

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Ho Fung College
Calibration Date: 11-Jun-08
Calibration Due Date: 11-Aug-08
Time: 17:28

Sampler Model:	BM2000HX
Serial No.:	4994
Calibrator Orifice no.:	517N
Slope (m):	2.02953
Intercept (b):	-0.01939
Correction coeff. (r):	0.9999

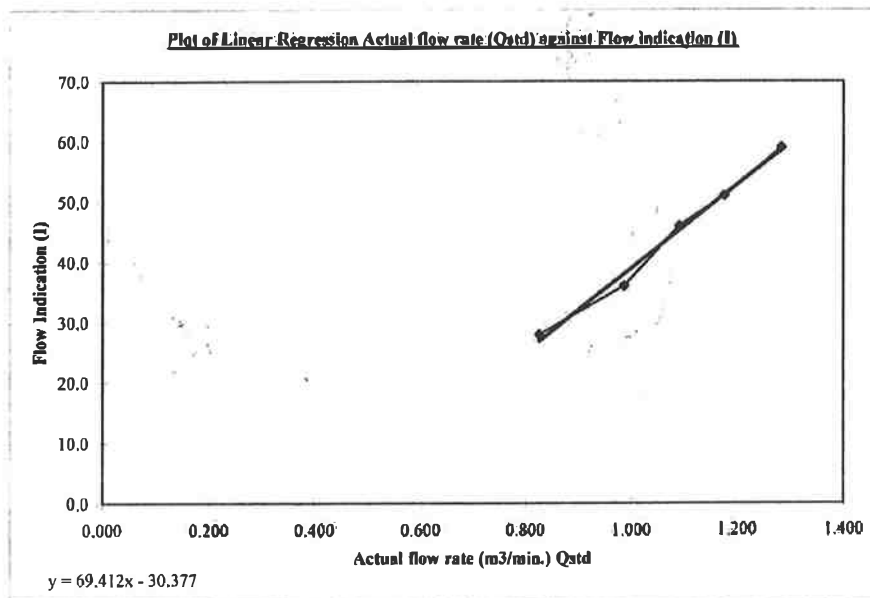
Standard pressure (mmHg) Pstd:	756.9
Standard temp. (K) Tstd:	297.18
Calibration pressure (mmHg) Pa:	756.5
Calibration temp. (K) Ta:	303.7

$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	6.8	2.582	1.282	59.0
2	5.7	2.364	1.175	51.0
3	4.9	2.192	1.090	48.0
4	4.0	1.981	0.985	38.0
5	2.8	1.657	0.826	28.0

Correlation Coefficient : 0.9950



Remark
 1HPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming
 (*[Signature]*)

Date: 12-6-08

Checked by: Tang Hiu Yeung
 (*[Signature]*)

Date: 12-6-08

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Ho Fung College
Calibration Date: 15-Aug-08
Calibration Due Date: 15-Oct-08
Time: 17:28

Sampler Model:	BM2000HX
Serial No.:	4994
Calibrator Orifice no.:	517N
Slope (m):	2.02953
Intercept (b):	-0.01939
Correction coeff. (r)	0.9999

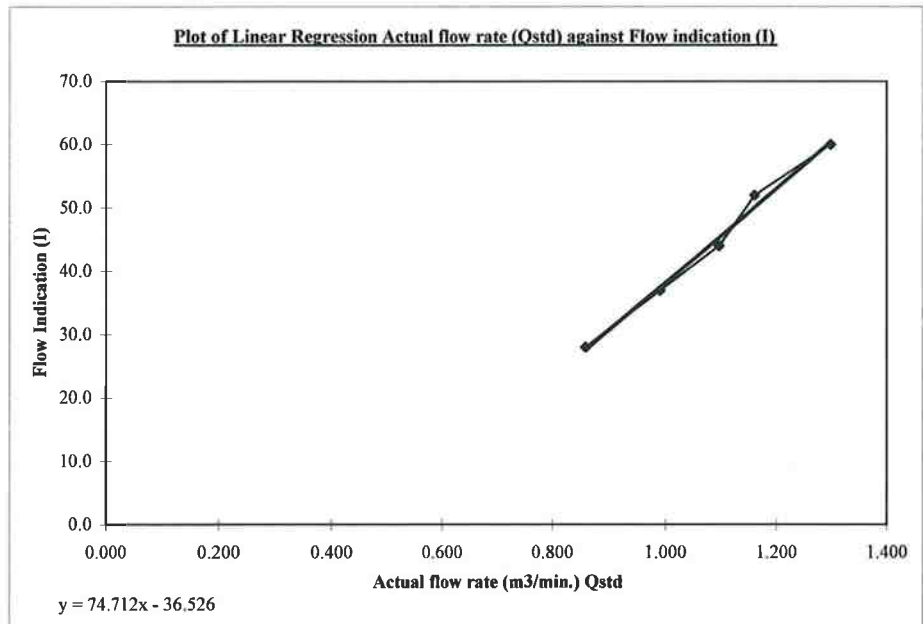
Standard pressure (mmHg) Pstd:	756.9
Standard temp. (K) Tstd:	297.18
Calibration pressure (mmHg) Pa:	755.5
Calibration temp. (K) Ta:	300.2

$$Flow (corrected) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	6.9	2.615	1.298	60.0
2	5.5	2.334	1.160	52.0
3	4.9	2.203	1.095	44.0
4	4.0	1.991	0.990	37.0
5	3.0	1.724	0.859	28.0


