



Calibration Certificate

Certificate No. **33624**

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Customer : Lam Geotechnics Limited

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

Order No. : Q31494

Date of receipt : 30-May-13

Item Tested

Description : Digital Sound Level Meter

Manufacturer : B&K

Model : Type 2236

Serial No. : 2100736

Test Conditions

Date of Test : 3-Jun-13

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	C127181	SCL-HKSAR
S024	Sound Level Calibrator	30620	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 : 
Liam Wong

Approved by : 
Dorothy Cheuk

Date: 3-Jun-13



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Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range	Parameter	Frequency Wt.	Freq. Response		
20 - 100	SPL	dBA	F	94.0	93.8
			S		93.8
		dBC	F		93.8
		dBL	F		93.9
		1 kHz	F		93.8
40 - 120	SPL	dBA	F	94.0	93.9
		1 kHz	F		93.9
	SPL	dBA	F	114.0	113.8
			S		113.8
		dBC	F		113.9
		dBL	F		113.9
1 kHz	F	113.8			

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 : ± 0.1 dB

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	0.0	± 0.7 dB
130	104.0	103.9	0.0	
120	94.0	93.9 (Ref.)	--	
110	84.0	83.9	0.0	
100	74.0	73.9	0.0	
100	64.0	63.9	0.0	
100	54.0	53.9	0.0	

Uncertainty : ± 0.1 dB



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3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	83.9	0.0	± 0.4 dB
	94.0	93.9 (Ref.)	- -	
	95.0	94.9	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	-39.6	- 39.4 dB, ± 1.5 dB
63 Hz	-26.4	- 26.2 dB, ± 1.5 dB
125 Hz	-16.3	- 16.1 dB, ± 1 dB
250 Hz	-8.8	- 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	+1.2	+ 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	-6.8	- 6.6 dB, + 3 dB ~ -∞

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	40.0	--
1/10	40.0	39.9	± 0.5 dB
1/10 ²	40.0	39.8	
1/10 ³	40.0	39.7	± 1.0 dB
1/10 ⁴	40.0	39.5	

Uncertainty : ± 0.1 dB



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6. Filter Response

Filter Setting	Attenuation (dB)	IEC 1260 Class 1 Spec.
125 Hz	-63.6	< - 61
250 Hz	-44.8	< - 42
500 Hz	-21.0	< - 17.5
707 Hz	-3.7	- 2 ~ - 5
1 kHz (Ref.)	0.0 (Ref.)	--
1.414 kHz	-4.1	- 2 ~ - 5
2 kHz	-21.4	< - 17.5
4 kHz	-45.0	< - 42
8 kHz	-63.9	< - 61

Uncertainty : ± 0.2 dB

Remark : 1. UUT : Unit-Under-Test

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

3. Atmospheric Pressure : 996 hPa

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

----- END -----



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Customer : Lam Geotechnics Limited

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

Order No. : Q31610

Date of receipt : 21-Jun-13

Item Tested

Description : Sound Level Calibrator

Manufacturer : Rion

Model : NC-73

Serial No. : 10707358

Test Conditions

Date of Test : 25-Jun-13

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

Test Results

All results were within the manufacturer's specification.


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


Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	30259	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	30620	NIM-PRC & SCL-HKSAR
S041	Universal Counter	28347	SCL-HKSAR
S206	Sound Level Meter	30655	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 : 
Liam Wong

Approved by : 
Dorothy Cheuk

Date: 25-Jun-13

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

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Results :

1. Level Accuracy (at 1 kHz)

UUT Nominal Value	Measured Value	Mfr's Spec.
94 dB	93.88 dB	± 1 dB

Uncertainty : ± 0.2 dB

2. Frequency Accuracy

UUT Nominal Value	Measured Value	Mfr's Spec.
1 kHz	0.995 kHz	± 2 %

Uncertainty : ± 0.1 %

3. Level Stability : 0.0 dB

Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 0.2 %

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 were the mean of 3 measurements.

