



Calibration Certificate

Certificate No. 12888

Page 1 of 4 Pages

Customer : Lam Geotechnics Limited

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

Order No. : Q10982

Date of receipt : 25-May-11

Item Tested

Description : Precision Integrating Sound Level Meter

Manufacturer : Rion

Model : NL-14

Serial No. : 10303242

Test Conditions

Date of Test : 26-May-11

Supply Voltage : --

Ambient Temperature : $(23 \pm 3)^{\circ}\text{C}$

Relative Humidity : $(50 \pm 25)\%$

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).

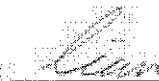
Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S017	Multi-Function Generator	C101623	SCL-HKSAR
S024	Sound Level Calibrator	04062	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 : 
Alan Chu

Date: 25-May-11

This Certificate is issued by:
Hong Kong Calibration Ltd.
Unit 80, 24/F., Well Fung Industrial Centre, No. 58-70, Ta Chuen Fong Street, Kwai Chung, NT, Hong Kong.
Tel: 2425 8801, Fax: 2425 8545

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Results:

1. SPL Accuracy

Level Range (dB)	UUT Setting			Applied Value (dB)	UUT Reading (dB)	
	Filter	Weight	Time Const.		Before adjust.	After adjust.
40 - 100	OFF	L _p	Fast	94.00	--	94.1
		L _{PA}	Fast		*95.0	94.1
			Slow		--	94.1
		L _{PC}	Fast		--	94.1
60 - 120	OFF	L _p	Fast	94.00	--	94.1
		L _{PA}	Fast		--	94.0
			Slow		--	94.0
		L _{PC}	Fast		--	94.0
60 - 120	OFF	L _p	Fast	114.00	--	114.0
		L _{PA}	Fast		--	113.9
			Slow		--	113.9
		L _{PC}	Fast		--	113.9

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	103.8	-0.2	
120	94.0	94.0 (Ref.)	--	
110	84.0	83.9	-0.1	
100	74.0	74.1	+0.1	
90	64.0	64.1	+0.1	
80	54.0	54.3	+0.3	

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	84.0	0.0	± 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	-8.4	- 8.6 dB, ± 1 dB
500 Hz	-3.0	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.3	+ 1.2 dB, ± 1 dB
4 kHz	+0.8	+ 1.0 dB, ± 1 dB
8 kHz	-1.3	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-7.1	-- 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	39.6	
1/10 ³	40.0	39.2	± 1.0 dB
1/10 ⁴	40.0	39.4	

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 : 1 004 hPa.

4. *Out of Specification

-----END-----



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Customer : Lam Geotechnics Limited

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

Order No. : Q10982

Date of receipt : 25-May-11

Item Tested

Description : Sound Level Calibrator

Manufacturer : Rion

Model : NC-73

Serial No. : 10465798

Test Conditions

Date of Test : 26-May-11

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 after adjustment.

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

Main Test equipment used:

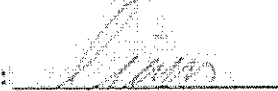
Equipment No.	Description	Cert. No.	Traceable to
S014	Spectrum Analyzer	03926	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	04062	NIM-PRC & SCL-HKSAR
S041	Universal Counter	04461	SCL-HKSAR
S206	Sound Level Meter	04462	SCL-HKSAR

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.

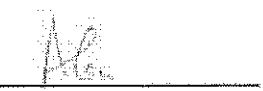
The test equipment used for calibration are traceable to International System of Units (SI).

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

Calibrated by :


P. F. Wong

Approved by :


Alan Chu

Date: 26-May-11

This Certificate is issued by:

Hong Kong Calibration Ltd.