Correlation Coefficient : 0.9954



Remark
 1HPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming
 ()

Date: 18. 8. 08

Checked by: Tang Hiu Yeung
 ()

Date: 18. 8. 08

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
 Monitoring Location: Long Beach Garden
 Calibration Date: 11-Jun-08
 Calibration Due Date: 11-Aug-08
 Time: 15:40

Sampler Model:	TE5005X
Serial No.:	0390
Calibrator Orifice no.:	517N
Slope (m):	2.02953
Intercept (b):	-0.01939
Correction coeff. (r):	0.9999

$$Flow(\text{corrected}) = \sqrt{H \times \frac{P_a}{P_{std}} \times \frac{T_{std}}{T_a}}$$

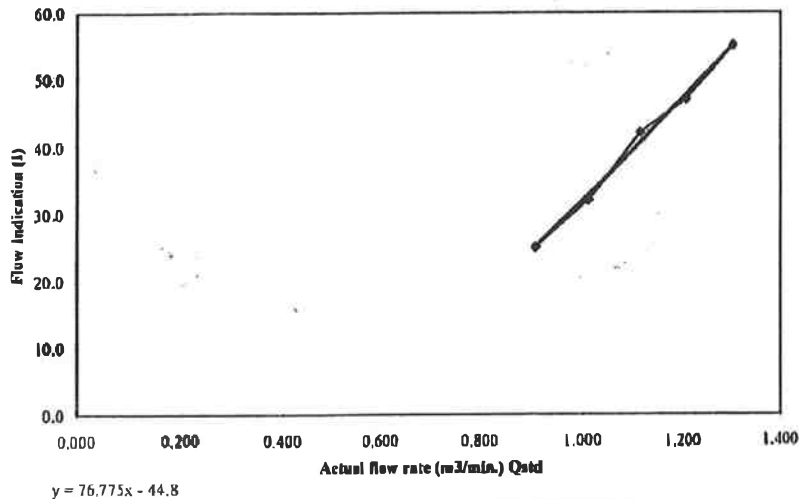
Standard pressure (mmHg) P _{std} :	756.9
Standard temp. (K) T _{std} :	297.18
Calibration pressure (mmHg) P _a :	756.5
Calibration temp. (K) T _a :	303.7

$$Q_{std} = \frac{1}{m} \times \left(\sqrt{H \times \frac{P_a}{P_{std}} \times \frac{T_{std}}{T_a}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Q _{std}), m ³ /min	Flow indication (I), arbitrary
1	7.0	2.620	1.301	55.0
2	6.0	2.426	1.205	47.0
3	5.1	2.236	1.112	42.0
4	4.2	2.030	1.010	32.0
5	3.4	1.826	0.909	25.0

Correlation Coefficient: 0.9972

Plot of Linear Regression Actual flow rate (Q_{std}) against Flow Indication (I)



Remark
 IHPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming Date: 12-1-08

Checked by: Tang Hiu Yeung Date: 12-6-08

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Long Beach Gardan
Calibration Date: 15-Aug-08
Calibration Due Date: 15-Oct-08
Time: 15:40

Sampler Model:	TE5005X
Serial No.:	0390
Calibrator Orifice no.:	517N
Slope (m):	2.02953
Intercept (b):	-0.01939
Correction coeff. (r)	0.9999

