:	31/07/2017
CLIENT:	LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter	
Brand Name:	Xin Rui	
Model No.:	WGZ-3B	and a state
Serial No.:	1309192	
Equipment No.:		
Date of Calibration:	31/07/2017	
Date of next Calibation:	31/10/2017	

# Parameters:

Turbidity

# Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance	
0	0.00		
4	4.00	0.0%	
10	9.92	-0.8%	
40	40.6	1.5%	
100	97.8	-2.2%	
400	425	6.3%	
1000	1000	0.0%	
	Tolerance Limit (±)	10%	

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



Information supplied	i by customer:		
CONTACT:	MR. SAM LAM	WORK ORDER:	HK1710434
CLIENT:	LAM GEOTECHNICS LIMITED		
DATE RECEIVED:	02/06/2017		
DATE OF ISSUE:	06/06/2017		
ADDRESS:	11/F, CENTRE POINT, 181-185, G	LOUCESTER ROAL	D,
	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.:	1512036	
Equipment No.:		
Date of Calibration:	05/06/2017	

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:

06/06/2017

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Address: No.B12, 5th Floor, Block B, Tonic Industrial Centre, No.19 Lam Hing Street, Kowloon Bay, Kowloon Phone +852 2527 6691 | Email info@pilot-testing.com



WORK ORDER:	HK1710434
DATE OF ISSUE:	06/06/2017
CLIENT:	LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter	
Brand Name:	Xin Rui	
Model No.:	WGZ-3B	
Serial No.:	1512036	
Equipment No.:		
Date of Calibration:	05/06/2017	
Date of next Calibation:	05/09/2017	

# Parameters:

Turbidity

Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance	
0	0.00		
4	4.01	0.2%	
10	9.87	-1.3%	
40	39.4	-1.5%	
100	101	0.6%	
400	400	0.0%	
1000	1000	0.0%	
	Tolerance Limit (±)	10%	

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



Information supplied	i by customer:		
CONTACT:	MR. SAM LAM	WORK ORDER:	HK1710724
CLIENT:	LAM GEOTECHNICS LIMITED		
DATE RECEIVED:	01/09/2017		
DATE OF ISSUE:	04/09/2017		
ADDRESS:	11/F, CENTRE POINT, 181-185, G	LOUCESTER ROAL	D,
	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.:	1512036	
Equipment No.:		
Date of Calibration:	01/09/2017	

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:

04/09/2017

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Address: No.B12, 5th Floor, Block B, Tonic Industrial Centre, No.19 Lam Hing Street, Kowloon Bay, Kowloon Phone +852 2527 6691 | Email info@pilot-testing.com



WORK ORDER:	HK1710724
DATE OF ISSUE:	04/09/2017
CLIENT:	LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter	
Brand Name:	Xin Rui	
Model No.:	WGZ-3B	
Serial No.:	1512036	
Equipment No.:	-	
Date of Calibration:	01/09/2017	
Date of next Calibation:	01/12/2017	C - 10

## Parameters:

Turbidity

# Method Ref: APHA 22nd ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance	
0	0.00		
4	4.18	4.5%	
10	9.93	-0.7%	
40	37.9	-5.3%	
100	108	8.0%	
400	383	-4.3%	
1000	976	-2.4%	
	Tolerance Limit (±)	10%	

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



## EQUIPMENT PERFORMANCE CHECK / CALIBRATION REPORT

Report No.	: HK1710621
Project Name	: EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT
Date of Issue	: 04/08/2017
Customer	: LAM ENVIRONMENTAL SERVICES LIMITED
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG
Calibration Job No.	: HK1710621
Test Item No.	: HK1710621-01
Test Item Details	
Test Item Description	: Sonde
Manufacturer	: YSI
Model No.	: Professional Plus
Serial No.	: 14E100105
Performance Method	: Checked according to in-house method CAL005
	(References: Temperature (Section 6 of Intermational Accreditation New Zealand Technical Guide
	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	: 02/08/2017
Test Item Calibration Date	: 03/08/2017

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

- 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

Issue Date:

04/08/2017

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

Pilot Testing Limited Address: Room B12, Block B, 5/F, Tonic Industrial Centre, 19 Lam Hing Street, Kowloon Bay, Kowloon Tel: (852) 2527 6691 email: test@pilot-testing.com