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

Tel: 3425 8801 Fax: 3425 8546

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Results:

1. Level Accuracy (at 1 kHz)

UUT Nominal Value	Measured Value		Mfr's Spec.
	Before Adjust	After Adjust	
94 dB	*95.20 dB	93.94 dB	±1 dB

Uncertainty : ± 0.2 dB

2. Frequency Accuracy

UUT Nominal Value	Measured Value	Mfr's Spec.
1 kHz	0.994 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 : 1.004 hPa

5. *Out of Specification

-----END-----



Calibration Certificate

Certificate No. 13813

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Customer : Lam Geotechnics Limited

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

Order No. : Q11569

Date of receipt : 7-Jul-11

Item Tested

Description : Sound Level Meter

Manufacturer : B&K

Model : 2250

Serial No. : 2722310

Test Conditions

Date of Test : 8-Jul-11

Supply Voltage : -

Ambient Temperature : $(23 \pm 3)^{\circ}\text{C}$

Relative Humidity : $(50 \pm 25) \%$

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>
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	04062	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.

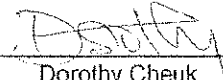
The test equipment used for calibration are traceable to International System of Units (SI).

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

Calibrated by :


P. F. Wong

Approved by :


Dorothy Cheuk

Date: 8-Jul-11

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 8901 Fax: 2425 8646

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Calibration Certificate

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Results :

1. SPL

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range	Freq. Wgt.	Time Const.	Center Freq.		
20 - 140	A (SPL)	Fast	--	94.0	93.8
		Slow	--		93.8
	C (SPL)	Fast	--	94.0	93.9
	A (SPL)	Fast	--	114.0	113.7
		Slow	--		113.7
	C (SPL)	Fast	--	114.0	113.7
	--	1/1 - Oct/Fast	1 kHz	94.0	93.8
	--			114.0	113.7
	--	1/3 - Oct/Fast	1 kHz	94.0	93.8
	--			114.0	113.7

IEC 651 Type 1 Spec. : ± 0.7 dB

Uncertainty : ± 0.2 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.
120	84.0	83.8	0.0	± 0.4 dB
	94.0	93.8 (Ref.)	--	
	95.0	94.8	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	-39.9	- 39.4 dB, ± 1.5 dB
63 Hz	-26.6	- 26.2 dB, ± 1.5 dB
125 Hz	-16.5	- 16.1 dB, ± 1 dB
250 Hz	-9.0	- 8.6 dB, ± 1 dB
500 Hz	-3.5	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.4	+ 1.2 dB, ± 1 dB
4 kHz	+1.2	+ 1.0 dB, ± 1 dB
8 kHz	-1.2	- 1.1 dB, +1.5 dB \sim -3 dB
16 kHz	-5.8	- 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	40.0	± 0.5 dB
1/10 ²	40.0	39.9	± 1.0 dB
1/10 ³	40.0	40.0	
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	-64.2	< - 61
250 Hz	-44.9	< - 42
500 Hz	-21.0	< - 17.5
707 Hz	-3.8	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-3.5	- 2 ~ - 5
2 kHz	-20.8	< - 17.5
4 kHz	-55.9	< - 42
8 kHz	-85.7	< - 61

Uncertainty : ± 0.25 dB

6.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 Spec.(dB)
326 Hz	-63.6	< - 61
530 Hz	-47.9	< - 42
772 Hz	-23.5	< - 17.5
891 Hz	-3.7	+ 0.3 ~ - 5.0
1 kHz (Ref)	--	--
1.122 kHz	-3.6	+ 0.3 ~ - 5.0
1.296 kHz	-23.4	< - 17.5
1.887 kHz	-48.1	< - 42
3.070 kHz	-69.8	< - 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 : 1 000 hPa.

