High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Ho Fung College (ASR 1)
Calibration Date: 23-Nov-10
Calibration Due Date 23-Jan-11
Time: 08:00

Sampler Model:	BM2000HX
Serial No.:	4994
Calibrator Orifice no.:	1785
Slope (m):	1.97702
Intercept (b):	-0.00070
Correction coeff. (r)	0.99992

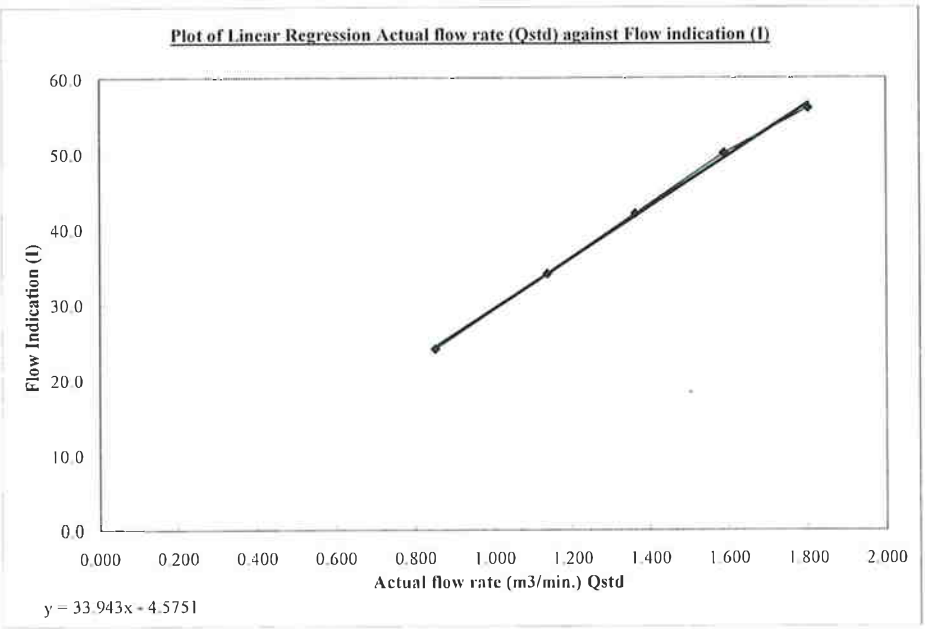
$$Flow(corrected) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

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

Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	760.9
Calibration temp. (K) Ta:	294.4

Sample no.	Pressure Drop (H), inch	Flow (corrcted), m^3/min	Actual flow rate (Qstd), m^3/min	Flow indication (I), arbitrary
1	12.6	3.564	1.803	56.0
2	9.8	3.143	1.590	50.0
3	7.2	2.694	1.363	42.0
4	5.0	2.245	1.136	34.0
5	2.8	1.680	0.850	24.0

Correlation Coefficient : 0.9993



Remark
1HPa = 0.750062 mmHg

Calibrated by: Arthur Chiu ( ) **Date:** 23/11/2010

Checked by: F.C. Tsang ( ) **Date:** 23/11/2010

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Heng Hoi Chi Hong Ship Temple (ASR 3)
Calibration Date: 23-Nov-10
Calibration Due Date 23-Jan-11
Time: 08:15

Sampler Model:	BM2000HX
Serial No.:	5875
Calibrator Orifice no.:	1785
Slope (m):	1.97702
Intercept (b):	-0.00070
Correction coeff. (r)	0.99992

