

Certificate No. 06680	Page 1 of 4 Pages
Customer: Lam Geotechnics Limited	
Address : 11/F, Centre Point, 181-185 Glouceste	r Road, Wanchai, Hong Kong,
Order No.: Q02553	Date of receipt : 18-Nov-10
Item Tested	
Description : Precision Integrating Sound Level Met Manufacturer : ACO Model : Type 6224	er Serial No. : 050112
Test Conditions	
Date of Test: 19-Nov-10	Supply Voltage :
Ambient Temperature : $(23 \pm 3)^{\circ}C$	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 The results are shown in the attached page(s).	I Specification.
Main Test equipment used:	
Equipment No. Description Cert	No. Traceable to
S017A Multi-Function Generator 0080	04 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.

04062

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

.

S024

Approved by : Dorothy Cheuk

NIM-PRC & SCL-HKSAR

Date: 23-Nov-10

This Certificate is issued by: Hong Kong Calibration Ltd. Unit 88, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong, Tel: 2425 8801 Fax: 2425 8646

Sound Level Calibrator

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Calibration Certificate

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Results :

1. SPL Accuracy

UU	JT Setting			
Level Range (dB)	Weight	Time Const.	Applied Value (dB)	UUT Reading (dB)
20-100	LA	Fast	94.0	94.3
and the second se		Slow		94.3
	L _C	Fast		94,3
30-120	LA	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
	Lċ	Fast	· · · · · · · · · · · · · · · · · · ·	94.3

IEC 651 Type 1 Spec. : \pm 0.7 dB Uncertainty : \pm 0.1 dB

 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	Applied	UUT Rdg	Variation	IEC 651 Type 1 Spec.
(dB)	Value (dB)	(dB)	(dB)	(Primary Indicator Range)
140	114.0	114.5	+0.1	$\pm 0.7 \mathrm{dB}$
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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Calibration Certificate

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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 : $\pm 0.1 \text{ dB}$

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	$-16.1 \text{ dB}, \pm 1 \text{ dB}$
250 Hz	-8.7	$- 8.6 dB, \pm 1 dB$
500 Hz	-3.3	$- 3.2 dB, \pm 1 dB$
1 kHz	0.0 (Ref)	$0 dB, \pm 1 dB$
2 kHz	+1.3	$+ 1.2 \text{ dB}, \pm 1 \text{ dB}$
4 kHz	+0.9	$+ 1.0 \text{ dB}, \pm 1 \text{ dB}$
8 kHz	-1.2	- 1.1 dB, +1.5 dB ~ -3 dB
16 kHz	-5.8	$- 6.6 \text{ dB}, + 3 \text{ dB} \sim -\infty$

Uncertainty : $\pm 0.1 \text{ dB}$



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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	$\pm 0.5 \text{ dB}$
1/10 ²	40.0	39.9	'
1/10 ³	40,0	40.3	± 1,0 dB
1/104	40:0	40.3	

Uncertainty: $\pm 0.1 \text{ dB}$

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.

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Certificate No. 06681	Page 1 of 2 Pages
Customer: Lam Geotechnics Limited	
Address : 11/F, Centre Point, 181-185 Gloucester Roa	ad, 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 : $(23 \pm 3)^{\circ}C$	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 Toot og uinmont upod

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 :	Appro	oved by :	Desthi	
P. F. Wong			Dorothy Cheuk	
This Certificate is issued by: Hong Kong Calibration Ltd.	Date:	23-Nov-10		
Unit 68, 24/F., Well Fung Industrial Centre, No. 58276, Ta Chuen Ping Street Kwai Chung, NT Tel: 2425 6861 Fax: 2425 6646	,Hong Kong.			
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Calibration Certificate

Certificate No. 06681

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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 : $\pm 0.1 \text{ dB}$

2. Frequency

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

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

Level Stability : 0.0 dB IEC 942 Class 1 Spec. : ± 0.1 dB Uncertainty : ± 0.01 dB

 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 -----

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Certificate No.	12888		Page	1 of 4	4 Pages
Customer :	Lam Geotechnics Limited				
Address :	11/F., Centre Point, 181-185	Gloucester Road, \	Nanchai, Hong Kong	g	
Order No. :	Q10982		Date of receip	t :	25-May-11
Item Tested					
Description	: Precision Integrating Sound L	evel Meter			
Manufacturer	: Rion				
Model :	: NL-14		Serial No.	: 10303	3242
Test Condit	ions				
Date of Test :	26-May-11		Supply Voltag	le :	
Ambient Temp	EDITOR CONTRACTOR		Relative Humi		25) %
Test Specifi				- 186 M	
Calibration che					
	/Procedure: Z01.				
Rei. Document	Procedule. 201.				
Test Result	s				
	within the IEO CE4 Tune 4 or I	EC 904 Tupo 1 co	alfination ofter adju	etmont	
	within the IEC 651 Type 1 or I		scincation after adjus	stment.	
The results are	shown in the attached page(s	1-			
Main Test equi	pment used:				
Equipment No.		Cert. No.		Traceable	to
S017	Multi-Function Generator	C101623		SCL-HKS	AR
S024	Sound Level Calibrator	04062		NIM-PRC	& SCL-HKSAR
The values given i	n this Calibration Certificate only relate wance for the equipment long term dr	e to the values measure	ed at the time of the test	and any uncert	ainties quoted
overloading, mis-h	andling, or the capability of any other	laboratory to repeat the	measurement. Hong Ko	ong Calibration	Ltd. shall not be liable
for any loss or dan	nage resulting from the use of the equ	ipment.			
	t used for calibration are traceable to		Units (SI).		
The test results ap	oply to the above Unit-Under-Test only				
	1-			10	
Calibrated by	: lan		Approved by :	AlGa	
ALC SUPERIOR OF A	P. F. Wong			Alan Chu	
This Certificate is issued	225	1	Date: 26-May-11		
Hong Kong Calibration L Unit 88, 24/F., Well Fun	td. g Industrial Centre, No. 58-76, Ta Chuen Ping Stre	set, Kwai Chung, NT, Hong Kong	E .		
Tel: 2425 8801 Fax: 24	25 8646				