----- END -----



Calibration Certificate

Certificate No. 13784

Page 1 of 4 Pages

Customer : Lam Geotechnics Limited

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

Order No. : Q11569

Date of receipt : 6-Jul-11

Item Tested

Description : Sound Level Meter

Manufacturer : B&K

Model : 2250

Serial No. : 2722311

Test Conditions

Date of Test : 6-Jul-11

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	04062	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-11

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

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range	Freq. Wgt.	Time Const.	Center Freq.		
20 - 140	A (SPL)	Fast	--	94.0	93.9
		Slow	--		93.9
	C (SPL)	Fast	--	94.0	93.9
	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	93.8
				114.0	113.7
	--	1/3 - Oct/Fast	1 kHz	94.0	93.7
				114.0	113.6

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	83.9	0.0	± 0.4 dB
	94.0	93.9 (Ref.)	--	
	95.0	95.0	+0.1	± 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	-39.8	- 39.4 dB, ± 1.5 dB
63 Hz	-26.5	- 26.2 dB, ± 1.5 dB
125 Hz	-16.5	- 16.1 dB, ± 1 dB
250 Hz	-9.0	- 8.6 dB, ± 1 dB
500 Hz	-3.5	- 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	+1.1	+ 1.0 dB, ± 1 dB
8 kHz	-1.3	- 1.1 dB, + 1.5 dB \sim -3 dB
16 kHz	-5.9	- 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	40.0	± 1.0 dB
1/10 ³	40.0	40.0	
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	-64.2	< - 61
250 Hz	-44.9	< - 42
500 Hz	-21.1	< - 17.5
707 Hz	-3.8	- 2 ~ - 5
1 kHz (Ref)	--	--
1.414 kHz	-3.6	- 2 ~ - 5
2 kHz	-20.9	< - 17.5
4 kHz	-56.0	< - 42
8 kHz	-86.0	< - 61

Uncertainty : ± 0.25 dB

6.2 1/3 – Octave Filter

Frequency	Attenuation (dB)	IEC 1260 Class 1 Spec. (dB)
326 Hz	-64.9	< - 61
530 Hz	-48.1	< - 42
772 Hz	-23.6	< - 17.5
891 Hz	-3.9	+ 0.3 ~ - 5.0
1 kHz (Ref)	--	--
1.122 kHz	-3.9	+ 0.3 ~ - 5.0
1.296 kHz	-23.7	< - 17.5
1.887 kHz	-48.8	< - 42
3.070 kHz	-70.4	< - 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 : 996 hPa.

----- END -----



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1127570
LABORATORY: HONG KONG
DATE RECEIVED: 23/11/2011
DATE OF ISSUE: 01/12/2011

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.: 11H100476
Equipment No.: --
Date of Calibration: 30 November, 2011

NOTES

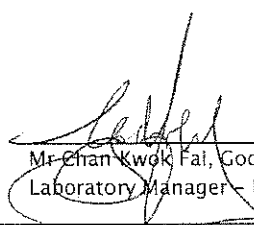
This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

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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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1127570
Date of Issue: 01/12/2011
Client: LAM GEOTECHNICS LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: YSI Professional Plus
Serial No.: 11H100476
Equipment No.: ---
Date of Calibration: 30 November, 2011 **Date of next Calibration:** 01 March, 2012

Parameters:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.87	5.78	-0.09
6.41	6.35	-0.06
7.89	7.79	-0.10
Tolerance Limit (±mg/L)		0.20

pH Value **Method Ref: ALPHA (21st edition), 4500H:B**

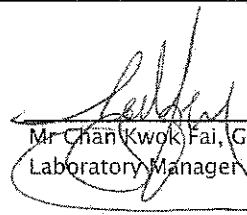
Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.95	-0.05
7.0	7.03	0.03
10.0	9.90	-0.10
Tolerance Limit (±unit)		0.20

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
10.0	9.95	-0.5
20.0	19.91	-0.4
30.0	29.13	-2.9
Tolerance Limit (±%)		10.0

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
12.0	13.1	1.1
22.0	21.8	-0.2
32.5	33.3	0.8
Tolerance Limit (°C)		2.0



 Mr Chan Kwok Fai, Godfrey
 Laboratory Manager - Hong Kong



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1130549
LABORATORY: HONG KONG
DATE RECEIVED: 23/12/2011
DATE OF ISSUE: 04/01/2012