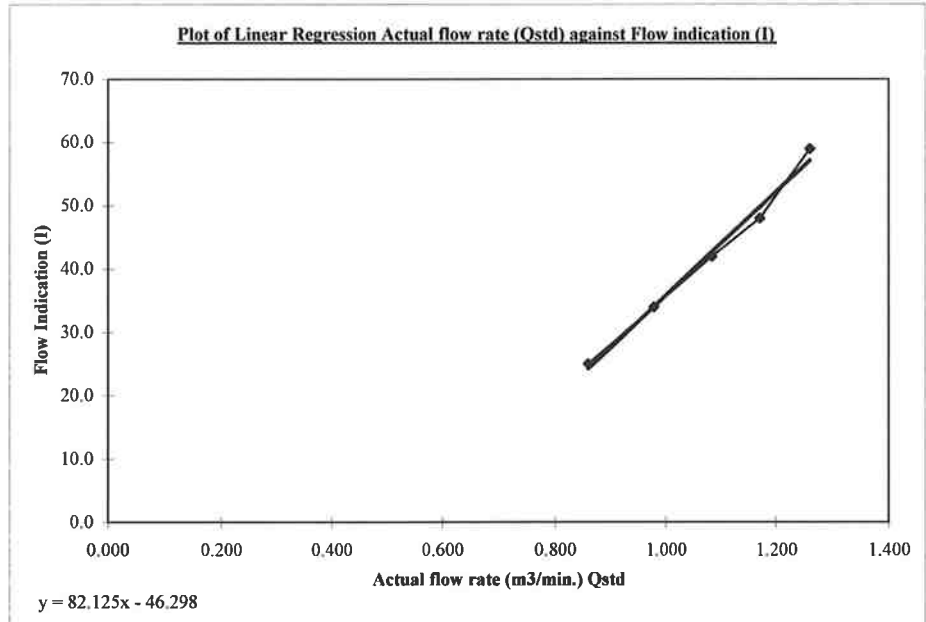
Standard pressure (mmHg) Pstd:	756.9
Standard temp. (K) Tstd:	297.18
Calibration pressure (mmHg) Pa:	755.5
Calibration temp. (K) Ta:	300.2

$$Flow\ (corrected) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	6.5	2.538	1.260	59.0
2	5.6	2.356	1.170	48.0
3	4.8	2.181	1.084	42.0
4	3.9	1.966	0.978	34.0
5	3.0	1.724	0.859	25.0


Correlation Coefficient : 0.9943



Remark
 1HPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming
 ()

Date: 18.8.08

Checked by: Tang Hiu Yeung
 ()

Date: 18.8.08

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Greenview Terrace
Calibration Date: 11-Jun-08
Calibration Due Date: 11-Aug-08
Time: 16:28

Sampler Model:	TE5005X
Serial No.:	0646
Calibrator Orifice no.:	517N
Slope (m):	2.02953
Intercept (b):	-0.01939
Correction coeff. (r)	0.9999

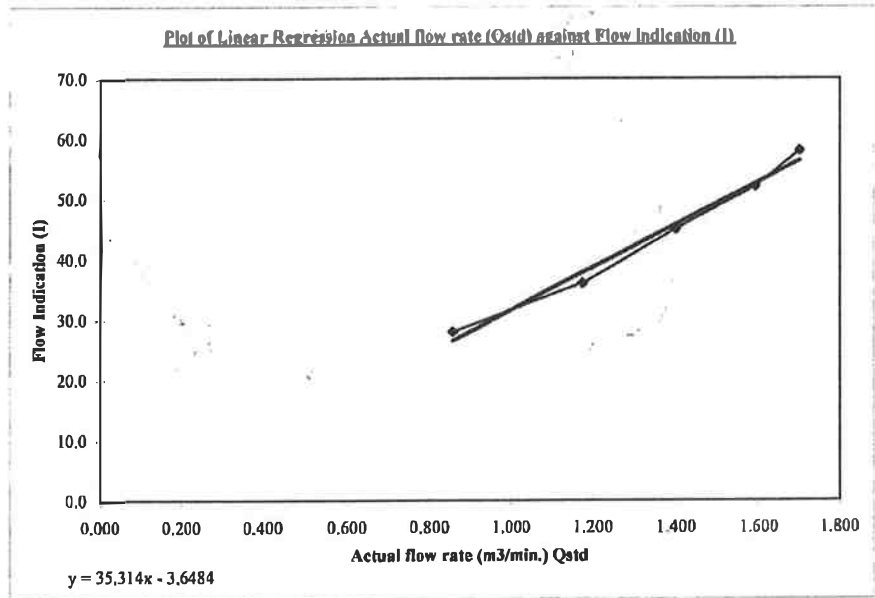
Standard pressure (mmHg) Pstd:	756.9
Standard temp. (K) Tstd:	297.18
Calibration pressure (mmHg) Pa:	756.5
Calibration temp. (K) Ta:	303.7

$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	12.0	3.431	1.700	58.0
2	10.5	3.209	1.591	52.0
3	8.1	2.818	1.398	45.0
4	5.7	2.364	1.175	36.0
5	3.0	1.715	0.855	28.0

Correlation Coefficient : 0.9923



Remark
 IHPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming

Date: 12-6-08

Checked by: Tang Hiu Yeung

Date: 12-6-08

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Greenview Terrance
Calibration Date: 15-Aug-08
Calibration Due Date: 15-Oct-08
Time: 16:28

Sampler Model:	TE5005X
Serial No.:	0646
Calibrator Orifice no.:	517N
Slope (m):	2.02953
Intercept (b):	-0.01939
Correction coeff. (r)	0.9999