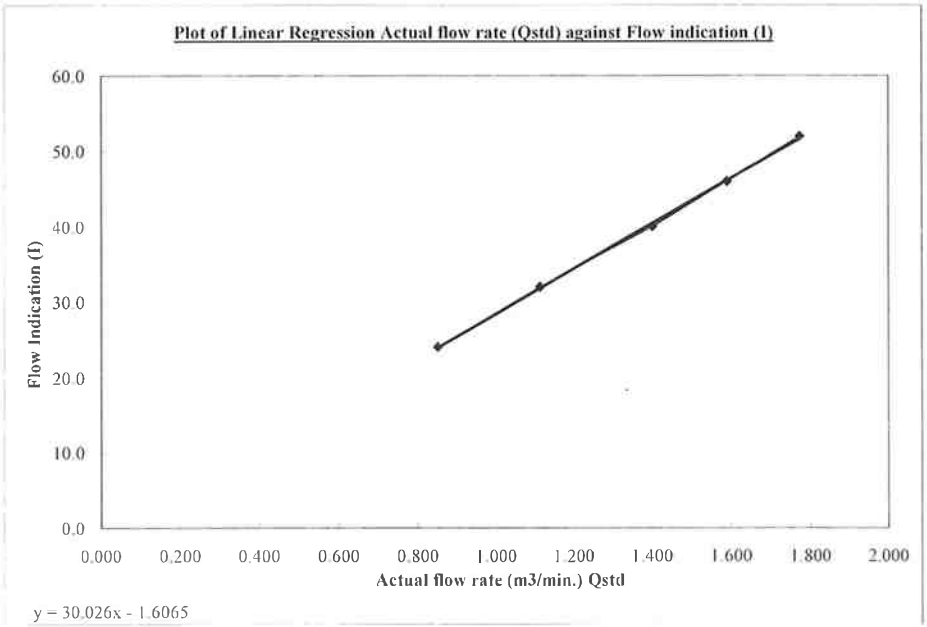
Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	760.9
Calibration temp. (K) Ta:	294.4

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

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

Sample no.	Pressure Drop (H), inch	Flow (corrcted), m^3/min	Actual flow rate (Qstd), m^3/min	Flow indication (I), arbitrary
1	12.2	3.507	1.774	52.0
2	9.8	3.143	1.590	46.0
3	7.6	2.768	1.401	40.0
4	4.8	2.200	1.113	32.0
5	2.8	1.680	0.850	24.0

Correlation Coefficient : 0.9996



Remark
1HPa = 0.750062 mmHg

Calibrated by: Arthur Chiu ( ) **Date:** 23/11/2010

Checked by: F.C. Tsang ( ) **Date:** 23/11/2010

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Long Beach Gardan (ASR 8)
Calibration Date: 23-Nov-10
Calibration Due Date 23-Jan-11
Time: 08:30

Sampler Model:	TE5005X
Serial No.:	1059
Calibrator Orifice no.:	1785
Slope (m):	1.97702
Intercept (b):	-0.00070
Correction coeff. (r)	0.99992

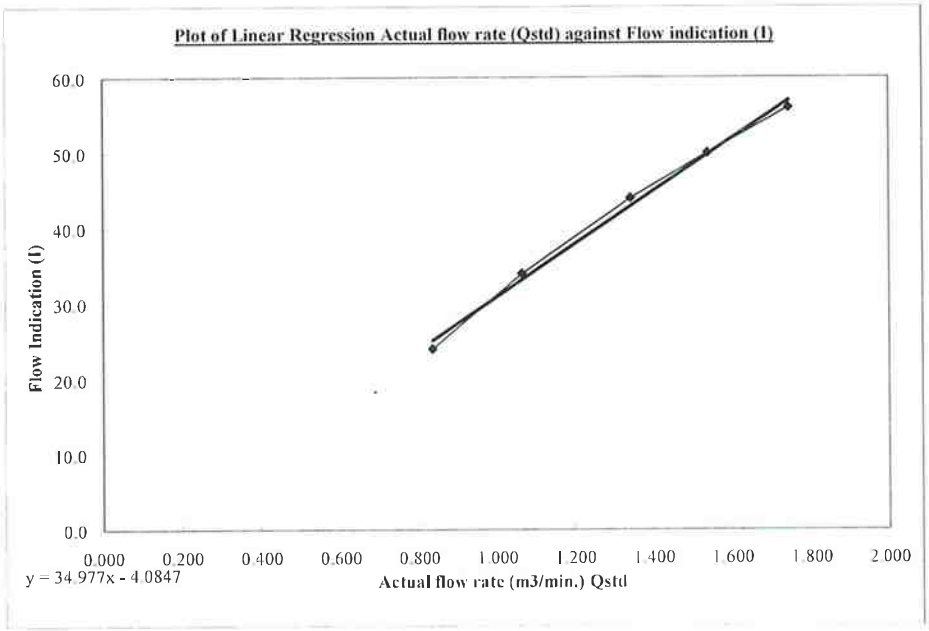
$$Flow(corrected) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

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

Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	760.9
Calibration temp. (K) Ta:	294.4

Sample no.	Pressure Drop (H), inch	Flow (corrcted), m^3/min	Actual flow rate (Qstd), m^3/min	Flow indication (I), arbitrary
1	11.8	3.449	1.745	56.0
2	9.2	3.046	1.541	50.0
3	7.0	2.657	1.344	44.0
4	4.4	2.106	1.066	34.0
5	2.7	1.650	0.835	24.0