4. Atmospheric Pressure : 999 hPa

----- END -----



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AIR POLLUTION MONITORING EQUIPMENT
 ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jul 15, 2013 Roots-meter S/N 0438320 Ta (K) - 300
 Operator Tisch Orifice I.D. - 0005 Pa (mm) - 759.46

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.3910	3.2	2.00
2	NA	NA	1.00	0.9830	6.4	4.00
3	NA	NA	1.00	0.8800	7.9	5.00
4	NA	NA	1.00	0.8380	8.8	5.50
5	NA	NA	1.00	0.6930	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9884	0.7106	1.4090	0.9958	0.7159	0.8888
0.9843	1.0013	1.9926	0.9916	1.0087	1.2570
0.9822	1.1161	2.2278	0.9895	1.1244	1.4054
0.9811	1.1708	2.3365	0.9884	1.1795	1.4740
0.9760	1.4084	2.8180	0.9832	1.4188	1.7777
Qstd slope (m) = 2.01968			Qa slope (m) = 1.26469		
intercept (b) = -0.02746			intercept (b) = -0.01732		
coefficient (r) = 0.99999			coefficient (r) = 0.99999		
y axis = $\text{SQRT}[\text{H}_2\text{O}(\text{Pa}/760)(298/\text{Ta})]$			y axis = $\text{SQRT}[\text{H}_2\text{O}(\text{Ta}/\text{Pa})]$		

CALCULATIONS

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

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

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

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

For subsequent flow rate calculations:

$$\text{Qstd} = 1/m \{ [\text{SQRT}(\text{H}_2\text{O}(\text{Pa}/760)(298/\text{Ta}))] - b \}$$

$$\text{Qa} = 1/m \{ [\text{SQRT}(\text{H}_2\text{O}(\text{Ta}/\text{Pa}))] - b \}$$



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA1b
 Equipment no. : EL452

Calibration Date : 17-Jul-13
 Calibration Due Date : 17-Sep-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1010 mmHg

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

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.2	6.2	12.4	1.7416	61	60.1977
2	5.1	5.1	10.2	1.5808	53	52.3029
3	4.1	4.1	8.2	1.4188	46	45.3950
4	2.5	2.5	5.0	1.1110	32	31.5791
5	1.4	1.4	2.8	0.8349	21	20.7238

By Linear Regression of Y on X						
Slope, m	=	43.5073	Intercept, b	=	-16.1479	
Correlation Coefficient*	=	0.9994				
Calibration Accepted	=	Yes/No**				

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam
 Date : 17-Jul-13

Checked by : Derek Lo
 Date : 17-Jul-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA1b Calibration Date : 16-Sep-13
 Equipment no. : EL452 Calibration Due Date : 16-Nov-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	304	Kelvin	Pressure, P _a
			1008 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01968
		Intercept, b _c	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	15-Jul-14		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7214	61	60.2369
2	5.1	5.1	10.2	1.5751	52	51.3495
3	4.1	4.1	8.2	1.4137	45	44.4370
4	2.5	2.5	5.0	1.1069	31	30.6122
5	1.5	1.5	3.0	0.8605	20	19.7498

By Linear Regression of Y on X

Slope, m = 46.1726 Intercept, b = -20.3866
 Correlation Coefficient* = 0.9987
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Checked by : Derek Lo
 Date : 16-Sep-13 Date : 16-Sep-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA2a
 Equipment no. : EL449

Calibration Date : 17-Jul-13
 Calibration Due Dat : 17-Sep-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1010 mmHg

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

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7276	59	58.2240
2	5.0	5.0	10.0	1.5654	51	50.3292
3	4.2	4.2	8.4	1.4359	43	42.4344
4	2.5	2.5	5.0	1.1110	26	25.6580
5	1.5	1.5	3.0	0.8637	14	13.8159

By Linear Regression of Y on X						
Slope, m	=	51.8624	Intercept, b	=	-31.4400	
Correlation Coefficient*	=	0.9996				
Calibration Accepted	=	Yes/No**				

