



Calibration Certificate

Certificate No. **06680**

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Customer : Lam Geotechnics Limited

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

Order No. : Q02553

Date of receipt : 18-Nov-10

Item Tested

Description : Precision Integrating Sound Level Meter

Manufacturer : ACO

Model : Type 6224

Serial No. : 050112

Test Conditions

Date of Test : 19-Nov-10

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 & 804 Type I 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	00804	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: 23-Nov-10

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 86, 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)	Weight	Time Const.		
20 - 100	L _A	Fast	94.0	94.3
		Slow		94.3
	L _C	Fast		94.3
30 - 120	L _A	Fast	94.0	94.4
		Slow		94.4
	L _C	Fast		94.4
30 - 120	L _A	Fast	114.0	94.3
		Slow		94.3
	L _C	Fast		94.3

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

3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Rdg. (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
140	114.0	114.5	+0.1	
130	104.0	104.4	0.0	
120	94.0	94.4 (Ref.)	--	
110	84.0	84.1	-0.3	
100	74.0	74.2	-0.2	
90	64.0	64.1	-0.3	
80	54.0	54.1	-0.3	

Uncertainty : ± 0.1 dB



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3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Rdg (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	84.1	-0.3	± 0.4
	94.0	94.4 (Ref.)	--	
	95.0	95.4	0.0	± 0.2

Uncertainty : ± 0.1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.3	- 39.4 dB, ± 1.5 dB
63 Hz	-26.2	- 26.2 dB, ± 1.5 dB
125 Hz	-16.1	- 16.1 dB, ± 1 dB
250 Hz	-8.7	- 8.6 dB, ± 1 dB
500 Hz	-3.3	- 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	+0.9	+ 1.0 dB, ± 1 dB
8 kHz	-1.2	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-5.8	- 6.6 dB, + 3 dB ~ - ∞

Uncertainty : ± 0.1 dB



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4. 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	39.9	
1/10 ³	40.0	40.3	± 1.0 dB
1/10 ⁴	40.0	40.3	

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 : 1 009 hPa.

-----END-----



Calibration Certificate

Certificate No. 06681

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Customer : Lam Geotechnics Limited

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

Order No. : Q02553

Date of receipt : 18-Nov-10

Item Tested

Description : Sound Level Calibrator (EL469)

Manufacturer : ACO

Model : --

Serial No. : 050213

Test Conditions

Date of Test : 19-Nov-10

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 IEC 942 Class 1 specification.

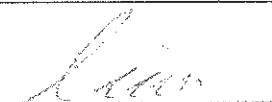
The results are shown in the attached page(s).

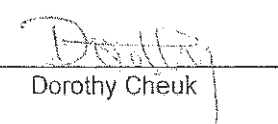
Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
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 : 
Dorothy Cheuk

Date: 23-Nov-10

This Certificate is issued by:
Hong Kong Calibration Ltd.
Unit 6B, 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

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.22	± 0.3 dB

The above measured values are the mean of 3 measurements.

Uncertainty : ± 0.1 dB

2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	0.9834 kHz	± 2 %

Uncertainty ; $\pm 3.6 \times 10^{-6}$

3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 0.2 %

IEC 942 Class 1 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. Atmospheric Pressure : 1 009 hPa.

-----END-----



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:

<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 : 
Alan Chu

Date: 26-May-11



Calibration Certificate

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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 -----



Calibration Certificate

Certificate No. 12889

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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

Ambient Temperature : (23 ± 3)°C

Supply Voltage : --

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:


<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
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

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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



Calibration Certificate

Certificate No. 12889

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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 -----



CERTIFICATE OF CALIBRATION

Certificate No. : 2KS100612-7

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Calibration of :

Description :	Sound Level Meter	,	Microphone
Manufacture :	Brüel & Kjær		
Type No. :	2250	,	4950
Serial No. :	2722310		2698702

Client :

Lam Geotechnics Limited
11/F, Centre Point
181-185 Gloucester Road
Wanchai
Hong Kong

Calibration Conditions :

Air Temperature :	23	°C
Air Pressure :	101.9	kPa
Relative Humidity :	62	%

Test Specifications :

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC 60651 and IEC 60804 type 1, and vendor specific procedures.

The measurements has been performed with the assistance of :
Brüel & Kjær's Sound Level Meter Calibration System B&K 9600 CAL2238A, Ver.25.10.1999
The standard(s) and instrument(s) used in the calibration are traceable to international standard and are calibrated on a schedule which is adjusted to maintain the required accuracy level.

Test Result :

A list of the performed (sub) tests is stated on page 2 of this certificate. Actual Measurement are documented on worksheet.

Date of Calibration : 22 July, 2010

Certificate issued : 22 July, 2010

Calibrated By :

Approved signatory :


Dai Bin


Jacky Leung

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CERTIFICATE OF CALIBRATION

Certificate No. : 2KS100612-7

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Results :

List of performed (sub) test with test status:

“OK” Means the result of the (sub)test is Inside the tolerances stated in the test specifications.

