



Calibration Certificate

Certificate No. **23166**

Page 1 of 4 Pages

Customer : Lam Geotechnics Limited

Address : 11/F, Centre Point, 181-185 Gloucester Road, Wanchai, Hong Kong.

Order No. : Q21208

Date of receipt : 24-May-12

Item Tested

Description : Precision Integrating Sound Level Meter

Manufacturer : Rion

Model : NL-14

Serial No. : 10303242

Test Conditions

Date of Test : 5-Jun-12

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: Z01.

Test Results

All results were within the IEC 651 Type 1 or IEC 804 Type 1 specification after adjustment.

The results are shown in the attached page(s).

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C101623	SCL-HKSAR
S024	Sound Level Calibrator	15136	NIM-PRC & SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by : 

P. F. Wong

Approved by : 

Dorothy Cheuk

Date: 6-Jun-12

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

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Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)	
Level Range (dB)	Filter	Weight	Time Const.		Before adjust.	After adjust.
40 – 100	OFF	L _P	Fast	94.0	--	94.1
		L _{PA}	Fast		*92.2	94.1
			Slow		--	94.1
		L _{PC}	Fast		--	94.1
60 – 120	OFF	L _P	Fast	94.0	--	94.0
		L _{PA}	Fast		--	94.0
			Slow		--	94.0
		L _{PC}	Fast		--	94.0
60 – 120	OFF	L _P	Fast	114.0	--	114.1
		L _{PA}	Fast		--	114.1
			Slow		--	114.1
		L _{PC}	Fast		--	114.1

IEC 651 Type 1 Spec. : ± 0.7 dB

Uncertainty : ± 0.2 dB

2. Level Stability : 0.1 dB

IEC 651 Type 1 Spec. : ± 0.3 dB

Uncertainty : ± 0.01 dB



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3. Linearity

3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
140	114.0	113.9	-0.1	± 0.7 dB
130	104.0	103.9	-0.1	
120	94.0	94.0 (Ref.)	--	
110	84.0	84.0	0.0	
100	74.0	74.1	+0.1	
90	64.0	64.1	+0.1	
80	54.0	54.2	+0.2	

Uncertainty : ± 0.1 dB

3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	84.1	+0.1	± 0.4 dB
	94.0	94.0 (Ref.)	--	
	95.0	95.0	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.0	- 39.4 dB, ± 1.5 dB
63 Hz	-25.9	- 26.2 dB, ± 1.5 dB
125 Hz	-15.9	- 16.1 dB, ± 1 dB
250 Hz	-8.5	- 8.6 dB, ± 1 dB
500 Hz	-3.2	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.1	+ 1.2 dB, ± 1 dB
4 kHz	+0.8	+ 1.0 dB, ± 1 dB
8 kHz	-1.5	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-7.2	- 6.6 dB, + 3 dB ~ - ∞

Uncertainty : ± 0.1 dB



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5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	39.9	± 0.5 dB
1/10 ²	40.0	39.7	
1/10 ³	40.0	39.4	± 1.0 dB
1/10 ⁴	40.0	39.3	

Uncertainty : ± 0.1 dB

- Remark : 1. UUT : Unit-Under-Test
2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1 000 hPa.
4. *Out of Specification

----- END -----



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Certificate No. **23167**

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Customer : Lam Geotechnics Limited

Address : 11/F, Centre Point, 181-185 Gloucester Road, Wanchai, Hong Kong.

Order No. : Q21208

Date of receipt : 24-May-12

Item Tested

Description : Sound Level Calibrator

Manufacturer : Rion

Model : NC-73

Serial No. : 10465798

Test Conditions

Date of Test : 6-Jun-12

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

Test Results

All results were within the manufacturer's specification.

The results are shown in the attached page(s).


Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	13535	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	15136	NIM-PRC & SCL-HKSAR
S041	Universal Counter	15610	SCL-HKSAR
S206	Sound Level Meter	16338	SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by : 
P. F. Wong

Approved by : 
Dorothy Cheuk

Date: 6-Jun-12

This Certificate is issued by:
Hong Kong Calibration Ltd.
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.
Tel: 2425 8801 Fax: 2425 8646

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Results :

1. Level Accuracy (at 1 kHz)

UUT Nominal Value	Measured Value	Mfr's Spec.
94 dB	94.43	± 1 dB

Uncertainty : ± 0.2 dB

2. Frequency Accuracy

UUT Nominal Value	Measured Value	Mfr's Spec.
1 kHz	0.982 kHz	± 2 %

Uncertainty : ± 0.1 %

3. Level Stability : 0.0 dB

Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 0.5 %

Mfr's Spec. : < 3 %

Uncertainty : ± 2.3 % of reading

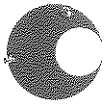
Remark : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. The above measured values are the mean of 3 measurement.

4. Atmospheric Pressure : 1 000 hPa

----- END -----



Calibration Certificate

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Customer : Lam Geotechnics Limited

Address : 11/F, Centre Point, 181-185 Gloucester Road, Wanchai, Hong Kong.

Order No. : Q21745

Date of receipt : 4-Jul-12

Item Tested

Description : Sound Level Meter

Manufacturer : B&K

Model : 2250

Serial No. : 2722311

Test Conditions

Date of Test : 6-Jul-12

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: Z01.

Test Results

All results were within the IEC 651 Type 1, IEC 804 Type 1 & IEC 1260 Class 1 specification.

The results are shown in the attached page(s).

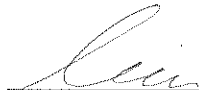
Main Test equipment used:


<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C101623	SCL-HKSAR
S024	Sound Level Calibrator	15136	NIM-PRC & SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

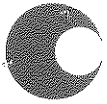
The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by : 
P. F. Wong

Approved by : 
Dorothy Cheuk

Date: 6-Jul-12



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Results :

1. SPL

UUT Setting				Applied Value (dB)	UUT Reading (dB)	
Range	Freq. Wgt.	Time Const.	Center Freq.		Before adjust	After adjust
20 - 140	A (SPL)	Fast	--	94.0	93.5	93.7
		Slow	--		--	93.7
	C (SPL)	Fast	--	94.0	--	93.7
	A (SPL)	Fast	--	114.0	--	113.8
		Slow	--		--	113.8
	C (SPL)	Fast	--	114.0	--	113.8
	--	1/1 – Oct/Fast	1 kHz	94.0	--	93.7
				114.0	--	113.8
	--	1/3 – Oct/Fast	1 kHz	94.0	--	93.6
				114.0	--	113.7

IEC 651 Type 1 Spec. : ± 0.7 dB

Uncertainty : ± 0.1 dB

2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. : ± 0.3 dB

Uncertainty : ± 0.01 dB

3. Linearity

Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Rdg (dB)	Variation (dB)	IEC 651 Type 1 Spec.
20~140	84.0	83.7	0.0	± 0.4 dB
	94.0	93.7 (Ref.)	--	
	95.0	94.7	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB



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4. Frequency Weighting

A weighting

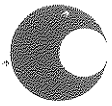
Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.4	- 39.4 dB, ± 1.5 dB
63 Hz	-26.2	- 26.2 dB, ± 1.5 dB
125 Hz	-16.2	- 16.1 dB, ± 1 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.2	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.2	+ 1.2 dB, ± 1 dB
4 kHz	+0.9	+ 1.0 dB, ± 1 dB
8 kHz	-1.5	- 1.1 dB, + 1.5 dB \sim -3 dB
16 kHz	-6.1	- 6.6 dB, + 3 dB \sim $-\infty$

Uncertainty : ± 0.1 dB

5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	--	--
1/10	40.0	40.1	± 0.5 dB
1/10 ²	40.0	40.1	
1/10 ³	40.0	40.1	± 1.0 dB
1/10 ⁴	40.0	40.0	

Uncertainty : ± 0.1 dB



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6. Filter Characteristics

6.1 1/1 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 Spec. (dB)
125 Hz	-74.5	< - 61
250 Hz	-53.2	< - 42
500 Hz	-24.0	< - 17.5
707 Hz	-4.8	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-2.8	- 2 ~ - 5
2 kHz	-19.7	< - 17.5
4 kHz	-55.4	< - 42
8 kHz	-85.8	< - 61

Uncertainty : ± 0.25 dB

6.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 Spec.(dB)
326 Hz	-67.7	< - 61
530 Hz	-50.7	< - 42
772 Hz	-24.3	< - 17.5
891 Hz	-4.1	+ 0.3 ~ - 5.0
1 kHz (Ref)	--	--
1.122 kHz	-3.4	+ 0.3 ~ - 5.0
1.296 kHz	-23.0	< - 17.5
1.887 kHz	-47.7	< - 42
3.070 kHz	-69.2	< - 61

Uncertainty : ± 0.25 dB

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric pressure : 1000 hPa.