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam
 Date : 17-Jul-13

Checked by : Derek Lo
 Date : 17-Jul-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA2a Calibration Date : 16-Sep-13
 Equipment no. : EL449 Calibration Due Date : 16-Nov-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	304	Kelvin	Pressure, P _a
			1008 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01968
		Intercept, b _c	-0.02746
Last Calibration Date	15-Jul-13	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	15-Jul-14		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7214	58	57.2744
2	5.1	5.1	10.2	1.5751	50	49.3745
3	4.2	4.2	8.4	1.4307	43	42.4621
4	2.5	2.5	5.0	1.1069	28	27.6497
5	1.4	1.4	2.8	0.8317	16	15.7998

By Linear Regression of Y on X

Slope, m = 46.3065 Intercept, b = -23.2217
 Correlation Coefficient* = 0.9993
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Checked by : Derek Lo
 Date : 16-Sep-13 Date : 16-Sep-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA3a
 Equipment no. : EL333

Calibration Date : 22-Aug-13
 Calibration Due Dat : 22-Oct-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1010 mmHg

Orifice Transfer Standard Information					
Equipment No.	EL086	Slope, m _c	2.01968	Intercept, b _c	-0.02746
Last Calibration Date	15-Jul-13	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	15-Jul-14				

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	5.8	5.8	11.6	1.6778	58	57.2371
2	4.8	4.8	9.6	1.5275	49	48.3555
3	4.0	4.0	8.0	1.3956	42	41.4476
4	2.4	2.4	4.8	1.0841	25	24.6712
5	1.6	1.6	3.2	0.8877	14	13.8159

By Linear Regression of Y on X

Slope, m = 54.5515 Intercept, b = -34.6041

Correlation Coefficient* = 0.9999

Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Henry
 Date : 22-Aug-13

Checked by : Derek Lo
 Date : 22-Aug-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA4a
 Equipment no. : EL390

Calibration Date : 17-Jul-13
 Calibration Due Date : 17-Sep-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1010 mmHg

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

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.0	6.0	12.0	1.7135	61	60.1977
2	5.0	5.0	10.0	1.5654	54	53.2897
3	4.1	4.1	8.2	1.4188	46	45.3950
4	2.5	2.5	5.0	1.1110	31	30.5923
5	1.5	1.5	3.0	0.8637	19	18.7501

By Linear Regression of Y on X

Slope, m = 48.9540 Intercept, b = -23.6832
 Correlation Coefficient* = 0.9999
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam
 Date : 17-Jul-13

Checked by : Derek Lo
 Date : 17-Jul-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA4a Calibration Date : 16-Sep-13
 Equipment no. : EL390 Calibration Due Date : 16-Nov-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	304	Kelvin	Pressure, P _a
			1008 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01968
		Intercept, b _c	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	15-Jul-14		

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	1.7353	62	61.2244
2	5.1	5.1	10.2	1.5751	52	51.3495
3	4.1	4.1	8.2	1.4137	44	43.4495
4	2.5	2.5	5.0	1.1069	29	28.6372
5	1.6	1.6	3.2	0.8882	17	16.7873

By Linear Regression of Y on X

Slope, m = 51.4211 Intercept, b = -28.8125
 Correlation Coefficient* = 0.9993
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Checked by : Derek Lo
 Date : 16-Sep-13 Date : 16-Sep-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA5a Calibration Date : 17-Jul-13
 Equipment no. : EL380 Calibration Due Date : 17-Sep-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1010 mmHg

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

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7276	61	60.1977
2	4.9	4.9	9.8	1.5498	53	52.3029
3	4.0	4.0	8.0	1.4016	46	45.3950
4	2.4	2.4	4.8	1.0888	31	30.5923
5	1.5	1.5	3.0	0.8637	20	19.7369

By Linear Regression of Y on X

Slope, m = 46.9543 Intercept, b = -20.6306
 Correlation Coefficient* = 0.9999
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Checked by : Derek Lo
 Date : 17-Jul-13 Date : 17-Jul-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA5a Calibration Date : 16-Sep-13
 Equipment no. : EL380 Calibration Due Date : 16-Nov-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	304	Kelvin	Pressure, P _a
			1008 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01968
		Intercept, b _c	-0.02746
Last Calibration Date	15-Jul-13	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	15-Jul-14		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7214	61	60.2369
2	5.1	5.1	10.2	1.5751	53	52.3370
3	4.1	4.1	8.2	1.4137	45	44.4370
4	2.4	2.4	4.8	1.0848	30	29.6247
5	1.5	1.5	3.0	0.8605	20	19.7498