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: Multimeter
Brand Name: WTW
Model No.: 3430
Serial No.: 10410294
Equipment No.: --
Date of Calibration: 03 January, 2012

NOTES

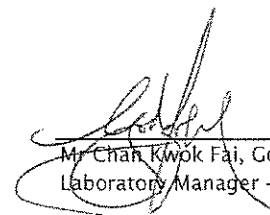
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ISSUING LABORATORY: HONG KONG

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1-3 Wing Yip Street
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Mr. Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1130549
 Date of Issue: 04/01/2012
 Client: LAM GEOTECHNICS LIMITED



Description: Multimeter
 Brand Name: WTW
 Model No.: 3430
 Serial No.: 10410294
 Equipment No.: --
 Date of Calibration: 03 January, 2012

Date of next Calibration: 03 April, 2012

Parameters:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
6.22	6.38	0.16
7.02	7.17	0.15
8.32	8.43	0.11
Tolerance Limit (\pm mg/L)		0.20

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

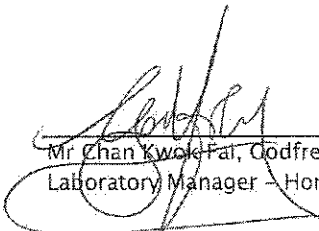
Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	3.991	-0.01
7.0	6.982	-0.02
10.0	9.920	-0.08
Tolerance Limit (\pm unit)		0.20

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.0	--
10	10.3	3.0
20	20.2	1.0
30	30.2	0.7
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.

Reading of Ref. thermometer ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
9.0	8.7	-0.3
22.0	21.6	-0.4
34.0	33.6	-0.4
Tolerance Limit ($^{\circ}$ C)		2.0


 Mr. Chan Kwok Fat, Godfrey
 Laboratory Manager - Hong Kong



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1126440
LABORATORY: HONG KONG
DATE RECEIVED: 09/11/2011
DATE OF ISSUE: 17/11/2011

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: Turbidity
Description: Turbidimeter
Brand Name: HACH
Model No.: 2100P
Serial No.: 000032935
Equipment No.: --
Date of Calibration: 16 November, 2011

NOTES

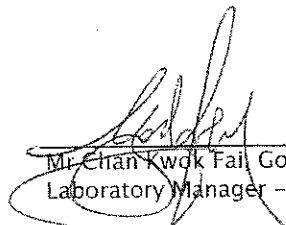
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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1126440
Date of Issue: 17/11/2011
Client: LAM GEOTECHNICS LIMITED




Description: Turbidimeter
Brand Name: HACH
Model No.: 2100P
Serial No.: 000032935
Equipment No.: --
Date of Calibration: 16 November, 2011 Date of next Calibration: 16 February, 2012

Parameters:

Turbidity

Method Ref: ALPHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.00	0.19	--
4.00	3.78	-5.5
40.0	39.1	-2.3
80.0	79.3	-0.9
400	410	2.5
800	828	3.5
	Tolerance Limit (±%)	10.0


Mr. Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1127257
LABORATORY: HONG KONG
DATE RECEIVED: 19/11/2011
DATE OF ISSUE: 25/11/2011

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: Turbidity
Description: Turbidimeter
Brand Name: HACH
Model No.: 2100P
Serial No.: 030800032283
Equipment No.: --
Date of Calibration: 25 November, 2011

NOTES

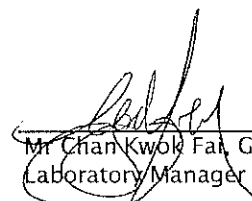
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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1127257
Date of Issue: 25/11/2011
Client: LAM GEOTECHNICS LIMITED



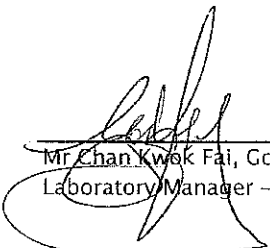
Description: Turbidimeter
Brand Name: HACH
Model No.: 2100P
Serial No.: 030800032283
Equipment No.: ---
Date of Calibration: 25 November, 2011 Date of next Calibration: 25 February, 2012