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Certificate No. 12888

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Results :

1. SPL Accuracy

	UUT Set	ting			UUT Rea	ding (dB)	
Level Range (dB)	Filter	Weight	Time Const.	Applied Value (dB)	Before adjust.	After adjust.	
40 – 100 OFI	OFF L _P Fast	Fast	94.00	677	94.1		
		LPA	Fast		*95.0	94.1	
		Slow		i ne	94.1		
	L _{PC} Fast	Fast			94.1		
60-120	OFF	Lp	Fast	94.00		94.1	
Allegat WhiteAl		L _{PA}	LPA	Fast	st	1370	94.0
			Slow			94.0	
		LPC	Fast		277	94.0	
60-120	OFF	Lp	Fast	114.00	1221	114.0	
PEDADO 1040407		PERSONAL PROPERTY AND ADDRESS	LPA	Fast	The second se	1.000	113.9
		4552	Slow	-		113.9	
		Lpc	Fast		((101 2)	113.9	

IEC 651 Type I Spec. : \pm 0.7 dB Uncertainty : \pm 0.2 dB

 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)	$0 \text{ dB}, \pm 1 \text{ dB}$
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 -----



Certificate	No. 12889		Page 1 of	2 Pages
Custome	r: 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 Test	ted			
Description	n : Sound Level Calibrator			
Manufactu	rer : Rion			
Model	: NC-73		Serial No. : 10-	465798
Test Con	ditions			
Date of Tes	st: 26-May-11		Supply Voltage :	
	emperature : (23 ± 3)°C		Relative Humidity : (50	0 ± 25) %
Test Spe	cifications			
Calibration	check			
	nent/Procedure : F21, Z02.			
Test Res	ults			
All results v	vere within the manufacturer's spo	ecification after adju	istment.	
	are shown in the attached page(an a		
Main Test e	equipment used:			
Equipment	No. Description	Cert. No.	Tracea	ble to
S014	Spectrum Analyzer	03926	NIM-PI	RC & SCL-HKSAR
S024	Sound Level Calibrator	04062	NIM-PI	RC & SCL-HKSAR
S041	Universal Counter	04461	SCL-H	KSAR
S206	Sound Level Meter	04462	SCL-H	KSAR
			2	
The values gi will not include	ven in this Calibration Certificate only rela e allowance for the equipment long term	ate to the values measure drift, variations with envir	ed at the time of the test and any un ronmental changes, vibration and sh	certainties quoted ock during transportation,
	nis-handling, or the capability of any othe	r laboratory to repeat the	e measurement. Hong Kong Calibra	tion Ltd. shall not be liable
		and the same of the same of the		
	r damage resulting from the use of the eq	luipment.		
for any loss o The test equip		o International System o	f Units (SI).	
for any loss o The test equip	r damage resulting from the use of the eq pment used for calibration are traceable to	o International System o	f Units (SI).	0
for any loss o The test equip	r damage resulting from the use of the equipment used for calibration are traceable to this apply to the above Unit-Under-Test on	o International System o	f Units (SI).	2

26-May-11

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

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Certificate No. 12889

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Results :