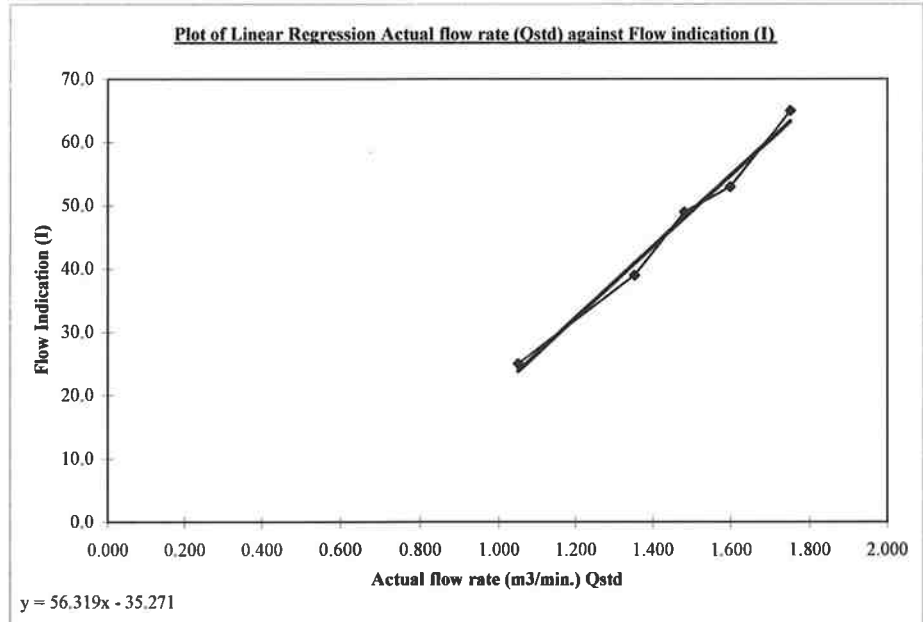
Standard pressure (mmHg) Pstd:	756.9
Standard temp. (K) Tstd:	297.18
Calibration pressure (mmHg) Pa:	755.5
Calibration temp. (K) Ta:	300.2

$$Flow\ (corrected) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	12.6	3.533	1.751	65.0
2	10.5	3.225	1.599	53.0
3	9.0	2.986	1.481	49.0
4	7.5	2.726	1.353	39.0
5	4.5	2.112	1.050	25.0

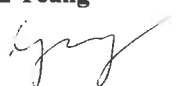
Correlation Coefficient : 0.9936



Remark
 1HPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming
 ()

Date: 18.8.08

Checked by: Tang Hiu Yeung
 ()

Date: 18.8.08

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Heng Hoi Chi Hong Ship Temple
Calibration Date: 11-Jun-08
Calibration Due Date: 11-Aug-08
Time: 08:28

Sampler Model:	BM2000HX
Serial No.:	5875
Calibrator Orifice no.:	517N
Slope (m):	2.02953
Intercept (b):	-0.01939
Correction coeff. (r):	0.9999

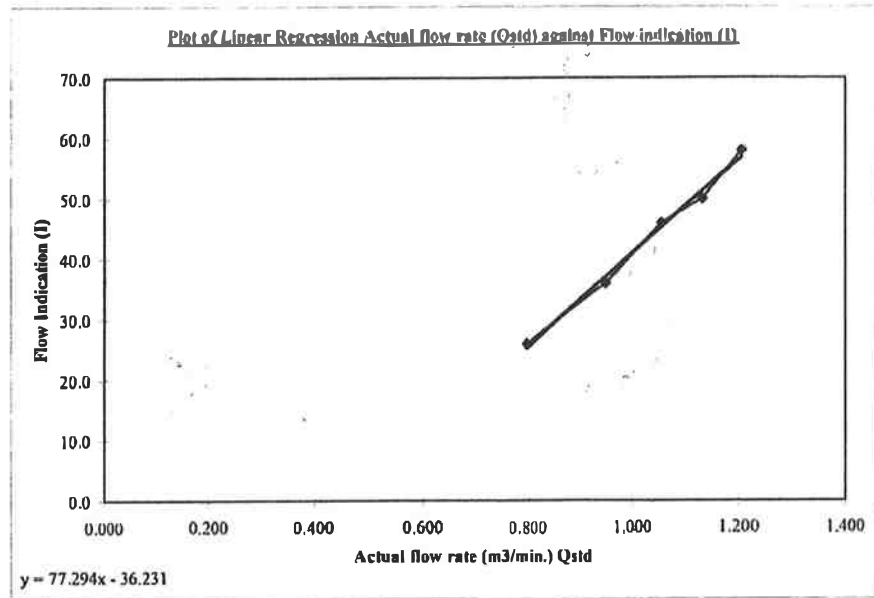
$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