4. The UUT was adjusted with the laboratory's sound calibrator at the reference sound pressure level before the calibration.

----- END -----



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MS EMILY KONG
CLIENT: LAM GEOTECHNICS LIMITED
ADDRESS: 11/F., CENTRE POINT,
181-185 GLOUCESTER ROAD,
WAN CHAI, HONG KONG

WORK ORDER: HK1213705
LABORATORY: HONG KONG
DATE RECEIVED: 25/05/2012
DATE OF ISSUE: 29/05/2012

PROJECT: --

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Dissolved Oxygen, pH, Salinity and Temperature
Description: YSI SONDE
Brand Name: YSI
Model No.: YSI Professional plus
Serial No.: 11F100421
Equipment No.: --
Date of Calibration: 29 May, 2012

NOTES

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

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd
11/F Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung
HONG KONG

Phone: 852-2610 1044
Fax: 852-2610 2021
Email: hongkong@alsglobal.com


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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Page 1 of 2

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1213705
Date of Issue: 29/05/2012
Client: LAM GEOTECHNICS LIMITED



Description: YSI SONDE
Brand Name: YSI
Model No.: YSI Professional plus
Serial No.: 11F100421
Equipment No.: --
Date of Calibration: 29 May, 2012

Date of next Calibration: 29 August, 2012

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.40	2.38	-0.02
5.26	5.17	-0.09
8.38	8.40	0.02
Tolerance Limit (\pm mg/L)		0.20

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.15	0.15
7.0	7.03	0.03
10.0	9.83	-0.17
Tolerance Limit (\pm unit)		0.20

Salinity

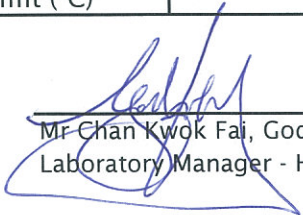
Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10.0	9.90	-1.0
20.0	19.47	-2.7
30.0	30.29	1.0
Tolerance Limit (\pm %)		10.0

Temperature

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

Expected Reading ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
11.0	11.0	0.0
21.5	21.1	-0.4
40.0	39.6	-0.4
Tolerance Limit ($^{\circ}$ C)		2.0



 Mr Chan Kwok Fai, Godfrey
 Laboratory Manager - Hong Kong

TEST REPORT
Performance Check / Calibration of Turbidity Meter

Date of issue : 31-07-2012

Page 1 of 1 page(s)

Castco LRN: EN0120726-13

Sample details as supplied by customer:-

Customer: Lam Geotechnics Ltd.

Customer Ref. No.: --

Address: 11/F., Centre Point, 181-185 Gloucester Road, Wanchai, Hong Kong

Contract No.: --

Job Title: --

Sample Identification No.: --

Date Sampled: --

Laboratory Test Results:-

Date of sample received: 26-07-2012

Test period: 27-07-2012

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)	Method
0	0.06	--	ENV-WAT-TUR
5	4.53	-9.4	
10	9.08	-9.2	
50	46.0	-8.0	
100	101	+1.0	
200	190	-5.0	

Remark(s):

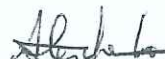
1. Test results only relate to the specimen tested.
2. Compliance requirement : Tolerance Limit $\pm 10.0\%$.
3. Turbidity meter model No.: HACH 2100P.
4. Turbidity meter serial No.: 931000003861.
5. Next Calibration due date: 27-10-2012.
6. Reference method: APHA 21st Ed. 2130B (Nephelometric method).