Parameters:

Turbidity

Method Ref: ALPHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.00	0.36	---
4.00	4.00	0.0
40.0	39.6	-1.0
80.0	81.2	1.5
400	409	2.3
800	824	3.0
	Tolerance Limit (±%)	10.0


Mr. Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1130031
LABORATORY: HONG KONG
DATE RECEIVED: 19/12/2011
DATE OF ISSUE: 20/12/2011

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: Turbidity
Description: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 11080C011942
Equipment No.: --
Date of Calibration: 20 December, 2011

NOTES

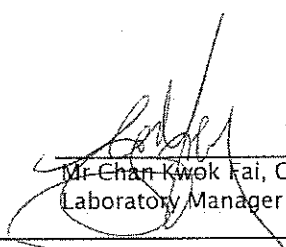
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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1130031
Date of Issue: 20/12/2011
Client: LAM GEOTECHNICS LIMITED



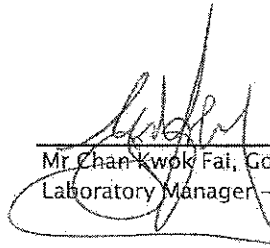
Description: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 11080C011942
Equipment No.: --
Date of Calibration: 20 December, 2011 Date of next Calibration: 20 March, 2012

Parameters:

Turbidity

Method Ref: ALPHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.23	--
4	3.96	-1.0
40	41.1	2.8
80	77.8	-2.8
400	385	-3.8
800	786	-1.8
	Tolerance Limit ($\pm\%$)	10.0


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AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jul 11, 2011 Rootsmeter S/N 0438320 Ta (K) - 298
 Operator Tisch Orifice I.D. - 0005 Pa (mm) - 749.3

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	1.3710	3.2	2.00
2	NA	NA	1.00	0.9730	6.4	4.00
3	NA	NA	1.00	0.8690	7.9	5.00
4	NA	NA	1.00	0.8300	8.8	5.50
5	NA	NA	1.00	0.6850	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9817	0.7160	1.4042	0.9957	0.7263	0.8919
0.9775	1.0046	1.9859	0.9915	1.0190	1.2613
0.9754	1.1225	2.2203	0.9894	1.1385	1.4101
0.9743	1.1739	2.3286	0.9882	1.1907	1.4790
0.9690	1.4126	2.8084	0.9829	1.4328	1.7837
Qstd slope (m) = 2.01593			Qa slope (m) = 1.26234		
intercept (b) = -0.03978			intercept (b) = -0.02526		
coefficient (r) = 0.99999			coefficient (r) = 0.99999		
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:

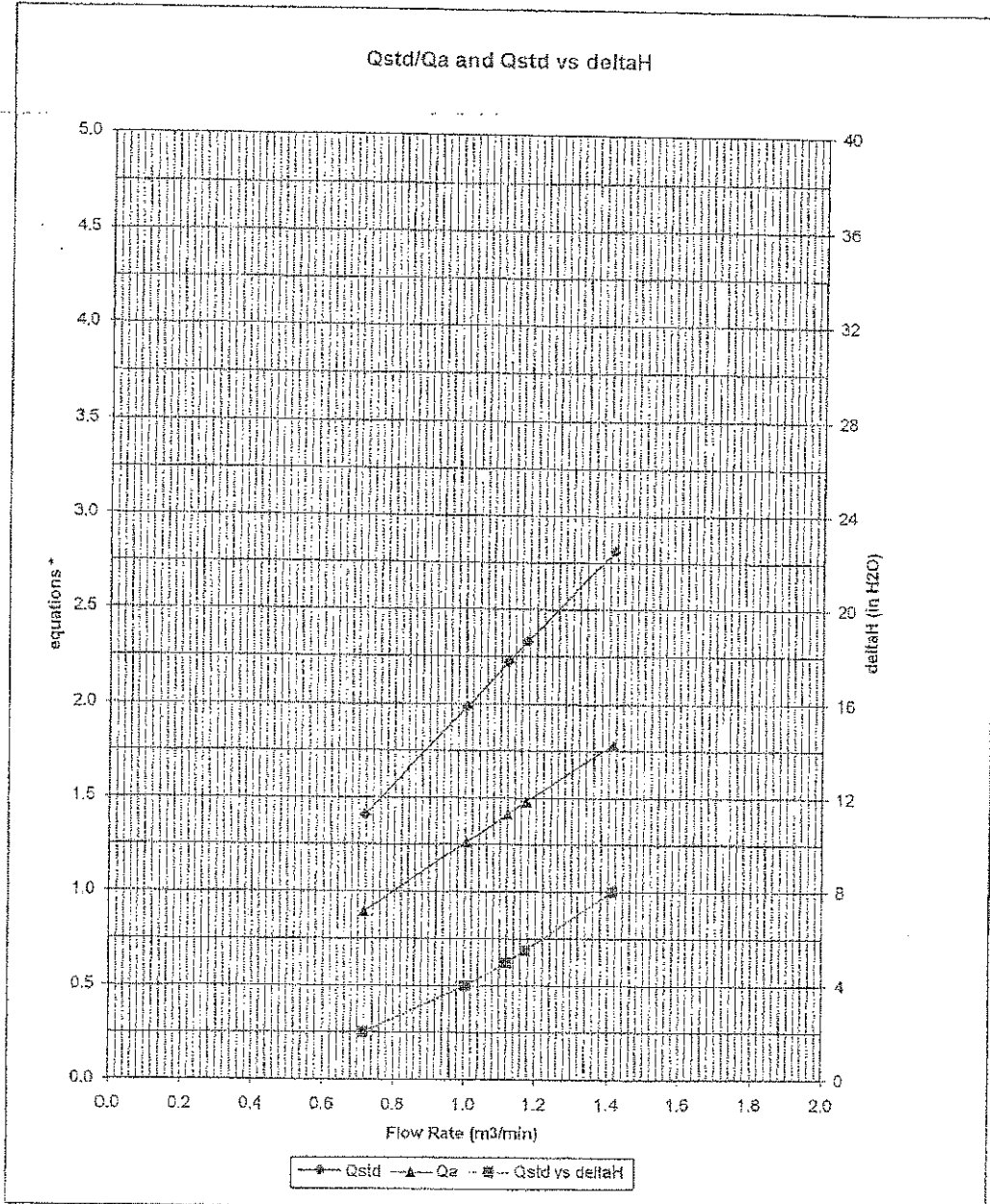
$$Qstd = 1/m \{ [\text{SQRT} (H2O (Pa/760) (298/Ta))] - b \}$$

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



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AIR POLLUTION MONITORING EQUIPMENT



* y-axis equations:

Qstd series:
$$\sqrt{\Delta H \left(\frac{P_a}{P_{std}} \right) \left(\frac{T_{std}}{T_a} \right)}$$

Qa series:
$$\sqrt{\Delta H (T_a / P_a)}$$

#0005



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA1b Calibration Date : 28-Dec-11
 Equipment no. : EL452 Calibration Due Date : 28-Feb-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	291	Kelvin	Pressure, P _a
			1020 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	6.2	6.2	12.4	1.7932	61	61.9331
2	5.0	5.0	10.0	1.6124	52	52.7954
3	3.9	3.9	7.8	1.4263	46	46.7036
4	2.5	2.5	5.0	1.1459	35	35.5354
5	1.5	1.5	3.0	0.8921	24	24.3671