“ - ” Means the result of the (sub)test is Outside these tolerances.

Test :	Subtest :	Status :
Noise	A	OK
Noise	C	OK
Noise	Lin	OK
Frequency Weighting	A	OK
Frequency Weighting	C	OK
Frequency Weighting	Lin	OK
Level Range Control	1000 Hz	OK
Linearity Range	SPL 10dB 4000 Hz	OK
Linearity Range	SPL 1dB 1000 Hz	OK
Linearity Range	Leq	OK
Linearity Range	SEL	OK
RMS Detector	CF 3	OK
RMS Detector	CF 5	OK
RMS Detector	CF 10	OK
RMS Detector	Symmetry	OK
Time Weighting	Difference Indication	OK
Time Weighting	Single Burst FAST	OK
Time Weighting	Single Burst SLOW	OK
Time Weighting	Single Burst IMPULSE	OK
Time Weighting	Repetitive Burst	OK
Time Weighting	Peak	OK
Time Averaging		OK
Pulse Range		OK
Overload	SPL	OK
Overload	SEL	OK
Acoustic Response	A	OK
Acoustic Response	Lin	OK

Calibration Equipment :

Description :	Make & Model :	Serial No. :	Last Cal. Date :	Traceable to:
Brüel & Kjær's Sound Level Meter Calibration System	B&K 9600	CAL2238A	Ver.25.10.1999	
Digital Multi-meter	Datron 1281	27361	30 Sept, 2009	HKSCS (HOKLAS)
Sine/Noise Generator	B&K 1049	1314978	Test	B&K Conformance
Test Waveform Generator	B&K 5918	1482949	Test	B&K Conformance
Acoustical Calibrator	B&K 4226	1843103	11 Aug 2009	NPL via B&K (DANAK)

Calibrated By : *Dar R M*
Date : 22 July 2010

Checked By : *[Signature]*
Date : 22 July, 2010



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 ± 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>
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.

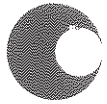
The test equipment used for calibration are traceable to International System of Units (SI).

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

Calibrated by : 
P. F. Wong

Approved by : 
Dorothy Cheuk

Date: 8-Jul-11



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



Calibration Certificate

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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 - ∞

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	
1/10 ³	40.0	40.0	± 1.0 dB
1/10 ⁴	40.0	40.0	

Uncertainty : ± 0.1 dB



Calibration Certificate

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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 -----

CERTIFICATE OF CALIBRATION**Certificate No. :** 2KS100705-2**Page 1 of 2****Calibration of :**

Description :	Sound Level Meter	,	Microphone
Manufacture :	Brüel & Kjær		
Type No. :	2250	,	4950
Serial No. :	2722311		2698703

Client :

Lam Geotechnics Limited
11/F, Centre Point
181-185 Gloucester Road
Wanchai
Hong Kong

Calibration Conditions :

Air Temperature :	23	°C
Air Pressure :	101.9	kPa
Relative Humidity :	62	%

Test Specifications :

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC 60651 and IEC 60804 type 1, and vendor specific procedures.

The measurements has been performed with the assistance of :
Brüel & Kjær's Sound Level Meter Calibration System B&K 9600 CAL2238A, Ver.25.10.1999
The standard(s) and instrument(s) used in the calibration are traceable to international standard and are calibrated on a schedule which is adjusted to maintain the required accuracy level.

Test Result :

A list of the performed (sub) tests is stated on page 2 of this certificate. Actual Measurement are documented on worksheet.

Date of Calibration : 03 Aug, 2010

Certificate issued : 03 Aug, 2010

Calibrated By :

Approved signatory :


Dai Bin
Jacky Leung

Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission.

CERTIFICATE OF CALIBRATION

Certificate No. : 2KS100705-2

Page 2 of 2

Results :

List of performed (sub) test with test status:

“OK” Means the result of the (sub)test is Inside the tolerances stated in the test specifications.

“ - ” Means the result of the (sub)test is Outside these tolerances.

Test :	Subtest :	Status :
Noise	A	OK
Noise	C	OK
Noise	Lin	OK
Frequency Weighting	A	OK
Frequency Weighting	C	OK
Frequency Weighting	Lin	OK
Level Range Control	1000 Hz	OK
Linearity Range	SPL 10dB 4000 Hz	OK
Linearity Range	SPL 1dB 1000 Hz	OK
Linearity Range	Leq	OK
Linearity Range	SEL	OK
RMS Detector	CF 3	OK
RMS Detector	CF 5	OK
RMS Detector	CF 10	OK
RMS Detector	Symmetry	OK
Time Weighting	Difference Indication	OK
Time Weighting	Single Burst FAST	OK
Time Weighting	Single Burst SLOW	OK
Time Weighting	Single Burst IMPULSE	OK
Time Weighting	Repetitive Burst	OK
Time Weighting	Peak	OK
Time Averaging		OK
Pulse Range		OK
Overload	SPL	OK
Overload	SEL	OK
Acoustic Response	A	OK
Acoustic Response	Lin	OK