Standard pressure (mmHg) Pstd:	756.9
Standard temp. (K) Tstd:	297.18
Calibration pressure (mmHg) Pa:	756.5
Calibration temp. (K) Ta:	303.7


$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	6.0	2.426	1.205	58.0
2	5.3	2.280	1.133	50.0
3	4.6	2.124	1.056	46.0
4	3.7	1.905	0.948	38.0
5	2.6	1.597	0.796	28.0


Correlation Coefficient : 0.9960



Remark
 IHPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming
 ()

Date: 12/6/08

Checked by: Tang Hiu Yeung
 ()

Date: 12/6/08

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Heng Hoi Chi Hong Ship Temple
Calibration Date: 15-Aug-08
Calibration Due Date: 15-Oct-08
Time: 08:28

Sampler Model:	BM2000HX
Serial No.:	5875
Calibrator Orifice no.:	517N
Slope (m):	2.02953
Intercept (b):	-0.01939
Correction coeff. (r)	0.9999

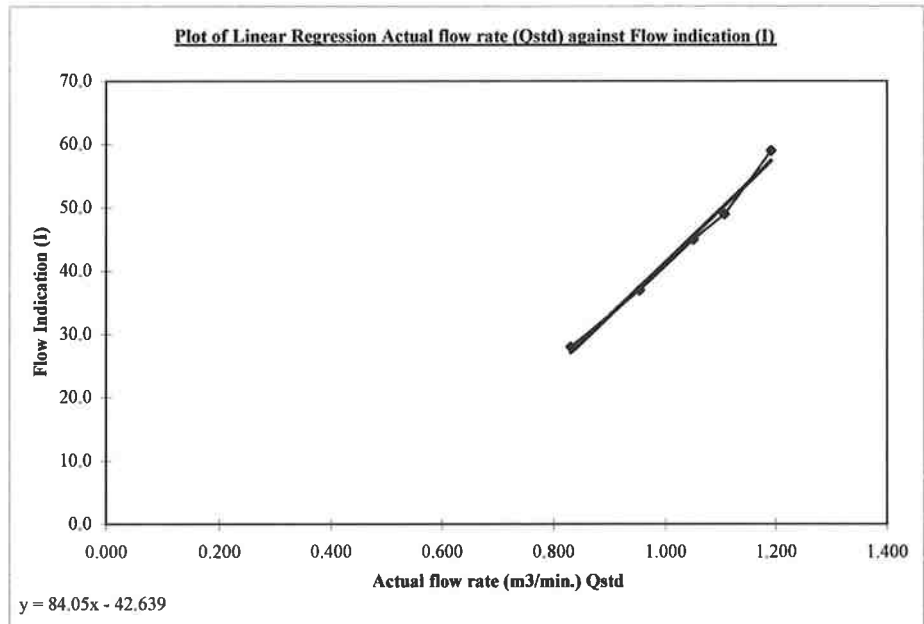
Standard pressure (mmHg) Pstd:	756.9
Standard temp. (K) Tstd:	297.18
Calibration pressure (mmHg) Pa:	755.5
Calibration temp. (K) Ta:	300.2

$$Flow(\text{corrected}) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	5.8	2.397	1.191	59.0
2	5.0	2.226	1.106	49.0
3	4.5	2.112	1.050	45.0
4	3.7	1.915	0.953	37.0
5	2.8	1.666	0.830	28.0

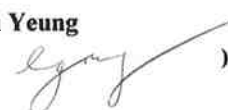
Correlation Coefficient : 0.9950



Remark
 1HPa = 0.750062 mmHg

Calibrated by: Hui Chun Ming
 ()

Date: 18-8-08

Checked by: Tang Hiu Yeung
 ()

Date: 18.8.08



TISCH ENVIRONMENTAL, INC.
 145 SOUTH MIAMI AVE.
 VILLAGE OF CLEVELAND, 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 - Apr 28, 2008 Rootsmeter S/N 9833620 Ta (K) - 296
 Operator: Tisch Orifice I.D. - 517N Pa (mm) - 749.3

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4040	3.2	2.00
2	NA	NA	1.00	0.9940	6.4	4.00
3	NA	NA	1.00	0.8860	7.9	5.00
4	NA	NA	1.00	0.8450	8.8	5.50
5	NA	NA	1.00	0.6980	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9883	0.7039	1.4090	0.9957	0.7092	0.8889
0.9841	0.9901	1.9926	0.9915	0.9975	1.2570
0.9820	1.1084	2.2278	0.9894	1.1167	1.4054
0.9809	1.1608	2.3365	0.9882	1.1695	1.4740
0.9756	1.3977	2.8179	0.9829	1.4082	1.7777
Qstd slope (m) = 2.02953			Qa slope (m) = 1.27086		
intercept (b) = -0.01939			intercept (b) = -0.01223		
coefficient (r) = 0.99999			coefficient (r) = 0.99999		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