Checked by :



H. T. MA

Certified by :



End of Report

 LEE STEPHEN SHU HANG
 Ph.D.
 Chief Chemist

Form No. ENV CAL Tur T1 dd 26/06/2012



TISCH ENVIRONMENTAL, INC.
 145 SOUTH MIAMI AVE.
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 513.467.9000
 877.263.7610 TOLL FREE
 513.467.9009 FAX
 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jul 19, 2012 Rootmeter S/N 0438320 Ta (K) - 298
 Operator Tisch Orifice I.D. - 0005 Pa (mm) - 751.84

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.3840	3.2	2.00
2	NA	NA	1.00	0.9760	6.4	4.00
3	NA	NA	1.00	0.8730	7.9	5.00
4	NA	NA	1.00	0.8340	8.8	5.50
5	NA	NA	1.00	0.6890	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9850	0.7117	1.4066	0.9957	0.7194	0.8903
0.9809	1.0050	1.9892	0.9915	1.0159	1.2591
0.9788	1.1212	2.2240	0.9894	1.1333	1.4078
0.9777	1.1723	2.3326	0.9883	1.1850	1.4765
0.9725	1.4115	2.8132	0.9831	1.4268	1.7807
Qstd slope (m) = 2.01145			Qa slope (m) = 1.25953		
intercept (b) = -0.02803			intercept (b) = -0.01774		
coefficient (r) = 0.99995			coefficient (r) = 0.99995		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

$$Vstd = \text{Diff. Vol} [(Pa - \text{Diff. Hg}) / 760] (298 / Ta)$$

$$Qstd = Vstd / \text{Time}$$

$$Va = \text{Diff Vol} [(Pa - \text{Diff Hg}) / Pa]$$

$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

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

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



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA1b Calibration Date : 15-Jun-12
 Equipment no. : EL452 Calibration Due Date : 15-Aug-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	303	Kelvin	Pressure, P _a
			1010 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01593
		Intercept, b _c	-0.03978
Last Calibration Date	11-Jul-11	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	11-Jul-12		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7352	62	61.3861
2	5.0	5.0	10.0	1.5728	54	53.4653
3	3.9	3.9	7.8	1.3914	45	44.5544
4	2.4	2.4	4.8	1.0958	35	34.6535
5	1.5	1.5	3.0	0.8704	26	25.7426

By Linear Regression of Y on X

Slope, m = 40.4856 Intercept, b = -10.0119
 Correlation Coefficient* = 0.9970
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Derek Lo
 Date : 15-Jun-12 Date : 15-Jun-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA1b
 Equipment no. : EL452

Calibration Date : 13-Aug-12
 Calibration Due Date : 13-Oct-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01145
		Intercept, b _c	-0.02803
Last Calibration Date	19-Jul-12	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	19-Jul-13		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.0	6.0	12.0	1.7177	60	59.3572
2	5.0	5.0	10.0	1.5692	54	53.4215
3	4.0	4.0	8.0	1.4050	47	46.4965
4	2.5	2.5	5.0	1.1137	36	35.6143
5	1.5	1.5	3.0	0.8658	24	23.7429

By Linear Regression of Y on X

Slope, m = 41.2723 Intercept, b = -11.3427
 Correlation Coefficient* = 0.9991
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Fung
 Date : 13-Aug-12

Checked by : Derek Lo
 Date : 13-Aug-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA5a Calibration Date : 15-Jun-12
 Equipment no. : EL380 Calibration Due Date : 15-Aug-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	303	Kelvin	Pressure, P _a
			1010 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01593
		Intercept, b _c	-0.03978
Last Calibration Date	11-Jul-11	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	11-Jul-12		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.0	6.0	12.0	1.7211	58	57.4257
2	5.0	5.0	10.0	1.5728	52	51.4851
3	3.7	3.7	7.4	1.3558	44	43.5643
4	2.4	2.4	4.8	1.0958	35	34.6535
5	1.4	1.4	2.8	0.8416	26	25.7426

By Linear Regression of Y on X

Slope, m = 35.7743 Intercept, b = -4.5550
 Correlation Coefficient* = 0.9997
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Derek Lo
 Date : 15-Jun-12 Date : 15-Jun-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA5a
 Equipment no. : EL380