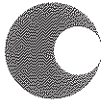
Calibration Equipment :

Brüel & Kjær's Sound Level Meter Calibration System B&K 9600 CAL2238A, Ver.25.10.1999

Description :	Make & Model :	Serial No. :	Last Cal. Date :	Traceable to:
Digital Multi-meter	Datron 1281	27361	30 Sept, 2009	HKSCS (HOKLAS)
Sine/Noise Generator	B&K 1049	1314978	Test	B&K Conformance
Test Waveform Generator	B&K 5918	1482949	Test	B&K Conformance
Acoustical Calibrator	B&K 4226	1843103	11 Aug 2009	NPL via B&K (DANAK)

Calibrated By : *Dai B M*
Date : 03 Aug 2010

Checked By : *Janly*
Date : 03 Aug, 2010



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

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 59-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646

Date: 6-Jul-11



Calibration Certificate

Certificate No. **13784**

Page 2 of 4 Pages

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



Calibration Certificate

Certificate No. 13784

Page 3 of 4 Pages

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 ~ -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	
1/10 ³	40.0	40.0	± 1.0 dB
1/10 ⁴	40.0	40.0	

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 13784

Page 4 of 4 Pages

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 -----



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C113521

Certificate of Calibration

This is to certify that the equipment

Description : Sound Level Meter

Manufacturer : Bruel & Kjaer

Model No. : 2250-L

Serial No. : 2675657

*has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C113521.*

The equipment is supplied by

Co. Name : EDMS Consulting Ltd.

*Address : Room 1009, 10/F., World Wide House,
19 Des Voeux Road Central, Hong Kong*

Date of Issue : 23 June 2011

Certified by : 
H C Chan

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

Tel: 2927 2606

Fax: 2744 8986

E-mail: callab@suncreation.com

Website: www.suncreation.com



Calibration Report

ITEM TESTED

DESCRIPTION : Sound Level Meter
MANUFACTURER : Bruel & Kjaer
MODEL NO. : 2250-L
SERIAL NO. : 2675657

TEST CONDITIONS

AMBIENT TEMPERATURE : $(23 \pm 2)^\circ\text{C}$ RELATIVE HUMIDITY : $(55 \pm 20)\%$
LINE VOLTAGE : ---

TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 22 June 2011

JOB NO. : IC11-1565

TEST RESULTS

The results apply to the particular unit-under-test only.
All results are within manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested by :


K C Lee

Date : 23 June 2011

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration Report

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL280	40 MHz Arbitrary Waveform Generator	C110018
CL281	Multifunction Acoustic Calibrator	C1006860

4. Test procedure : MA101N.

5. Results :

- 5.1 Sound Pressure Level

- 5.1.1 Reference Sound Pressure Level

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	± 1.1

- 5.1.2 Linearity

UUT Setting		Applied Value		UUT Reading (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)	
20 - 140	LAF (SPL)	94.00	1	94.0 (Ref.)
		104.00		104.0
		114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

- 5.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	Ref.
	LAS (SPL)			94.0	± 0.3

The test equipment used for calibration are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration Report

5.3 Frequency Weighting

5.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LAF (SPL)	94.00	63 Hz	67.8	-26.2 ± 1.5
			125 Hz	77.8	-16.1 ± 1.5
			250 Hz	85.3	-8.6 ± 1.4
			500 Hz	90.7	-3.2 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	95.2	+1.2 ± 1.6
			4 kHz	94.9	+1.0 ± 1.6
			8 kHz	92.5	-1.1(+2.1 ; -3.1)
			12.5 kHz	89.4	-4.3(+3.0 ; -6.0)

5.3.2 C-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LCF (SPL)	94.00	63 Hz	93.2	-0.8 ± 1.5
			125 Hz	93.8	-0.2 ± 1.5
			205 Hz	94.0	0.0 ± 1.4
			500 Hz	94.0	0.0 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	93.8	-0.2 ± 1.6
			4 kHz	93.1	-0.8 ± 1.6
			8 kHz	90.6	-3.0(+2.1 ; -3.1)
			12.5 kHz	87.5	-6.2(+3.0 ; -6.0)

Remarks :- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz : ± 0.35 dB
 250 Hz - 500 Hz : ± 0.30 dB
 1 kHz : ± 0.20 dB
 2 kHz - 4 kHz : ± 0.35 dB
 8 kHz : ± 0.45 dB
 12.5 kHz : ± 0.70 dB
 104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
 114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
- The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this Calibration Report 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 environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.