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

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

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

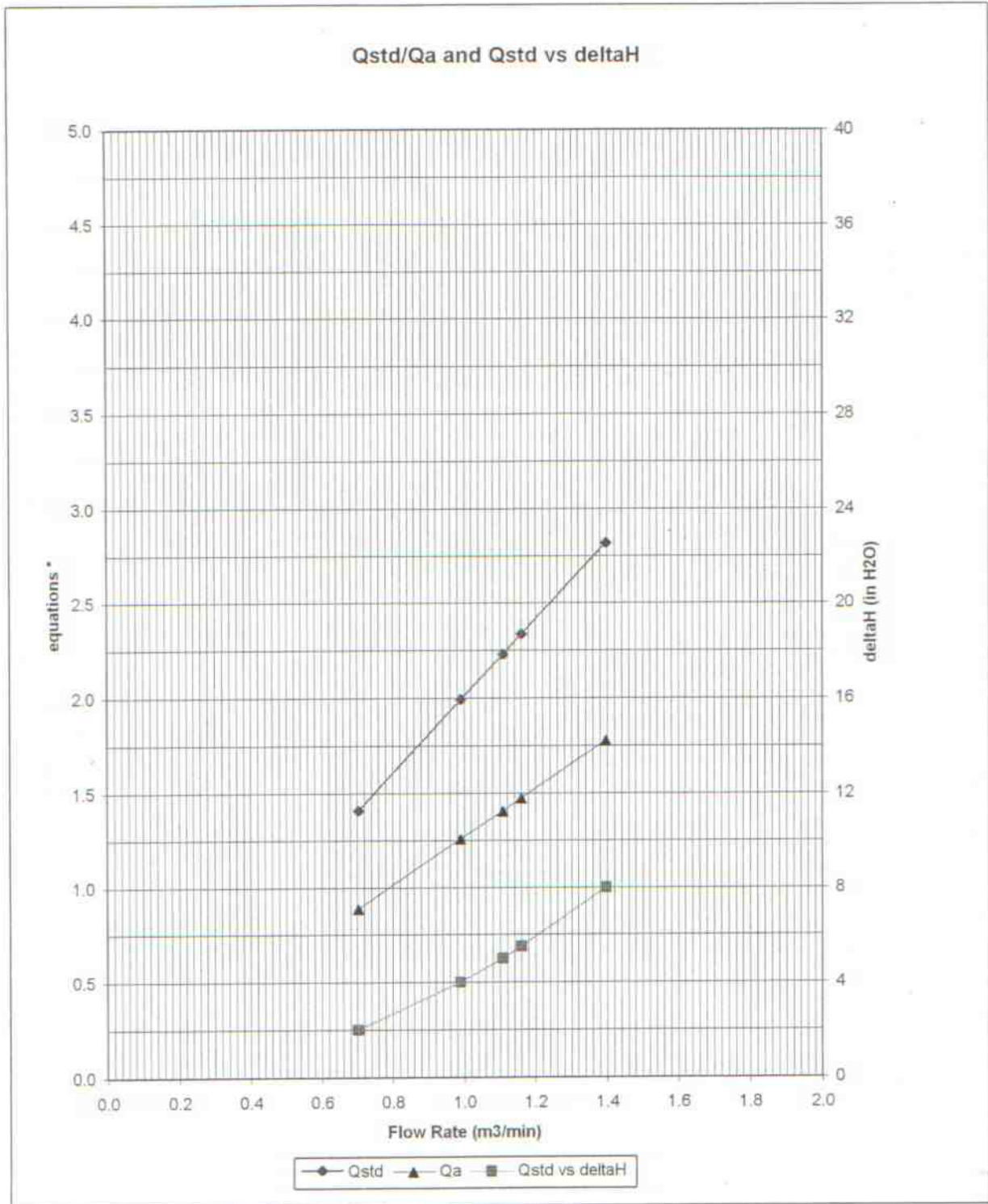
$$Qa = Va / \text{Time}$$

For subsequent flow rate calculations:

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

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

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

#517N

Calibration Certificate

Certificate No. **80026**

Page 1 of 3 Pages

Customer : Hyder Consulting Limited

Address : Room 3801., Hopewell Centre, 183 Queen's Road East, Wan Chai, Hong Kong

Order No. : Q72325

Date of receipt : 3-Jan-08

Item Tested

Description : Sound Level Meter

Manufacturer : B&K

Model : 2238

Serial No. : 2285726

Test Conditions

Date of Test : 17-Jan-08

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Calibration procedure : Z01.