Calibration Date : 13-Aug-12
 Calibration Due Date : 13-Oct-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01145
		Intercept, b _c	-0.02803
Last Calibration Date	19-Jul-12	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	19-Jul-13		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7318	58	57.3786
2	5.0	5.0	10.0	1.5692	52	51.4429
3	3.7	3.7	7.4	1.3519	44	43.5286
4	2.4	2.4	4.8	1.0915	35	34.6250
5	1.4	1.4	2.8	0.8369	26	25.7215

By Linear Regression of Y on X

Slope, m = 35.3013 Intercept, b = -3.9263
 Correlation Coefficient* = 0.9999
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Fung
 Date : 13-Aug-12

Checked by : Derek Lo
 Date : 13-Aug-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA4a Calibration Date : 15-Jun-12
 Equipment no. : EL390 Calibration Due Date : 15-Aug-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	303	Kelvin	Pressure, P _a
			1010 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01593
		Intercept, b _c	-0.03978
Last Calibration Date	11-Jul-11	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	11-Jul-12		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	5.9	5.9	11.8	1.7068	60	59.4059
2	4.9	4.9	9.8	1.5572	53	52.4752
3	3.5	3.5	7.0	1.3192	44	43.5643
4	2.4	2.4	4.8	1.0958	35	34.6535
5	1.4	1.4	2.8	0.8416	26	25.7426

By Linear Regression of Y on X

Slope, m = 38.7214 Intercept, b = -7.3288
 Correlation Coefficient* = 0.9992
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Derek Lo
 Date : 15-Jun-12 Date : 15-Jun-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA4a
 Equipment no. : EL390

Calibration Date : 13-Aug-12
 Calibration Due Date : 13-Oct-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01145
		Intercept, b _c	-0.02803
Last Calibration Date	19-Jul-12	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	19-Jul-13		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7318	60	59.3572
2	5.0	5.0	10.0	1.5692	53	52.4322
3	3.7	3.7	7.4	1.3519	45	44.5179
4	2.5	2.5	5.0	1.1137	36	35.6143
5	1.4	1.4	2.8	0.8369	26	25.7215

By Linear Regression of Y on X

Slope, m = 37.3619 Intercept, b = -5.8154
 Correlation Coefficient* = 0.9996
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Fung
 Date : 13-Aug-12

Checked by : Derek Lo
 Date : 13-Aug-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA3a Calibration Date : 15-Jun-12
 Equipment no. : EL888 Calibration Due Date : 15-Aug-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	303	Kelvin	Pressure, P _a
			1010 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01593
		Intercept, b _c	-0.03978
Last Calibration Date	11-Jul-11	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	11-Jul-12		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.0	6.0	12.0	1.7211	48	47.5247
2	4.7	4.7	9.4	1.5255	41	40.5940
3	3.8	3.8	7.6	1.3737	34	33.6634
4	2.4	2.4	4.8	1.0958	24	23.7624
5	1.6	1.6	3.2	0.8983	15	14.8515

By Linear Regression of Y on X

Slope, m = 39.5332 Intercept, b = -20.2184
 Correlation Coefficient* = 0.9991
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Derek Lo
 Date : 15-Jun-12 Date : 15-Jun-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA3a
 Equipment no. : EL888

Calibration Date : 13-Aug-12
 Calibration Due Date : 13-Oct-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01145
		Intercept, b _c	-0.02803
Last Calibration Date	19-Jul-12	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	19-Jul-13		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.0	6.0	12.0	1.7177	48	47.4858
2	4.7	4.7	9.4	1.5219	41	40.5608
3	3.9	3.9	7.8	1.3875	36	35.6143
4	2.4	2.4	4.8	1.0915	24	23.7429
5	1.5	1.5	3.0	0.8658	15	14.8393

By Linear Regression of Y on X

Slope, m = 38.5754 Intercept, b = -18.3502
 Correlation Coefficient* = 0.9997
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Fung
 Date : 13-Aug-12

Checked by : Derek Lo
 Date : 13-Aug-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA2a Calibration Date : 15-Jun-12
 Equipment no. : EL449 Calibration Due Date : 15-Aug-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	303	Kelvin	Pressure, P _a
			1010 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01593
		Intercept, b _c	-0.03978
Last Calibration Date	11-Jul-11	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	11-Jul-12		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.2	6.2	12.4	1.7492	53	52.4752
2	5.1	5.1	10.2	1.5883	45	44.5544
3	4.0	4.0	8.0	1.4089	38	37.6237
4	2.5	2.5	5.0	1.1179	26	25.7426
5	1.6	1.6	3.2	0.8983	15	14.8515