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: HK1107641
LABORATORY: HONG KONG
DATE RECEIVED: 04/04/2011
DATE OF ISSUE: 08/04/2011

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: Dissolved Oxygen, Salinity and Temperature
Description: Sonde
Brand Name: YSI
Model No.: YSI 600XL
Serial No.: 05C1607
Equipment No.: EL424
Date of Calibration: 06 April, 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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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
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Environmental 

www.alsglobal.com

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1107641
 Date of Issue: 08/04/2011
 Client: LAM GEOTECHNICS LIMITED
 Reference: --



Description: Sonde
 Brand Name: YSI
 Model No.: YSI 600XL
 Serial No.: 05C1607
 Equipment No.: EL424
 Date of Calibration: 06 April, 2011

Date of next Calibration: 06 July, 2011

Parameters:

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)
16.0	16.1	0.1
23.0	22.5	-0.6
39.5	39.5	0.0
Tolerance Limit (°C)		2.0

Dissolved Oxygen

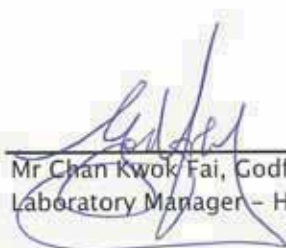
Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.88	4.94	0.06
6.06	5.90	-0.16
8.23	8.40	0.17
Tolerance Limit (±mg/L)		0.20

Salinity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.0	0.20	--
10.0	9.96	-0.4
20.0	19.98	-0.1
30.0	30.05	0.2
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.

WORK ORDER: HK1115453
LABORATORY: HONG KONG
DATE RECEIVED: 07/07/2011
DATE OF ISSUE: 13/07/2011

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: Conductivity, Dissolved Oxygen pH, Salinity and Temperature
Description: YSI Sonde
Brand Name: YSI
Model No.: YSI 600XL Sonde
Serial No.: 05C1607
Equipment No.: EL424
Date of Calibration: 11 July, 2011

NOTES

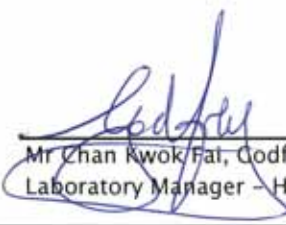
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Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd
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1-3 Wing Yip Street
Kwai Chung
HONG KONG

Phone: 852-2610 1044
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Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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Page 1 of 3

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1115453
 Date of Issue: 13/07/2011
 Client: LAM GEOTECHNICS LIMITED



Description: YSI Sonde
 Brand Name: YSI
 Model No.: YSI 600XL Sonde
 Serial No.: 05C1607
 Equipment No.: EL424
 Date of Calibration: 11 July, 2011 Date of next Calibration: 11 October, 2011

Parameters:

Conductivity

Method Ref: APHA (20th edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	156.0	6.2
6667	6276	-5.9
12890	12373	-4.0
58670	55520	-5.4
	Tolerance Limit (%)	10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
6.00	6.15	0.15
6.91	7.11	0.20
7.48	7.66	0.18
	Tolerance Limit (±mg/L)	0.20

pH Value

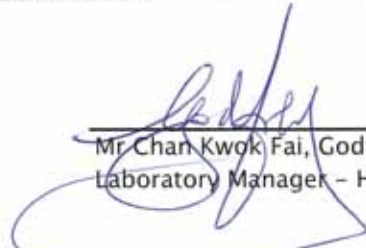
Method Ref: ALPHA (21st edition), 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.00	4.05	0.05
7.00	7.08	0.08
10.0	10.01	0.01
	Tolerance Limit (±unit)	0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
10.0	9.90	-1.0
20.0	19.80	-1.0
30.0	29.85	-0.5
	Tolerance Limit (±%)	10.0


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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1115453
Date of Issue: 13/07/2011
Client: LAM GEOTECHNICS LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: YSI 600XL Sonde
Serial No.: 05C1607
Equipment No.: EL424
Date of Calibration: 11 July, 2011

Date of next Calibration: 11 October, 2011

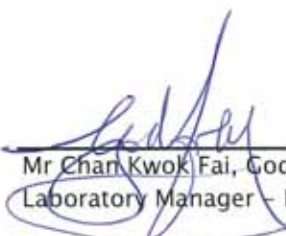
Parameters:

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)
10.9	10.95	0.0
23.5	23.50	0.0
35.5	36.24	0.7
	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: HK1107886
LABORATORY: HONG KONG
DATE RECEIVED: 07/04/2011
DATE OF ISSUE: 09/04/2011

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: pH, Dissolved Oxygen, Salinity and Temperature
Description: Sonde
Brand Name: YSI
Model No.: YSI Professional Plus
Serial No.: 10E100385
Equipment No.: N/A
Date of Calibration: 08 April, 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
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Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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Page 1 of 2

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ALS TECHNICHEM (HK) PTY LTD Part of the ALS Laboratory Group A Campbell Brothers Limited Company

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1107886
 Date of Issue: 09/04/2011
 Client: LAM GEOTECHNICS LIMITED
 Reference: --