By Linear Regression of Y on X

Slope, m = 40.7016 Intercept, b = -11.6560

Correlation Coefficient* = 0.9987

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Chery Mak
 Date : 28-Dec-12 Date : 28-Dec-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA6a Calibration Date : 28-Dec-11
 Equipment no. : EL448 Calibration Due Date : 28-Feb-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	291	Kelvin	Pressure, P _a
			1020 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	6.3	6.3	12.6	1.8075	59	59.9025
2	5.5	5.5	11.0	1.6901	53	53.8107
3	4.0	4.0	8.0	1.4442	45	45.6883
4	2.4	2.4	4.8	1.1231	36	36.5507
5	1.5	1.5	3.0	0.8921	28	28.4283

By Linear Regression of Y on X

Slope, m = 33.0987 Intercept, b = -1.1775

Correlation Coefficient* = 0.9972

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Cherry Mak
 Date : 28-Dec-11 Date : 28-Dec-11



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA5a Calibration Date : 28-Dec-11
 Equipment no. : EL380 Calibration Due Date : 28-Feb-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	291	Kelvin	Pressure, P _a
			1020 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	5.9	5.9	11.8	1.7498	56	56.8566
2	4.9	4.9	9.8	1.5964	50	50.7648
3	3.8	3.8	7.6	1.4082	43	43.6577
4	2.5	2.5	5.0	1.1459	33	33.5048
5	1.6	1.6	3.2	0.9207	22	22.3365

By Linear Regression of Y on X

Slope, m = 41.0174 Intercept, b = -14.5308

Correlation Coefficient* = 0.9985

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Cherry Mak
 Date : 28-Dec-11 Date : 28-Dec-11



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA4a Calibration Date : 28-Dec-11
 Equipment no. : EL390 Calibration Due Date : 28-Feb-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	291	Kelvin	Pressure, P _a
			1020 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	1.7644	58	58.8872
2	4.9	4.9	9.8	1.5964	50	50.7648
3	3.7	3.7	7.4	1.3898	42	42.6424
4	2.9	2.9	5.8	1.2327	32	32.4895
5	1.5	1.5	3.0	0.8921	21	21.3212

By Linear Regression of Y on X						
Slope, m	=	43.7252	Intercept, b	=	-18.9031	
Correlation Coefficient*	=	0.9950				
Calibration Accepted	=	Yes/No**				

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Cherry Mak
 Date : 28-Dec-11 Date : 28-Dec-11



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA3a Calibration Date : 28-Dec-11
 Equipment no. : EL888 Calibration Due Date : 28-Feb-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	291	Kelvin	Pressure, P _a
			1020 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	5.7	5.7	11.4	1.7202	50	50.7648
2	4.5	4.5	9.0	1.5306	45	45.6883
3	3.5	3.5	7.0	1.3522	40	40.6118
4	2.3	2.3	4.6	1.0999	32	32.4895
5	1.4	1.4	2.8	0.8625	22	22.3365

By Linear Regression of Y on X

Slope, m = 32.8319 Intercept, b = -4.7332

Correlation Coefficient* = 0.9953

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Cherry Mak
 Date : 28-Dec-11 Date : 28-Feb-12



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA2a Calibration Date : 28-Dec-11
 Equipment no. : EL449 Calibration Due Date : 28-Feb-12

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T_a	291	Kelvin	Pressure, P_a
			1020 mmHg

Office 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 ($W(P_a / 1013.3 \times 298 / T_a)^{1/2} / 35.31$) Y-axis
	(up)	(down)	(difference)			
1	6.3	6.3	12.6	1.8075	53	53.8107
2	5.1	5.1	10.2	1.6282	43	43.6577
3	3.9	3.9	7.8	1.4263	38	38.5813
4	2.6	2.6	5.2	1.1682	28	28.4283
5	1.1	1.1	2.2	0.7667	14	14.2141

By Linear Regression of Y on X

Slope, m = 36.9319 Intercept, b = -14.4664

Correlation Coefficient* = 0.9963

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam Checked by : Cherry Mak
 Date : 28-Dec-11 Date : 28-Dec-11