By Linear Regression of Y on X

Slope, m = 46.6426 Intercept, b = -20.8083
 Correlation Coefficient* = 0.9994
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Checked by : Derek Lo
 Date : 16-Sep-13 Date : 16-Sep-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : MA1e Calibration Date : 17-Jul-13
 Equipment no. : EL455 Calibration Due Date : 17-Sep-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1010 mmHg

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

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7276	63	62.1714
2	5.1	5.1	10.2	1.5808	54	53.2897
3	4.0	4.0	8.0	1.4016	44	43.4213
4	2.8	2.8	5.6	1.1749	31	30.5923
5	1.9	1.9	3.8	0.9703	20	19.7369

By Linear Regression of Y on X

Slope, m = 55.9477 Intercept, b = -34.8651
 Correlation Coefficient* = 0.9998
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Checked by : Derek Lo
 Date : 17-Jul-13 Date : 17-Jul-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : MA1e Calibration Date : 16-Sep-13
 Equipment no. : EL455 Calibration Due Date : 16-Nov-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	304	Kelvin	Pressure, P _a
			1008 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01968
		Intercept, b _c	-0.02746
Last Calibration Date	15-Jul-13	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	15-Jul-14		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7214	62	61.2244
2	5.1	5.1	10.2	1.5751	53	52.3370
3	4.1	4.1	8.2	1.4137	44	43.4495
4	2.7	2.7	5.4	1.1498	30	29.6247
5	1.9	1.9	3.8	0.9667	21	20.7373

By Linear Regression of Y on X

Slope, m = 53.4418 Intercept, b = -31.4912
 Correlation Coefficient* = 0.9993
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam Checked by : Derek Lo
 Date : 16-Sep-13 Date : 16-Sep-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : MA1w
 Equipment no. : EL080

Calibration Date : 17-Jul-13
 Calibration Due Date : 17-Sep-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	305	Kelvin	Pressure, P _a
			1010 mmHg

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

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.2	6.2	12.4	1.7416	59	58.2240
2	5.1	5.1	10.2	1.5808	50	49.3424
3	4.2	4.2	8.4	1.4359	42	41.4476
4	2.5	2.5	5.0	1.1110	26	25.6580
5	1.5	1.5	3.0	0.8637	15	14.8027

By Linear Regression of Y on X

Slope, m = 49.3800 Intercept, b = -28.5998
 Correlation Coefficient* = 0.9990
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam
 Date : 17-Jul-13

Checked by : Derek Lo
 Date : 17-Jul-13



Lam Geotechnics Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location : MA1w
 Equipment no. : EL080

Calibration Date : 16-Sep-13
 Calibration Due Date : 16-Nov-13

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition			
Temperature, T _a	304	Kelvin	Pressure, P _a
			1008 mmHg

Orifice Transfer Standard Information			
Equipment No.	EL086	Slope, m _c	2.01968
		Intercept, b _c	-0.02746
Last Calibration Date	15-Jul-13	$\left(H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$	
Next Calibration Date	15-Jul-14		

Calibration of RSP						
Calibration Point	Manometer Reading			Q _{std} (m ³ / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P _a /1013.3x298/T _a) ^{1/2} /35.31) Y-axis
	(up)	(down)	(difference)			
1	6.1	6.1	12.2	1.7214	61	60.2369
2	5.1	5.1	10.2	1.5751	53	52.3370
3	4.2	4.2	8.4	1.4307	45	44.4370
4	2.5	2.5	5.0	1.1069	29	28.6372
5	1.4	1.4	2.8	0.8317	16	15.7998

By Linear Regression of Y on X

Slope, m = 49.8280 Intercept, b = -26.1389
 Correlation Coefficient* = 0.9995
 Calibration Accepted = Yes/No**

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

** Delete as appropriate.

Remarks : _____

Calibrated by : Sam
 Date : 16-Sep-13

Checked by : Derek Lo
 Date : 16-Sep-13