Description: Sonde
 Brand Name: YSI
 Model No.: YSI Professional Plus
 Serial No.: 10E100385
 Equipment No.: N/A
 Date of Calibration: 08 April, 2011

Date of next Calibration: 08 July, 2011

Parameters:

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)
16.0	15.0	-1.0
23.5	22.8	-0.7
30.7	30.0	-0.7
Tolerance Limit (°C)		2.0

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.04	0.04
7.0	6.93	-0.07
10.0	9.85	-0.15
Tolerance Limit (±unit)		0.2

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
6.76	6.90	0.14
7.97	8.06	0.09
8.76	8.76	0.00
Tolerance Limit (±mg/L)		0.20

Salinity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.0	0.00	--
10.0	10.25	2.5
20.0	20.15	0.7
30.0	30.48	1.6
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: HK1113921
LABORATORY: HONG KONG
DATE RECEIVED: 20/06/2011
DATE OF ISSUE: 24/06/2011

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: Multimeter
Brand Name: WTW
Model No.: Multi 3430 Set G
Serial No.: 10410294
Equipment No.: --
Date of Calibration: 21 June, 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

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HONG KONG

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

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Page 1 of 2

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1113921
 Date of Issue: 24/06/2011
 Client: LAM GEOTECHNICS LIMITED



Description: Multimeter
 Brand Name: WTW
 Model No.: Multi 3430 Set G
 Serial No.: 10410294
 Equipment No.: --
 Date of Calibration: 21 June, 2011

Date of next Calibration: 21 September, 2011

Parameters:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
1.29	1.15	-0.14
4.56	4.59	0.03
7.90	7.94	0.04
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	4.166	0.166
7.0	7.158	0.158
10.0	9.950	-0.050
Tolerance Limit (\pm unit)		0.20

Salinity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.0	0.0	--
10.0	10.1	1.0
20.0	20.6	3.0
30.0	30.4	1.3
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)
15.0	14.9	-0.1
25.0	25.0	0.0
37.5	38.1	0.6
Tolerance Limit ($^{\circ}$ 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.
PROJECT: --

WORK ORDER: HK1116231
LABORATORY: HONG KONG
DATE RECEIVED: 07/07/2011
DATE OF ISSUE: 19/07/2011

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: Conductivity, Dissolved Oxygen pH, Salinity and Temperature
Description: YSI Sonde
Brand Name: YSI
Model No.: YSI Professional Plus
Serial No.: 10G101955
Equipment No.: N/A
Date of Calibration: 07 July, 2011

NOTES

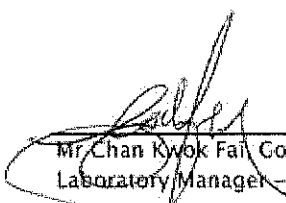
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ISSUING LABORATORY: HONG KONG

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1116231
 Date of Issue: 19/07/2011
 Client: LAM GEOTECHNICS LIMITED



Description: YSI Sonde
 Brand Name: YSI
 Model No.: YSI Professional Plus
 Serial No.: 10G101955
 Equipment No.: N/A
 Date of Calibration: 07 July, 2011 Date of next Calibration: 07 October, 2011

Parameters:

Conductivity

Method Ref: APHA (20th edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	147.9	0.7
6667	6568	-1.5
12890	12300	-4.6
58670	55033	-6.2
Tolerance Limit (%)		10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.01	5.16	0.15
6.45	6.63	0.18
7.50	7.46	-0.04
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)
4.00	4.14	0.14
7.00	7.19	0.19
10.0	9.98	-0.02
Tolerance Limit (±unit)		0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
10.0	10.57	5.7
20.0	20.52	2.6
30.0	30.85	2.8
Tolerance Limit (±%)		10.0


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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1116231
Date of issue: 19/07/2011
Client: LAM GEOTECHNICS LIMITED



Description: YSI Sonde
Brand Name: YSI
Model No.: YSI Professional Plus
Serial No.: 10G101955
Equipment No.: N/A
Date of Calibration: 07 July, 2011

Date of next Calibration: 07 October, 2011

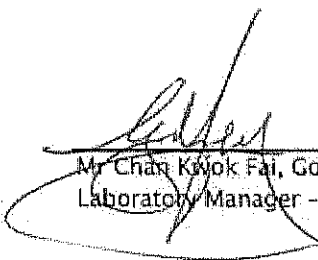
Parameters:

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	12.5	0.5
24.0	24.7	0.7
33.0	33.3	0.3
	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: HK1111265
LABORATORY: HONG KONG
DATE RECEIVED: 18/05/2011
DATE OF ISSUE: 24/05/2011

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.: 0300800032283
Equipment No.: --
Date of Calibration: 24 May, 2011

NOTES

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

ISSUING LABORATORY: HONG KONG

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Laboratory Manager - Hong Kong

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Page 1 of 2

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1111265
Date of Issue: 24/05/2011
Client: LAM GEOTECHNICS LIMITED