Test Results

All results were within the IEC 651 Type 1 & IEC 804 Type 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>Due Date</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C071115	14-Mar-08	SCL-HKSAR
S024	Sound Level Calibrator	71791	16-Jul-08	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: 17-Jan-08

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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Calibration Certificate

Certificate No. **80026**

Page 2 of 3 Pages

Results :

1. SPL Accuracy

Range	UUT Setting			Applied Value (dB)	UUT Reading (dB)
	Freq. Wgt.	Bandwith	Center Freq.		
20 ~ 100	A	BB/F	--	94.03	93.9
	A	BB/S	--		93.9
	C	BB/F	--		93.9
40 ~ 120	A	BB/F	--	94.03	94.0
	A	BB/F	--	113.97	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 : ± 0.01 dB

3. Linearity

3.1 Level Linearity

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

Uncertainty : ± 0.1 dB

3.2 Differential level linearity

UUT Range	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
	104.0	103.9	0.1	± 0.3 dB
	105.0	104.9	0.1	± 1.0 dB

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 80026

Page 3 of 3 Pages

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	- 26.1	- 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	- 3.2	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+ 1.2	+ 1.2 dB, ± 1 dB
4 kHz	+ 1.0	+ 1.0 dB, ± 1 dB
8 kHz	- 1.1	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	- 6.7	- 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	39.6	
1/10 ³	40.0	39.4	± 1.0 dB
1/10 ⁴	40.0	39.1	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test

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

3. Atmospheric pressure : 1 015 hPa.

----- END -----



Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. **80027**

Page 1 of 2 Pages

Customer : Hyder Consulting Limited

Address : Room 3801., Hopewell Centre, 183 Queen's Road East, Wan Chai, Hong Kong

Order No. : Q72325

Date of receipt : 3-Jan-08

Item Tested

Description : Sound Level Calibrator

Manufacturer : B&K

Model : Type 4231

Serial No. : 1770806

Test Conditions

Date of Test : 17-Jan-08

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Calibration 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>Due Date</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	73602	7-Jul-08	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	71791	16-Jul-08	NIM-PRC & SCL-HKSAR
S041	Universal Counter	73453	22-Aug-08	SCL-HKSAR

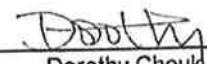
The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, 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: 17-Jan-08

This Certificate is issued by:
Hong Kong Calibration Ltd.
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-75, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.
Tel: 2425 8801 Fax: 2425 8848

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Wissenschaftlich-Technische Werkstätten GmbH
Dr.Karl-Slevogt-Str.1 D-82362 Weilheim

Manufacturer's Test Certificate Hersteller - Prüfzertifikat

Product / Produkt: **Multi-parameter instrument / Mehrparameter-Meßgerät**
Model / Modell: **pH/Oxi 340i**
Serial no. / Serien-Nr. **08101283**

The a.m. product has been checked by us and complies with the demanded specifications.

Das oben genannte Produkt wurde von uns geprüft und entspricht den geforderten Spezifikationen.

Accuracy of the pH measurement:
 $\leq 0,01 \text{ pH} \pm 1 \text{ digit}$

Genauigkeit der pH-Messung:
 $\leq 0,01 \text{ pH} \pm 1 \text{ Digit}$

Accuracy of the voltage measurement:
 $\leq 1 \text{ mV} \pm 1 \text{ digit}$

Genauigkeit der Spannungssessung:
 $\leq 1 \text{ mV} \pm 1 \text{ Digit}$

Accuracy of the oxygen measurement:
 $\leq 0,5\% \text{ of measured value} \pm 1 \text{ digit}$

Genauigkeit der Sauerstoff-Messung:
 $\leq 0,5\% \text{ vom Meßwert} \pm 1 \text{ Digit}$

Accuracy of the temperature measurement:
 $\leq 0,1 \text{ K} \pm 1 \text{ digit}$

Genauigkeit der Temperaturmessung:
 $\leq 0,1 \text{ K} \pm 1 \text{ Digit}$

The test equipment used for checking is regularly calibrated by means of a precision multimeter (HP 3458A, Ser.-No. 2823 A 09038) which itself is annually calibrated in a laboratory accredited to the national German Calibration Service DKD (EADS Deutschland GmbH, DKD-K-01901). This ensures the traceability to national and international standards.

Die zur Prüfung eingesetzten Prüfmittel werden regelmäßig anhand eines Präzisionsmultimeters (HP 3458A, Ser.-Nr. 2823 A 09038) kalibriert, das seinerseits jährlich in einem DKD-Labor kalibriert wird (EADS Deutschland GmbH, DKD-K-01901). Damit ist der Anschluß an nationale und internationale Normale gewährleistet.