1. Level Accuracy (at 1 kHz)

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

Uncertainty : $\pm 0.2 \text{ dB}$

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 : $\pm 0.01 \text{ dB}$

 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 -----

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Certificate No.	13813	Pag	je 1 of 4 Pages
Customer :	Lam Geotechnics Limited		
Address :	11/F., Centre Point, 181-185 Glo	ucester Road, Wanchai, Hong Ko	ng
Order No. :	Q11569	Date of rece	i pt : 7-Jul-11
Item Tested		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,
Description :	Sound Level Meter		
Manufacturer :	B&K		
Model :	2250	Serial No.	: 2722310
Test Conditi	ons		
Date of Test :	8-Jul-11	Supply Volta	age :
Ambient Temp	erature : (23 ± 3)°C	Relative Hur	nidity:(50 ± 25) %
Test Specifi	cations		
Calibration chec Ref. Document/	k. Procedure: Z01.		
Test Results	•		
	within the IEC 651 Type 1, IEC 8 shown in the attached page(s).	04 Type 1 & IEC 1260 Class 1 sp	ecification.
	shown in the attached page(s).	04 Type 1 & IEC 1260 Class 1 sp	ecification.
The results are	shown in the attached page(s).	04 Type 1 & IEC 1260 Class 1 sp	ecification. <u>Traceable to</u>
The results are Main Test equip	shown in the attached page(s).		
The results are Main Test equip Equipment No.	shown in the attached page(s), ment used: <u>Description</u>	<u>Cert. No.</u>	Traceable to
The results are Main Test equip <u>Equipment No.</u> S017A	shown in the attached page(s). oment used: <u>Description</u> Multi-Function Generator	<u>Cert. No.</u> 07279	<u>Traceable to</u> SCL-HKSAR
The results are Main Test equip <u>Equipment No.</u> S017A	shown in the attached page(s). oment used: <u>Description</u> Multi-Function Generator	<u>Cert. No.</u> 07279	<u>Traceable to</u> SCL-HKSAR
The results are Main Test equip <u>Equipment No.</u> S017A	shown in the attached page(s). ment used: <u>Description</u> Multi-Function Generator Sound Level Calibrator	<u>Cert. No.</u> 07279	<u>Traceable to</u> SCL-HKSAR
The results are Main Test equip Equipment No. S017A S024 The values given in will not include allow overloading, mis-ha for any loss or dam	shown in the attached page(s). ment used: <u>Description</u> Multi-Function Generator Sound Level Calibrator this Calibration Certificate only relate to wance for the equipment long term drift, v	Cert. No. 07279 04062 the values measured at the time of the ter ariations with environmental changes, vib ratory to repeat the measurement. Hong ent.	<u>Traceable to</u> SCL-HKSAR NIM-PRC & SCL-HKSAR st and any uncertainties quoted ration and shock during transportation,

Calibrated by :

um P. F. Wong

Date: 8-Jul-11

Approved by :

Dorothy Cheuk

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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Certificate No. 13813

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Results :

1. SPL

	UUTS	Setting			
Range	Freq. Wgt.	Time Const.	Center Freq.	Applied Value (dB)	UUT Reading (dB)
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. : \pm 0.7 dB Uncertainty : \pm 0.2 dB

 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	$\pm 0.4 \text{ dB}$
	94.0	93.8 (Ref.)		
	95.0	94.8	0.0	± 0.2 dB

Uncertainty : $\pm 0.1 \text{ dB}$



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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)	$0 dB, \pm 1 dB$
2 kHz	+1.4	$+ 1.2 \text{ dB}, \pm 1 \text{ dB}$
4 kHz	+1.2	$+ 1.0 \text{ dB}, \pm 1 \text{ dB}$
8 kHz	-1.2	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-5.8	- 6.6 dB, + 3 dB ~ - ∞

Uncertainty : $\pm 0.1 \text{ dB}$

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	$\pm 0.5 \text{ dB}$
$1/10^{2}$	40.0	39.9	
1/10 ³	40.0	40.0	± 1.0 dB
1/104	40.0	40.0	

Uncertainty : $\pm 0.1 \text{ dB}$



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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 : $\pm 0.25 \text{ dB}$

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 : $\pm 0.25 \text{ dB}$

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 No.	13784		Pag	ge 1 of	4 Pages
Customer :	Lam Geotechnics Limited				······
Address :	11/F., Centre Point, 181-185	Gloucester Road, N	Nanchai, Hong Ko	ong	
Order No. :	Q11569		Date of rece	ipt :	6-Jul-11
Item Tested			4 4		
Description :	: Sound Level Meter				
Manufacturer :	: B&K				
Model :	2250		Serial No.	: 27223	311
Test Condit	ions				
Date of Test :	6-Jul-11		Supply Volta	ige :	
Ambient Temp	erature: (23 ± 3)°C			nidity : (50 ±	25) %
Test Specifi	cations		· · · · · · · · · · · · · · · · · · ·		
Calibration chee	rk				
	Procedure: Z01.				
Test Results	5				,
All results were	within the IEC 651 Type 1, IEC	C 804 Type 1 & IEC	1260 Class 1 spe	ecification.	
	shown in the attached page(s)				
Main Test equip	oment used [.]				
Equipment No.		Cert. No.		Traceable	to
S017	Multi-Function Generator	C101623		SCL-HKS/	
S024	Sound Level Calibrator	04062			& SCL-HKSAR
The values given in will not include allow	this Calibration Certificate only relate vance for the equipment long term dri	to the values measure ft, variations with enviro	d at the time of the tes	t and any uncerta	inties quoted
overloading, mis-ha	indling, or the capability of any other la	aboratory to repeat the	measurement. Hong k	Kong Calibration	Ltd. shall not be liable

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 :

U. P. F. Wond

for any loss or damage resulting from the use of the equipment.