Description: Turbidimeter
Brand Name: HACH
Model No.: 2100P
Serial No.: 0300800032283
Equipment No.: --
Date of Calibration: 24 May, 2011


Date of next Calibration: 24 August, 2011

Parameters:

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.0	0.0	--
4.0	3.9	-3.0
40.0	40.3	0.7
80.0	87.9	9.9
400.0	421.0	5.3
800.0	861.0	7.6
	Tolerance Limit ($\pm\%$)	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

WORK ORDER: HK1110550
LABORATORY: HONG KONG
DATE RECEIVED: 11/05/2011
DATE OF ISSUE: 20/05/2011

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.: 1000032935
Equipment No.: EN06
Date of Calibration: 20 May, 2011

NOTES

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ISSUING LABORATORY: HONG KONG

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1110550
Date of Issue: 20/05/2011
Client: LAM GEOTECHNICS LIMITED



Description: Turbidimeter
Brand Name: HACH
Model No.: 2100P
Serial No.: 1000032935
Equipment No.: EN06
Date of Calibration: 20 May, 2011

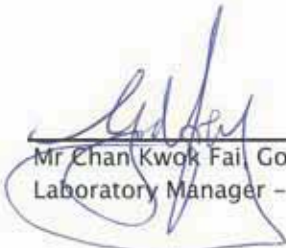
Date of next Calibration: 16 August, 2011

Parameters:

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.0	0.0	--
4.0	3.9	-2.0
40.0	36.3	-9.3
80.0	76.0	-5.0
400.0	376.0	-6.0
800.0	778.0	-2.8
	Tolerance Limit ($\pm\%$)	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

WORK ORDER: HK1114116
LABORATORY: HONG KONG
DATE RECEIVED: 22/06/2011
DATE OF ISSUE: 24/06/2011

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.: 930300002705
Equipment No.: --
Date of Calibration: 24 June, 2011

NOTES

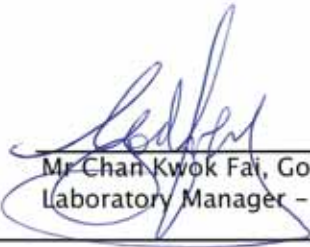
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ISSUING LABORATORY: HONG KONG

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1114116
Date of Issue: 24/06/2011
Client: LAM GEOTECHNICS LIMITED



Description: Turbidimeter
Brand Name: HACH
Model No.: 2100P
Serial No.: 930300002705
Equipment No.: --
Date of Calibration: 24 June, 2011


Date of next Calibration: 24 September, 2011

Parameters:

Turbidity

Method Ref: ALPHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.00	0.57	--
4.00	3.96	-1.0
40.0	41.9	4.8
80.0	81.3	1.6
400	428	7.0
800	850	6.3
	Tolerance Limit ($\pm\%$)	10.0


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong



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 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jun 28, 2010 Rootsmeter S/N 9833620 Ta (K) - 298
 Operator Tisch Orifice I.D. - 0005 Pa (mm) - 745.49

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	1.3860	3.2	2.00
2	NA	NA	1.00	0.9740	6.4	4.00
3	NA	NA	1.00	0.8730	7.9	5.00
4	NA	NA	1.00	0.8320	8.8	5.50
5	NA	NA	1.00	0.6850	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9767	0.7047	1.4006	0.9957	0.7184	0.8941
0.9725	0.9985	1.9808	0.9914	1.0179	1.2645
0.9704	1.1116	2.2146	0.9893	1.1332	1.4137
0.9693	1.1650	2.3227	0.9882	1.1877	1.4828
0.9641	1.4075	2.8013	0.9829	1.4349	1.7883
Qstd slope (m) = 1.99628			Qa slope (m) = 1.25003		
intercept (b) = -0.00699			intercept (b) = -0.00446		
coefficient (r) = 0.99995			coefficient (r) = 0.99995		
y axis = SQRT[H2O(Pa/760)(298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