Correlation Coefficient : 0.9969



Remark
1HPa = 0.750062 mmHg

Calibrated by: Arthur Chiu ( ) **Date:** 23/11/2010

Checked by: F.C. Tsang ( ) **Date:** 23/11/2010

High Volume Air Sampler Calibration Worksheet

Project Title: Design and Construction of Tsuen Wan Drainage Tunnel
Monitoring Location: Greenview Terrance (ASR 9)
Calibration Date: 23-Nov-10
Calibration Due Date 23-Jan-11
Time: 08:45

Sampler Model:	TE5005X
Serial No.:	1713
Calibrator Orifice no.:	1785
Slope (m):	1.97702
Intercept (b):	-0.00070
Correction coeff. (r)	0.99992

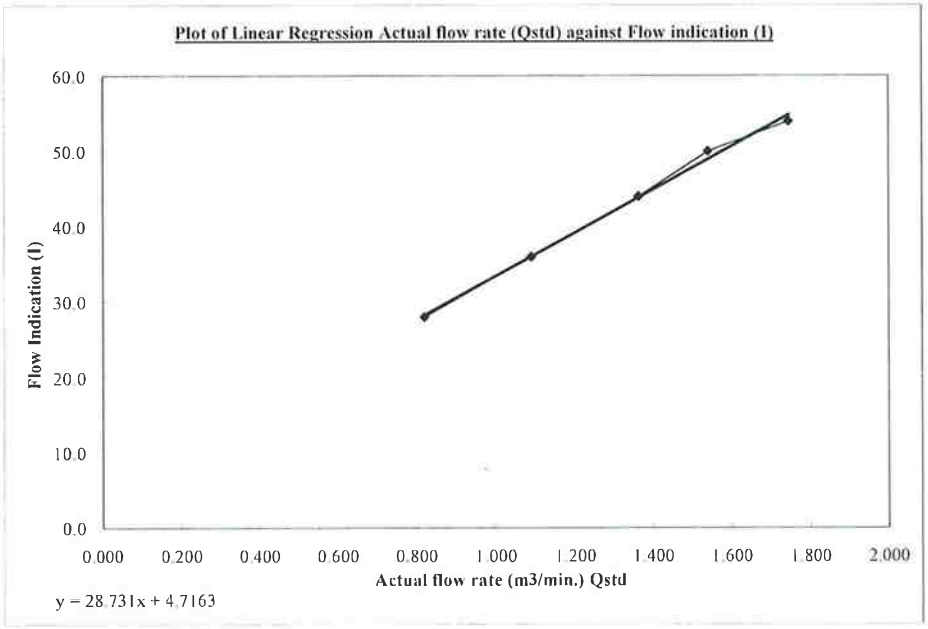
$$Flow(corrected) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

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

Standard pressure (mmHg) Pstd:	763.9
Standard temp. (K) Tstd:	290.8
Calibration pressure (mmHg) Pa:	760.9
Calibration temp. (K) Ta:	294.4

Sample no.	Pressure Drop (H), inch	Flow (corrcted), m^3/min	Actual flow rate (Qstd), m^3/min	Flow indication (I), arbitrary
1	11.8	3.449	1.745	54.0
2	9.2	3.046	1.541	50.0
3	7.2	2.694	1.363	44.0
4	4.6	2.154	1.090	36.0
5	2.6	1.619	0.819	28.0

Correlation Coefficient : 0.9979



Remark
1 HPa = 0.750062 mmHg

Calibrated by: Arthur Chiu ( ) **Date:** 23/11/2010

Checked by: F.C. Tsang ( ) **Date:** 23/11/2010

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 - May 10, 2010 Rootsmeter S/N 9833620 Ta (K) - 296
Operator Tisch Orifice I.D. - 1785 Pa (mm) - 750.57

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	1.3960	3.2	2.00
2	NA	NA	1.00	0.9840	6.4	4.00
3	NA	NA	1.00	0.8790	7.9	5.00
4	NA	NA	1.00	0.8390	8.7	5.50
5	NA	NA	1.00	0.6940	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
0.9900	0.7092	1.4102		0.9957	0.7133	0.8881
0.9858	1.0018	1.9943		0.9915	1.0076	1.2560
0.9837	1.1191	2.2296		0.9894	1.1256	1.4042
0.9827	1.1713	2.3385		0.9884	1.1781	1.4728
0.9774	1.4084	2.8203		0.9830	1.4165	1.7762
Qstd slope (m) =		2.01637		Qa slope (m) =		1.26262
intercept (b) =		-0.02316		intercept (b) =		-0.01458
coefficient (r) =		0.99996		coefficient (r) =		0.99996
y axis = SQRT[H2O(Pa/760)(298/Ta)]				y axis = SQRT[H2O(Ta/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}