Approved by : ____ Date: 6-Jul-11

This Certificate is issued by: Date of the provided of the pro

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Certificate No. 13784

Page 2 of 4 Pages

Results :

1. SPL

	UUT S	Setting			
Range	Freq. Wgt.	Time Const.	Center Freq.	Applied Value (dB)	UUT Reading (dB)
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. : \pm 0.7 dB Uncertainty : \pm 0.1 dB

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	$\pm 0.4 \text{ dB}$
	94.0	93.9 (Ref.)		
	95.0	95.0	+0.1	± 0.2 dB

Uncertainty : $\pm 0.1 \text{ dB}$



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	- $8.6 dB, \pm 1 dB$
500 Hz	-3.5	$- 3.2 \text{ dB}, \pm 1 \text{ dB}$
1 kHz	0.0 (Ref)	$0 dB, \pm 1 dB$
2 kHz	+1.1	$+ 1.2 dB, \pm 1 dB$
4 kHz	+1.1	$+ 1.0 \text{ dB}, \pm 1 \text{ dB}$
8 kHz	-1.3	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-5.9	$- 6.6 \text{ dB}, + 3 \text{ dB} \sim -\infty$

Uncertainty : $\pm 0.1 \text{ dB}$

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
1/104	40.0	40.0	

Uncertainty : $\pm 0.1 \text{ dB}$

1



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 : $\pm 0.25 \text{ dB}$

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	$+0.3 \sim -5.0$
1 kHz (Ref)		
1.122 kHz	-3.9	$+0.3 \sim -5.0$
1.296 kHz	-23.7	< - 17.5
1.887 kHz	-48.8	< - 42
3.070 kHz	-70.4	<- 61

Uncertainty : $\pm 0.25 \text{ dB}$

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 -----

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MS CHERRY MAK	WORK ORDER:	HK1115453
CLIENT:	LAM GEOTECHNICS LIMITED	LABORATORY:	HONG KONG
ADDRESS:	11/F., CENTRE POINT,	DATE RECEIVED:	07/07/2011
	181-185 GLOUCESTER ROAD,	DATE OF ISSUE:	13/07/2011
	WAN CHAI, HONG KONG.		
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 aceptance 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

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 Rwok/Fai, Godfrey Laboratory Manager - Hong Kong

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Work Order: Date of Issue: Client: HK1115453 13/07/2011 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		
	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
	Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
	Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
			No. of Concession
	6.00	6.15	0.15
			No. of Concession
	6.00 6.91	6.15 7.11	0.15 0.20
W- Loss	6.00 6.91 7.48	6.15 7.11 7.66 Tolerance Limit (±mg/L)	0.15 0.20 0.18
Value	6.00 6.91 7.48 Method Ref: ALPHA (21st edit	6.15 7.11 7.66 Tolerance Limit (±mg/L)	0.15 0.20 0.18

cxpected Reading (pri onit)	Displayed Reading (pri Oliti)	Tolerance (pri 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

(pected 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
	신지형 정말 정말 것이	10.0 9.90 20.0 19.80 30.0 29.85

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ALS Technichem (HK) Pty Ltd

ALS Environmental

Work Order: Date of Issue: Client:

HK1115453 13/07/2011 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
PROJECT:	

CUEDDVALV

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 aceptance 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

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 Kwøk Fai, Godfrey Manager Laboratory - Hong Kong

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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.:	1 <u>22</u>
Date of Calibration:	21 June, 2011

Date of next Calibration:

21 September, 2011

Parameters:

Dissolved Oxygen	Method Ref: APHA (21st edition), 45000: 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 (±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 (±unit)	0.20

Salinity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.0	0.0	1223
10.0	10.1	1.0
20.0	20.6	3.0
30.0	30.4	1.3
	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.

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
15.0	14.9	-0.1
25.0	25.0	0.0
37.5	38.1	0.6
	Tolerance Limit (°C)	2.0

Mr Chan Kwok Fai, Codfrey Laboratory Manager Hong Kong

ALS Technichem (HK) Pty Ltd



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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:	ng ng pana pana pana kana pana pana pana kana k

WORK ORDER:	HK1122321
LABORATORY:	HONG KONG
DATE RECEIVED:	22/09/2011
DATE OF ISSUE:	27/09/2011

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 aceptance criteria of ALS will be followed.

Scope of Test:	Dissolved Oxygen, pH, Salinity and Temperature
Description:	Multimeter
Brand Name:	WTW
Model No.:	Multi 3430
Serial No.:	10410294
Equipment No.:	
Date of Calibration:	23 September, 2011

NOTES

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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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Work Order:	HK1122321
Date of Issue:	27/09/2011
Client:	LAM GEOTECHNICS LIMITED



Description:	Multimeter
Brand Name:	WTW
Model No.:	Multi 3430
Serial No.:	10410294
Equipment No.:	
Date of Calibration:	23 September, 2011

Date of next Calibration:

23 December, 2011

Parameters:

1916 A. 2020 - 2010 - 2017 A. 201	Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
	4.76	4.71	-0.05
	5.89	5.83	-0.06
	7.82	7.82	0
		Tolerance Limit (±mg/L)	0.20

pH Value Method Re

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.125	0.125
7.0	7.050	0.050
10.0	9.991	-0.009
	Tolerance Limit (±unit)	0.20

Salinity

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

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)
0.0	0.0	
10.0	10.3	3.0
20.0	20.4	2.0
30.0	30.5	1.7
	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.