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

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

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

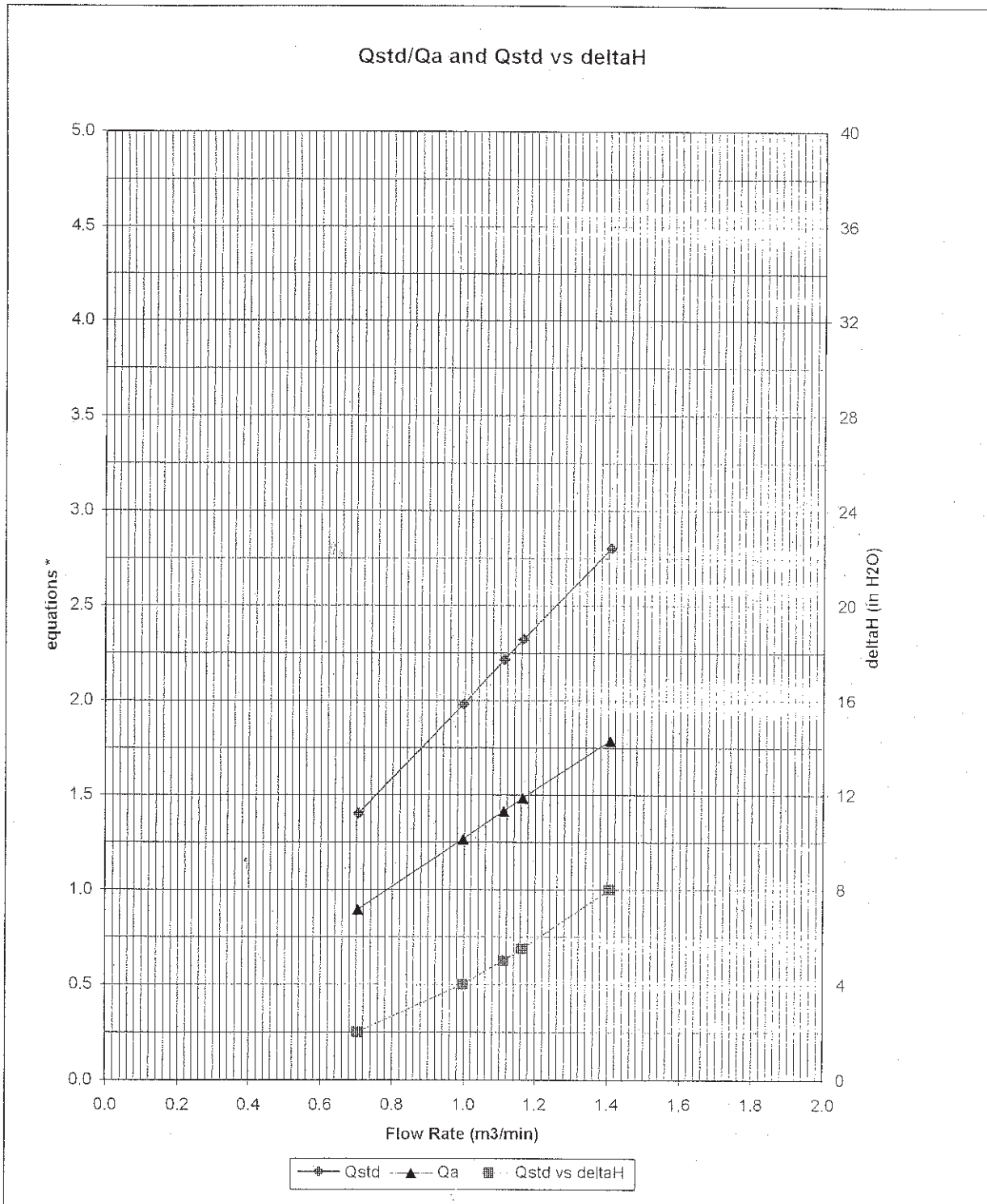
$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

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

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

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

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA1b
 Equipment no. : EL452

Calibration Date : 25-Jun-11
 Calibration Due Date : 25-Aug-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T_a	303	Kelvin	Pressure, P_a
			1015 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m_c	1.99628	Intercept, b_c	-0.00699
Last Calibration Date	28-Jun-10	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	28-Jun-11				

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	1.7684	59	58.5602
2	5.1	5.1	10.2	1.5914	52	51.6124
3	4.1	4.1	8.2	1.4273	44	43.6720
4	2.5	2.5	5.0	1.1153	31	30.7689
5	1.4	1.4	2.8	0.8355	19	18.8584

By Linear Regression of Y on X

Slope, m = 42.7572 Intercept, b = -16.9235
 Correlation Coefficient* = 0.9998
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam
 Date : 25-Jun-11

Checked by : Cherry Mak
 Date : 25-Jun-11



Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA2a
 Equipment no. : EL449

Calibration Date : 25-Jun-11
 Calibration Due Date : 25-Aug-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	303	Kelvin	Pressure, P _a
			1015 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m _c	1.99628	Intercept, b _c	-0.00699
Last Calibration Date	28-Jun-10	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	28-Jun-11				

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	1.7543	59	58.5602
2	5.0	5.0	10.0	1.5758	52	51.6124
3	3.8	3.8	7.6	1.3742	40	39.7019
4	2.4	2.4	4.8	1.0928	26	25.8062
5	1.4	1.4	2.8	0.8355	14	13.8956

By Linear Regression of Y on X

Slope, m = 49.6280 Intercept, b = -27.9168

Correlation Coefficient* = 0.9989

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam
 Date : 25-Jun-11

Checked by : Cherry Mak
 Date : 25-Jun-11

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA3a
 Equipment no. : EL888

Calibration Date : 25-Jun-11
 Calibration Due Date : 25-Aug-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T_a	303	Kelvin	Pressure, P_a
			1015 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m_c	1.99628	Intercept, b_c	-0.00699
Last Calibration Date	28-Jun-10	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	28-Jun-11				