By Linear Regression of Y on X

Slope, m = 43.2622 Intercept, b = -23.4638
 Correlation Coefficient* = 0.9991
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Derek Lo
 Date : 15-Jun-12 Date : 15-Jun-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA2a Calibration Date : 13-Aug-12
 Equipment no. : EL449 Calibration Due Date : 13-Oct-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01145
		Intercept, b _c	-0.02803
Last Calibration Date	19-Jul-12	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	19-Jul-13		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.0	6.0	12.0	1.7177	51	50.4536
2	5.0	5.0	10.0	1.5692	44	43.5286
3	3.9	3.9	7.8	1.3875	36	35.6143
4	2.5	2.5	5.0	1.1137	26	25.7215
5	1.4	1.4	2.8	0.8369	14	13.8500

By Linear Regression of Y on X

Slope, m = 40.8952 Intercept, b = -20.3530
 Correlation Coefficient* = 0.9992
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Fung Checked by : Derek Lo
 Date : 13-Aug-12 Date : 13-Aug-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA6a Calibration Date : 15-Jun-12
 Equipment no. : EL448 Calibration Due Date : 15-Aug-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	303	Kelvin	Pressure, P _a
			1010 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01593
		Intercept, b _c	-0.03978
Last Calibration Date	11-Jul-11	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	11-Jul-12		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7352	59	58.4158
2	4.8	4.8	9.6	1.5415	51	50.4950
3	3.9	3.9	7.8	1.3914	45	44.5544
4	2.5	2.5	5.0	1.1179	35	34.6535
5	1.5	1.5	3.0	0.8704	24	23.7624

By Linear Regression of Y on X

Slope, m = 39.5476 Intercept, b = -10.2730
 Correlation Coefficient* = 0.9995
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Derek Lo
 Date : 15-Jun-12 Date : 15-Jun-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA6a
 Equipment no. : EL448

Calibration Date : 13-Aug-12
 Calibration Due Date : 13-Oct-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01145
		Intercept, b _c	-0.02803
Last Calibration Date	19-Jul-12	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	19-Jul-13		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.2	6.2	12.4	1.7458	61	60.3465
2	5.0	5.0	10.0	1.5692	53	52.4322
3	4.1	4.1	8.2	1.4223	46	45.5072
4	2.5	2.5	5.0	1.1137	34	33.6358
5	1.5	1.5	3.0	0.8658	24	23.7429

By Linear Regression of Y on X

Slope, m = 41.3102 Intercept, b = -12.3623
 Correlation Coefficient* = 0.9993
 Calibration Accepted = Yes/No**

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

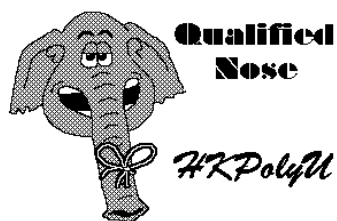
** Delete as appropriate.

Remarks : _____

Calibrated by : Fung
 Date : 13-Aug-12

Checked by : Derek Lo
 Date : 13-Aug-12

Certificate for a Qualified Odour Panel Member



Odour Research Laboratory
The Hong Kong Polytechnic University,
Hung Hom, Kowloon, Hong Kong
Tel: (852) 2766 6011 Fax: (852) 2334 6389

25 June 2012

Re: A Certificate for a Qualified Odour Panel Member

This is to certify that Mr. Ng Kin-hung participated in a set of n-butanol screening tests in our laboratory between Nov 2011 – May 2012 and his odour threshold of n-butanol in nitrogen gas was found to be in the range of 20 – 80 ppb/v. According to the requirement of the European Standard Method of Air Quality – Determination of Odour Concentration by Dynamic Olfactometry (EN13725), he is qualified to participate olfactometry analysis to determine odour concentration.

Yours sincerely

A handwritten signature in blue ink, appearing to be "S. C. Lee". The signature is fluid and cursive, with a long horizontal stroke at the end.

Professor S. C. Lee
Odour Research Laboratory at PolyU