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)
11.0	10.7	-0.3
24.5	23.5	-1.0
50.0	49.2	-0.8
	Tolerance Limit (°C)	2.0

Mr Chan Kwok Fai, Godfrey Laboratory Manager - Hong Kong

ALS Technichem (HK) Pty Ltd



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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MS CHERRY MAK
CLIENT:	LAM GEOTECHNICS LIMITED
ADDRESS:	11/F., CENTRE POINT,
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	WAN CHAI, HONG KONG.
PROIFCT	

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

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 aceptance 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

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: Fax: Email:

852-2610 1044 852-2610 2021 hongkong@alsglobal.com

Godfrey Mr Chan Kwok Fai Laboratory Manager - Hong Kong

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Work Order: Date of Issue: Client: HK1116231 19/07/2011 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
-		Bate of next campiation.	07 October, 2011

Parameters:

	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
olved Oxygen	Mathod Poft APUA (21st aditio	an) 45000 C	
olveu oxygen	Method Ref: APHA (21st edition Expected Reading (mg/L)	Displayed Reading (mg/L)	Talaranas (ma /l)
	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
	1 1		
		Tolerance Limit (±mg/L)	0.20
			0.20
'alue	Method Ref: ALPHA (21st edit	ion), 4500H:B	
/alue	Method Ref: ALPHA (21st editi Expected Reading (pH Unit)	ion), 4500H:B	
'alue		ion), 4500H:B	Tolerance (pH unit)
'alue	Expected Reading (pH Unit)	ion), 4500H:B Displayed Reading (pH Unit)	Tolerance (pH unit) 0.14
'alue	Expected Reading (pH Unit) 4.00	ion), 4500H:B Displayed Reading (pH Unit) 4.14	Tolerance (pH unit)
'alue	Expected Reading (pH Unit) 4.00 7.00	ion), 4500H:B Displayed Reading (pH Unit) 4.14 7.19	Tolerance (pH unit) 0.14 0.19
	Expected Reading (pH Unit) 4.00 7.00 10.0	ion), 4500H:B Displayed Reading (pH Unit) 4.14 7.19 9.98 Tolerance Limit (±unit)	Tolerance (pH unit) 0.14 0.19 -0.02
'alue ity	Expected Reading (pH Unit) 4.00 7.00	ion), 4500H:B Displayed Reading (pH Unit) 4.14 7.19 9.98 Tolerance Limit (±unit)	Tolerance (pH unit) 0.14 0.19 -0.02
	Expected Reading (pH Unit) 4.00 7.00 10.0 Method Ref: APHA (21st edition Expected Reading (ppt)	ion), 4500H:B Displayed Reading (pH Unit) 4.14 7.19 9.98 Tolerance Limit (±unit) on), 2520B Displayed Reading (ppt)	Tolerance (pH unit) 0.14 0.19 -0.02 0.20 Tolerance (%)
	Expected Reading (pH Unit) 4.00 7.00 10.0 Method Ref: APHA (21st edition Expected Reading (ppt) 10.0	ion), 4500H:B Displayed Reading (pH Unit) 4.14 7.19 9.98 Tolerance Limit (±unit) on), 2520B Displayed Reading (ppt) 10.57	Tolerance (pH unit) 0.14 0.19 -0.02 0.20 Tolerance (%) 5.7
	Expected Reading (pH Unit) 4.00 7.00 10.0 Method Ref: APHA (21st edition Expected Reading (ppt)	ion), 4500H:B Displayed Reading (pH Unit) 4.14 7.19 9.98 Tolerance Limit (±unit) on), 2520B Displayed Reading (ppt)	Tolerance (pH unit) 0.14 0.19 -0.02 0.20 Tolerance (%)

Mr Chan Kwok Fai, Oodfrey Laboratory Manager - Hong Kong

ALS Technichem (HK) Pty Ltd ALS Environmental

Work Order: Date of Issue: Client: HK1116231 19/07/2011 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 ALS Environmental



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:	HK1118564
LABORATORY:	HONG KONG
DATE RECEIVED:	08/08/2011
DATE OF ISSUE:	10/08/2011

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 aceptance criteria of ALS will be followed.

Scope of Test:	Turbidity
Description:	Turbidimeter
Brand Name:	HACH
Model No.:	2100P
Serial No.:	931000003861
Equipment No.:	EL148
Date of Calibration:	09 August, 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 Pai, Godfrey Laboratory/Manager - Hong Kong

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Work Order: Date of Issue: Client: HK1118564 10/08/2011 LAM GEOTECHNICS LIMITED



1

Date of next Calibration:

09 November, 2011

Parameters:

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.00	0.09	1045
4.00	3.77	-5.8
40.0	38.2	-4.5
80.0	79.8	-0.3
400	401	0.3
800	827	3.4
	Tolerance Limit (±%)	10.0

Mr Chan Kwpk Fai, Godfrey Laboratory Manager - Hong Kong

ALS Technichem (HK) Pty Ltd ALS Environmental



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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:	HK1114116
LABORATORY:	HONG KONG
DATE RECEIVED:	22/06/2011
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 aceptance 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

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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Work Order: Date of Issue: Client: HK1114116 24/06/2011 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 (±%)	10.0

Mr Chan Kwok Fail Godfrey Laboratory Manager - Hong Kong

ALS Technichem (HK) Pty Ltd ALS Environmental



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: --

HK1118564
HONG KONG
08/08/2011
10/08/2011

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 aceptance criteria of ALS will be followed.