Weilheim, 07.04.2008

WISSENSCHAFTLICH-TECHNISCHE WERKSTÄTTEN GMBH

Dr.K.Löhnert

Quality Manager / Leiter Qualitätssicherung

TEST REPORT

Report No. : 106189N
Project Name : Calibration of Field measurement equipment
Customer : Hyder Consulting Limited
Address : 47/F, Hopewell Centre, 183 Queen's Road East, Wanchai, Hong Kong

Lab Job No. : J651	Lab Sample No. : 20840/1
Sample Description : One Turbidimeter and four turbidity standards.	
Sample Receipt Date : 21/4/2008	Test Period : 21/4/2008

Test Information

Test Parameter	Test Procedure
Calibraion of Turbidimeter and Turbidity Standard	In-house Method IC 42

- Notes :
1. This report shall not be reproduced, except in full, without prior written approval from Lam Laboratories Limited.
 2. Results related to sample(s) as received.
 3. Results satisfy all in-house QA/QC protocols as attached.

Authorized Signatory :


 WONG Yau Tim
 (Operation Manager)

Issue Date :

21/4/2008

TEST REPORT

Report No. : 106627N
Project Name : Calibration of Field measurement equipment
Customer : Hyder Consulting Limited

Lab Job No. : J651 **Lab Sample No.** : 21151/1

Test Results

Value re-assignment for Turbidity Standards:

Customer Ref.	Measured value (NTU)
STD 1	0.03
STD 2	17.99
STD 3	101
STD 4	893

Linearity check for Turbidimeter:

Serial No.	Linearity range (NTU)
215619	0-100

- End of Report -

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

ALS TECHNICHEM (HK) Pty Ltd

Environmental Division



CERTIFICATE OF ANALYSIS

CONTACT: MR DESMOND CHAN
CLIENT: HYDER CONSULTING LTD
ADDRESS: 47/F, HOPEWELL CENTRE,
183 QUEEN'S ROAD EAST,
WANCHAI, HONG KONG
PROJECT : TWDT TSUEN WAN DRAINAGE TUNNEL

Batch: HK0810543
LABORATORY: HONG KONG
DATE RECEIVED: 04/07/2008
DATE OF ISSUE: 07/07/2008
SAMPLE TYPE: EQUIPMENT
No. of SAMPLES: 1

COMMENTS

The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

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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Email: hongkong@alsenviro.com


Ms Wong Wai Man, Alice
Laboratory Manager - Hong Kong

Other ALS Environmental Laboratories

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Abbreviations: % SPK REC denotes percentage spike recovery

CHK denotes duplicate check sample

LOR denotes limit of reporting

LCS % REC denotes Laboratory Control Sample percentage recovery

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ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group

11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., H.K.

Phone: 852-2610 1044 Fax: 852-2610 2021 www.alsenviro.com

A Campbell Brothers Limited Company

CERTIFICATE OF ANALYSIS



Batch: HK0810543
Date of Issue: 07/07/2008
Client: HYDER CONSULTING LTD
Client Reference:

Calibration of pH System

Item : Multi-parameter Instrument / Mehrparameter-Meßgerät

Model No. : WTW pH / Oxi 340i

Serial No. : 08101283


Equipment No.: --

Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 4500-H⁺B

Date of Calibration : 07 July, 2008

Testing Results :

Expected Reading	Recording Reading
4.00	4.11
7.00	7.07
10.0	9.86
Allowing Deviation	± 0.2


Ms Wong Wai Man / Alice
Laboratory Manager - Hong Kong

CERTIFICATE OF ANALYSIS




Batch: HK0810543
Date of Issue: 07/07/2008
Client: HYDER CONSULTING LTD
Client Reference:

Calibration of Thermometer

Item : Multi-parameter Instrument / Mehrparameter-Meßgerät
Model No. : WTW pH / Oxi 340i
Serial No. : 08101283
Equipment No. : --
Calibration Method : In-house Method
Date of Calibration : 07 July, 2008

Testing Results :

Reference Temperature (°C)	Recorded Temperature (°C)
19.0 °C	19.1 °C
27.5 °C	27.3 °C
Allowing Deviation	±2.0°C


Ms Wong Wai Man, Alice
Laboratory Manager - Hong Kong

CERTIFICATE OF ANALYSIS




Batch: HK0810543
Date of Issue: 07/07/2008
Client: HYDER CONSULTING LTD
Client Reference:

Calibration of DO System

Item : Multi-parameter Instrument / Mehrparameter-Meßgerät
Model No. : WTW pH / Oxi 340i
Serial No. : 08101283
Equipment No. : --
Calibration Method : This meter was calibrated in accordance with standard method APHA (18th Ed.) 4500-OC & G
Date of Calibration : 07 July, 2008

Testing Results :

Expected Reading	Recording Reading
4.19 mg/L	4.28 mg/L
5.79 mg/L	5.73 mg/L
7.72 mg/L	7.86 mg/L
Allowing Deviation	±0.2 mg/L


Ms Wong Wai Man, Alice
Laboratory Manager - Hong Kong