WORK ORDER:	HK1710621
DATE OF ISSUE:	04/08/2017
CLIENT:	LAM ENVIRONMENTAL SERVICES LIMITED

Equipment Type	Sonde	
Manufacturer	YSI	
Model No.	Professional Plus	
Serial No.	14E100105	
Date of Calibration	03-Aug-17	
Date of next Calibation	03-Nov-17	

### 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)
6.5	6.4	-0.1
15.6	15.5	-0.1
26.0	25.6	-0.4
	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	3.88	3.77	-0.11
7.0	6.90	6.98	0.08
10.0	9.86	9.81	-0.05
	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	12.0	11.9	-0.83
0.2000	24.1	23.8	-1.24
0.5000	54.7	53.8	-1.65
	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)	
9.00	8.89	-0.11	_
6.62	6.71	0.09	
4.64	4.55	-0.09	
	Tolerance Limit	±0.20	

Remarks:

s: (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.	: HK1710517
Project Name	: EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT
Date of Issue	04/07/2017
Customer	: LAM ENVIRONMENTAL SERVICE LIMITED
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG
Calibration Job No.	: HK1710517
Test Item No.	: HK1710517-01
Test Item Details	
Test Item Description	: Sonde
Manufacturer	: YSI
Model No.	Professional Plus
Serial No.	: 17E100236
Performance Method	: Checked according to in-house method CAL005
	(References: Temperature (Section 6 of Intermational Accreditation New Zealand Technical Guide
	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	: 29/06/2017
Test Item Calibration Date	: 29/06/2017

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.

12

- 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:

04/07/2017

Pilot Testing Limited Address: Room B12, Block B, 5/F, Tonic Industrial Centre, 19 Lam Hing Street, Kowloon Bay, Kowloon Tel: (852) 2527 6691 email: test@pilot-testing.com

WORK ORDER:	HK1710517
DATE OF ISSUE:	04/07/2017
CLIENT:	LAM ENVIRONMENTAL SERVICE LIMITED

Equipment Type	Sonde	
Manufacturer	YSI	
Model No.	Professional Plus	
Serial No.	17E100236	
Date of Calibration	29-Jun-17	
Date of next Calibation	29-Sep-17	

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)
6.9	6.8	-0.1
13.4	13.3	-0.1
25.4	25.6	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	4.00	3.97	-0.03
7.0	6.98	7.07	0.09
10.0	9.94	9.96	0.02
	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	13.00	12.90	-0.77
0.2000	24.60	24.20	-1.63
0.5000	57.40	56.80	-1.05
	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)	
7.59	7.43	-0.16	
5.36	5.46	0.10	
4.48	4.52	0.04	
	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.	: HK1710708
Project Name	: EQUIPMENT PERFORMANCE CHECK/CALIBRATION REPORT
Date of Issue	: 07/09/2017
Customer	: LAM ENVIRONMENTAL SERVICES LIMITED
Address	: 11/F., CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG
Calibration Job No.	: HK1710708
Test Item No.	: HK1710708-01
Test Item Details	
Test Item Description	3 Sonde
Manufacturer	: YSI
Model No.	: Professional Plus
Serial No.	: 16J100298
Performance Method	: Checked according to in-house method CAL005
	(References: Temperature (Section 6 of Intermational Accreditation New Zealand Technical Guide
	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	29/08/2017
Test Item Calibration Date	: 06/09/2017

Notes: 1. This report shall not be reproduced, except in full, without prior approval from Pllot 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.
- 7. 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:

07/09/2017

WORK ORDER:	HK1710708
DATE OF ISSUE:	07/09/2017
CLIENT:	LAM ENVIRONMENTAL SERVICES LIMITED

Equipment Type	Sonde	
Manufacturer	YSI	
Model No.	Professional Plus	
Serial No.	16J100298	
Date of Calibration	06-Sep-17	
Date of next Calibation	06-Dec-17	

### 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)
5.7	5.7	0.0
14.5	14.5	0.0
23.4	23.4	0.0
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	4.02	4.00	-0.02
7.0	7.03	7.00	-0.03
10.0	10.19	10.05	-0.14
	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	13.2	13.3	0.76
0.2000	25.2	25.1	-0.40
0.5000	54.7	54.7	0.00
	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)	
7.23	7.40	0.17	
6.63	6.52	-0.11	
5.43	5.40	-0.03	
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 -