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	5.3	5.3	10.6	1.6223	46	45.6571
2	4.4	4.4	8.8	1.4784	40	39.7019
3	3.4	3.4	6.8	1.3000	34	33.7466
4	2.0	2.0	4.0	0.9979	26	25.8062
5	1.3	1.3	2.6	0.8052	18	17.8658

By Linear Regression of Y on X

Slope, m = 32.5928 Intercept, b = -7.8845
 Correlation Coefficient* = 0.9969
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam
 Date : 25-Jun-11

Checked by : Cherry Mak
 Date : 25-Jun-11

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA4a
 Equipment no. : EL390

Calibration Date : 25-Jun-11
 Calibration Due Date : 25-Aug-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T_a	303	Kelvin	Pressure, P_a
			1015 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m_c	1.99628	Intercept, b_c	-0.00699
Last Calibration Date	28-Jun-10	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	28-Jun-11				

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	5.8	5.8	11.6	1.6969	56	55.5826
2	4.6	4.6	9.2	1.5116	50	49.6273
3	3.5	3.5	7.0	1.3190	43	42.6795
4	2.3	2.3	4.6	1.0699	34	33.7466
5	1.4	1.4	2.8	0.8355	25	24.8137

By Linear Regression of Y on X

Slope, m = 35.8192 Intercept, b = -4.7936
 Correlation Coefficient* = 0.9996
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam
 Date : 25-Jun-11

Checked by : Cherry Mak
 Date : 25-Jun-11

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA5a
 Equipment no. : EL380

Calibration Date : 25-Jun-11
 Calibration Due Date : 25-Aug-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T_a	303	Kelvin	Pressure, P_a
			1015 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m_c	1.99628	Intercept, b_c	-0.00699
Last Calibration Date	28-Jun-10	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	28-Jun-11				

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	6.0	6.0	12	1.7258	54	53.5975
2	4.7	4.7	9.4	1.5279	49	48.6348
3	3.6	3.6	7.2	1.3376	43	42.6795
4	2.1	2.1	4.2	1.0225	34	33.7466
5	1.5	1.5	3.0	0.8647	26	25.8062

By Linear Regression of Y on X

Slope, m = 31.5137 Intercept, b = 0.0608
 Correlation Coefficient* = 0.9945
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam
 Date : 25-Jun-11

Checked by : Cherry Mak
 Date : 25-Jun-11

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA6a
 Equipment no. : EL448

Calibration Date : 25-Jun-11
 Calibration Due Date : 25-Aug-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T_a	303	Kelvin	Pressure, P_a
			1015 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m_c	1.99628	Intercept, b_c	-0.00699
Last Calibration Date	28-Jun-10	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	28-Jun-11				

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	1.7684	57	56.5751
2	5.0	5.0	10.0	1.5758	51	50.6199
3	4.0	4.0	8.0	1.4098	45	44.6646
4	2.5	2.5	5.0	1.1153	36	35.7317
5	1.5	1.5	3.0	0.8647	24	23.8211

By Linear Regression of Y on X

Slope, m = 35.5685 Intercept, b = -5.6205
 Correlation Coefficient* = 0.9961
 Calibration Accepted = Yes/No**

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

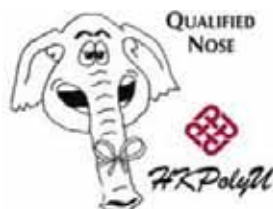
** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Lam
 Date : 25-Jun-11

Checked by : Cherry Mak
 Date : 25-Jun-11

Certificate for a Qualified Odour Panel Member



Odour Research Laboratory
The Hong Kong Polytechnic University,
Hung Hom, Kowloon, Hong Kong
Tel: (852) 2766 6016 Fax: (852) 2334 6389

09 June 2011

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 Oct 2010 – Apr 2011 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. The relevant data are shown as follows:

Ng Kin Hung	V_{ITE}	$10^{-3} V_{ITE}$	S_{ITE}	$10^{-3} S_{ITE}$	unit	20 Oct. 2010	17 Nov. 2010	8 Dec. 2010	22 Dec. 2010	21 Feb. 2011	9 Mar. 2011	18 Mar. 2011	3 Apr. 2011	14 Apr. 2011	20 Apr. 2011
		50.8			dilution	1334.4	932.6	704.8	932.6	1334.4	932.6	932.6	1334.4	932.6	932.6
					$\mu\text{mol} / \text{mol}$	37.9	54.3	71.8	54.3	37.9	54.3	54.3	37.9	54.3	54.3
	1.6961		0.0963	1.25	log $(\mu\text{mol} / \text{mol})$	1.5789	1.7345	1.8561	1.7345	1.5789	1.7345	1.7345	1.5789	1.7345	1.7345

Yours sincerely

Professor X. Z. Li
Odour Research Laboratory at PolyU