Scope of Test:	Turbidity
Description:	Turbidimeter
Brand Name:	HACH
Model No.:	2100P
Serial No.:	931000003861
Equipment No.:	EL148
Date of Calibration:	09 August, 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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Work Order: Date of Issue: Client: HK1118564 10/08/2011 LAM GEOTECHNICS LIMITED



Description:	Turbidimeter		
Brand Name:	HACH		
Model No.:	2100P		
Serial No.:	931000003861		
Equipment No.:	EL148		
Date of Calibration:	09 August, 2011		

Date of next Calibration:

09 November, 2011

Parameters:

5 083 D 75 888 98 7 .	Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
	0.00	0.09	
	4.00	3.77	-5.8
	40.0	38.2	-4.5
	80.0	79.8	-0.3
	400	401	0.3
	800	827	3.4
		Tolerance Limit (±%)	10.0

Mr Chan Kwok Fai, Godfrey Laboratory Manager - Hong Kong

ALS Technichem (HK) Pty Ltd ALS Environmental



TISCH ENVIROMENTAL, INC. 145 SOUTH MIAMI AVE. VILLAGE OF CLEVES, OH 45002 513.467.9000 877.263.7610 TOLL FREE 513.467.9009 FAX WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Ji Operator	ul 11, 2011 Tisch	Rootsmeter Orifice I.I		0438320 0005	Ta (K) - Pa (mm) -	298 749.3
PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1 2 3 4 5	NA NA NA NA NA	NA NA NA NA	1.00 1.00 1.00 1.00 1.00	1.3710 0.9730 0.8690 0.8300 0.6860	3.2 6.4 7.9 8.8 12.8	2.00 4.00 5.00 5.50 8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
Reference - Destant		a non sense sonon son				in monon monor morem
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 slop intercep coefficie	t (b) =	2.01593 -0.03978 0.99999		Qa slop intercep coeffici	t (b) =	1.26234 -0.02526 0.99999
y axis =	SQRT [H20 (1	Pa/760) (298/'	[Ta)]	y axis =	SQRT [H2O (Fa/Pa)]

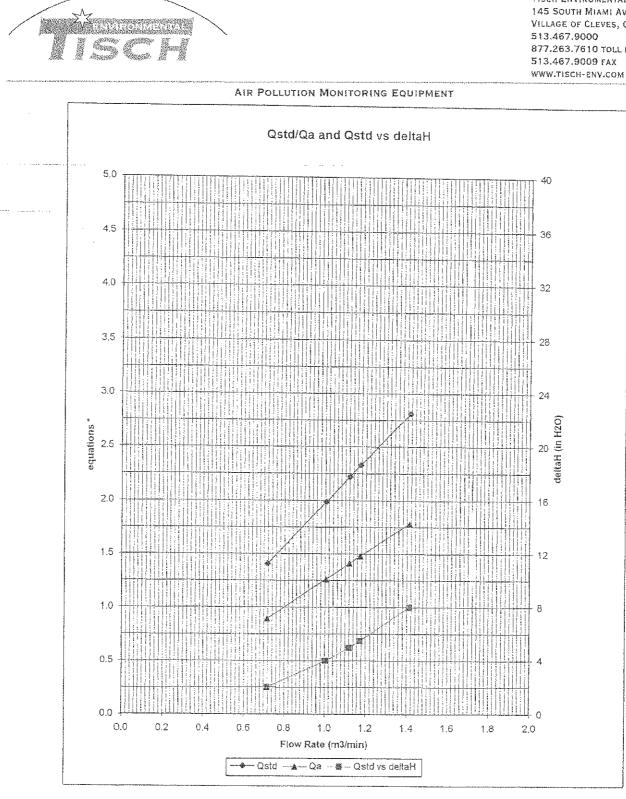
CALCULATIONS

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

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

For subsequent flow rate calculations:

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



* y-axis equations: Qstd series:

Qa series:

$$\sqrt{\Delta H \left(\frac{Pa}{Pstd}\right) \left(\frac{Tstd}{Ta}\right)}$$
$$\sqrt{(\Delta H (Ta / Pa))}$$

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Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA1b	Calbration Date	:	23-Aug-11
Equipment no.	:	EL452	Calbration Due Date	:	23-Oct-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

				Ambient Co	ondition				
Temperature, T _a		305		Kelvin	Pressure, P _a	l		1010	mmHg
			Orifice Tra	ansfer Stan	dard Informa	tion			
Equipment No.		EL086		Slope, m _c	2.015	93	Intercept, bo	c	-0.03978
Last Calibration Date		11-Jul-11 $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$							
Next Calibration Date		11-Jul-12	2	$= m_c \times Q_{std} + b_c$					
Calibration of RSP									
Calibration	Ма	Manometer Reading Q _{std} Continuous Flow IC						IC	
Point	H (H (inches of water)		(m ³	(m ³ / min.) Recorder			(W(P _a /1013	.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-axis
1	6.4	6.4	12.8	1.	7711		61	6	0.1977
2	5.2	5.2	10.4	1.	5984		54	5	3.2897
3	4.0	4.0	8.0	1.4	4043		46	4	5.3950
4	2.5	2.5	5.0	1.	1143		35	3	4.5396
5	1.4	1.4	2.8	0.8	8389		21	2	0.7238
By Linear Regression of Y	on X								
	Slope, m	=	41.7	132	In	tercept, b	=	13.2921	
Correlation C	oefficient*	=	0.99	985					
Calibration	Accepted	=	Yes/	Vo**					

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

Remarks :							
Calibrated by	:	Sam Lam		Checked by	:	Cherry Mak	
Date	:	23-Aug-11	-	Date	:	23-Aug-11	



Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA2a	Calbration Date	:	23-Aug-11
Equipment no.	:	EL449	Calbration Due Date	:	23-Oct-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

				Ambient Co	ondition				
Temperature, T _a		305		Kelvin	Pressure, P _a			1010	mmHg
			Orifice Tra	ansfer Stan	dard Informa	tion			
Equipment No.		EL086		Slope, m _c	2.015	93	Intercept, bo	c	-0.03978
Last Calibration Date		11-Jul-11 $(H \times P_a / 1013.3 \times 298 / T_a)^{-1}$					/ T _a) ^{1/2}		
Next Calibration Date		11-Jul-12	2		=	m_c >	$(Q_{std} + b_c)$		
			(Calibration	of RSP				
Calibration	Ma	Manometer Reading Q std Continuous Flow IC							IC
Point	H (inches of water)		(m ³ / min.) Recorde			order, W	(W(P _a /1013	.3x298/T _a) ^{1/2} /35.31)	
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-axis
1	6.3	6.3	12.6	1.	7574		52	5	51.3161
2	5.0	5.0	10.0	1.	5677		45	4	4.4081
3	3.8	3.8	7.6	1.3	3693		37	3	6.5133
4	2.4	2.4	4.8	1.0	0922		27	2	26.6449
5	1.5	1.5	3.0	0.8	8676		14	1	3.8159
By Linear Regression of Y	on X								
	Slope, m	=	41.1	960	In	tercept, b	=2	20.2858	
Correlation C	oefficient*	=	0.99	959					
Calibration	Accepted	=	Yes/ł	No**					

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

Remarks :							
Calibrated by	:	Sam Lam	_	Checked by	:	Cherry Mak	
Date	:	23-Aug-11	_	Date	:	23-Aug-11	
Date	·	20-Aug-11	-	Date	·	20-Aug-11	



Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	СМАЗа	Calbration Date	:	23-Aug-11
Equipment no.	:	EL888	Calbration Due Date	:	23-Oct-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

			ļ	Ambient Co	ondition					
Temperature, T _a		305		Kelvin	Pressure, P _a	I		1010	mmHg	
			Orifice Tra	Insfer Stan	dard Informa	tion				
Equipment No.		EL086		Slope, m _c	2.015	93	Intercept, b	c	-0.03978	
Last Calibration Date		11-Jul-11			(Hx	P _a / 10	13.3 x 298	/ T _a) ^{1/2}		
Next Calibration Date		11-Jul-12	2		=	m_c)	$(Q_{std} + b_c)$			
	Calibration of RSP									
Calibration	Ma	nometer Re	eading	c	Q _{std}	Contir	uous Flow		IC	
Point	Н ((inches of water)		(m ³	(m ³ / min.) Recorder, W			(W(P _a /101	3.3x298/T _a) ^{1/2} /35.31)	
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-axis	
1	5.4	5.4	10.8	1.0	6285		46		45.3950	
2	4.3	4.3	8.6	1.4	4553		41		40.4607	
3	3.5	3.5	7.0	1.3	3149		35		34.5396	
4	2.3	2.3	4.6	1.0	0696		26		25.6580	
5	1.5	1.5	3.0	0.8	8676		18		17.7632	
By Linear Regression of Y	on X									
	Slope, m	=	36.7	801	In	tercept, b	= -	13.8439		
Correlation C	oefficient*	=	0.99	988						
Calibration	Accepted	=	Yes/	\o **						

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

Remarks :							
Calibrated by	:	Sam Lam		Checked by	:	Cherry Mak	
Date	:	23-Aug-11	-	Date	:	23-Aug-11	



Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA4a	Calbration Date	:	23-Aug-11
Equipment no.	:	EL390	Calbration Due Date	:	23-Oct-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

				Ambient Co	ondition				
Temperature, T _a		305		Kelvin	Pressure, P _a	l		1010	mmHg
			Orifice Tra	insfer Stan	dard Informa	tion			
Equipment No.		EL086		Slope, m _c	2.015	93	Intercept, bo		-0.03978
Last Calibration Date		11-Jul-11 $(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$							
Next Calibration Date		11-Jul-12	2	$= m_c \times Q_{std} + b_c$					
			(Calibration	of RSP				
Calibration	Ma	anometer Reading Q std Continuous Flow IC						IC	
Point	H (inches of water)		vater)	(m ³	(m ³ / min.) Recorde			(W(P _a /1013.	3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-	axis	(CFM)	Y	∕-axis
1	5.8	5.8	11.6	1.0	6870		54	5	3.2897
2	4.5	4.5	9.0	1.4	4883		48	4	7.3687
3	3.5	3.5	7.0	1.3	3149		41	4	0.4607
4	2.3	2.3	4.6	1.0	0696		31	3	0.5923
5	1.4	1.4	2.8	0.8	8389		21	2	0.7238
By Linear Regression of Y	on X								
	Slope, m	=	38.8	337	In	tercept, b	=1	11.2100	
Correlation C	oefficient*	=	0.99	982					
Calibration	Accepted	=	Yes/	\o **					

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

Remarks :						
Calibrated by	:	Sam Lam		Checked by	:	Cherry Mak
Date	:	23-Aug-11	-	Date	:	23-Aug-11



Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	СМА5а	Calbration Date	:	23-Aug-11
Equipment no.	:	EL380	Calbration Due Date	:	23-Oct-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

	Ambient Condition										
Temperature, T _a		305		Kelvin	Pressure, P _a			1010	mmHg		
			Orifice Tra	Insfer Stan	dard Informa	tion					
Equipment No.		EL086		Slope, m _c	2.015	93	Intercept, bo	ntercept, bc -0.0397			
Last Calibration Date		11-Jul-11	l	(H x P _a / 1013.3 x 298 / T _a) ^{1/2}							
Next Calibration Date		11-Jul-12	2		=	m _c x	$x Q_{std} + b_c$				
			(Calibration	of RSP						
Calibration	Ma	nometer Re	eading	C	Q std	Contin	uous Flow		IC		
Point	Н (inches of v	vater)	(m ³ / min.)		Recorder, W		(W(P _a /1013.3x298/T _a) ^{1/2} /35.3 ⁻			
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-axis		
1	5.8	5.8	11.6	1.0	6870		54	5	3.2897		
2	4.6	4.6	9.2	1.	5045		49	4	8.3555		
3	3.6	3.6	7.2	1.3	3333		43	4	2.4344		
4	2.3	2.3	4.6	1.0	.0696 34		1.0696 34		3	3.5528	
5	1.5	1.5	3.0	0.8	8676		27	2	6.6449		
By Linear Regression of Y	on X										
	Slope, m	=	32.8	954	In	tercept, b	=	1.6589			
Correlation C	oefficient*	=	0.99	993							
Calibration	Accepted	=	Yes/	Vo**							

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

Remarks :						
Calibrated by	:	Sam Lam	_	Checked by	:	Cherry Mak
Date	:	23-Aug-11	_	Date	:	23-Aug-11
Date	·	20-Aug-11	-	Date	·	20-Aug-11



Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	СМА6а	Calbration Date	:	23-Aug-11
Equipment no.	:	EL448	Calbration Due Date	:	23-Oct-11

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition												
Temperature, T _a		305		Kelvin	Pressure, P _a	I		1010	mmHg			
			Orifice Tra	insfer Stan	dard Informa	tion						
Equipment No.	EL086 Slope, m _c 2.01593 Intercept, b					Intercept, be	-0.03978					
Last Calibration Date		11-Jul-11	1	(H x P _a / 1013.3 x 298 / T _a) ^{1/2}								
Next Calibration Date		11-Jul-12	2		=	m_c >	$\langle Q_{std} + b_c$					
	Calibration of RSP											
Calibration	Ма	nometer Re	eading	c	Q _{std}	Contin	uous Flow		IC			
Point	H (inches of water)		(m ³	/ min.) Record		order, W	er, W (W(P _a /1013.3x298/T					
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-axis			
1	6.0	6.0	12.0	1.	7155		56	;	55.2634			
2	4.8	4.8	9.6	1.	5365		51	ļ	50.3292			
3	3.7	3.7	7.4	1.3	3514		44	4	43.4213			
4	2.4	2.4	4.8	1.0	0922		35	:	34.5396			
5	1.4	1.4	2.8	0.8	8389		24	:	23.6843			
By Linear Regression of Y	on X											
	Slope, m	=	36.0	920	In	tercept, b	= -	5.7206				
Correlation C	oefficient*	=	0.99	978								
Calibration	Accepted	=	Yes/	Vo**								

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

Remarks :						
Calibrated by	:	Sam Lam	Checked by	:	Cherry Mak	
Date	:	23-Aug-11	Date	:	23-Aug-11	



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

1st September 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 during May and August 2011 and the data of his screening tests are shown below:

dilution 890,2 1102.9 1366.3 1102.9 890,2 1102.9 1366.3 1102.9													
	У _{ITE} 10 ^У ITE	SITE 10 ^{SITE}	SITE 10 ^{SITE} unit	17-May-11	26-May-11	08-Jun-11	20-Jun-11	24-Jun-11	05-Jul-11	14-Jul-11	13-Aug-11	16-Aug-11	22-Aug-11
47.4 umpl/mpl E6.9 4E.0 4E.0 27.0 4E.0 E6.9 4E.0 27.0 4E.0			dilution	890.2	1102.9	1102.9	1366.3	1102.9	890.2	1102.9	1366.3	1102.9	890.2
47.4 µmor/mor 50.6 45.9 45.9 57.0 45.9 50.6 45.9 57.0 45.9	47.4		µmol / mo	56.8	45.9	45.9	37.0	45.9	56.8	45.9	37.0	45.9	56.8
1.6709 0.0686 1.17 log10 (µmol / mol) 1.7547 1.6616 1.6616 1.5686 1.6616 1.7547 1.6616 1.5686 1.6616 1.7547	1.6709	0.0686 1.17	0.0686 1.17 log ₁₀ (μmol / 1	nol) 1.7547	1.6616	1.6616	1.5686	1.6616	1.7547	1.6616	1.5686	1.6616	1.7547

Results demonstrated that his odour threshold of n-butanol in nitrogen gas was found to be in the range of 20 - 80 ppb/v and a standard deviation of R < 2.3. 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 for a valid period of three months from today until 30^{th} November 2011.

Yours sincerely



li Xiampthy

Professor X. Z. Li Odour Research Laboratory The Hong Kong Polytechnic University