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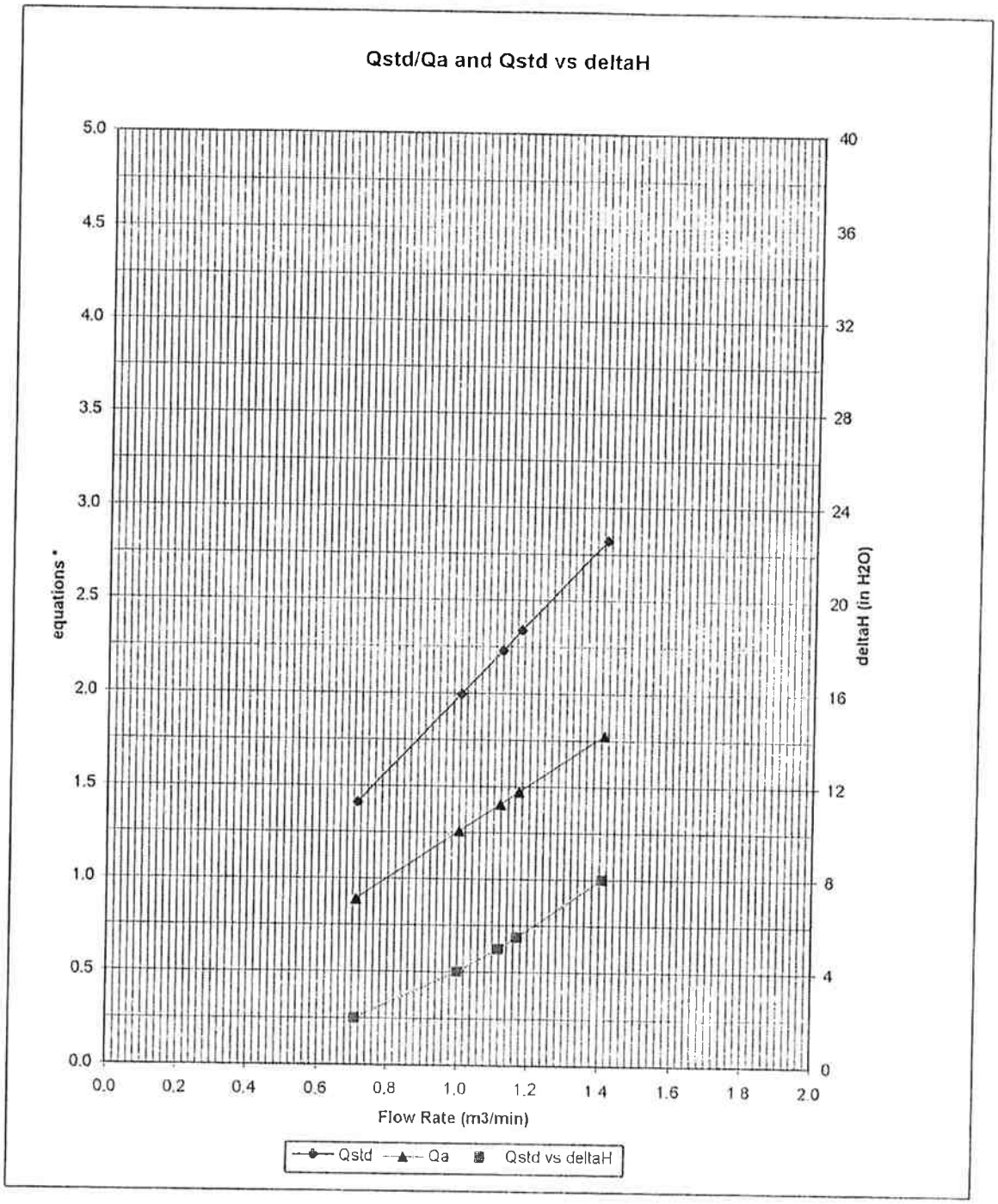
AIR POLLUTION MONITORING EQUIPMENT



* y-axis equations:

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

Qa series: $\sqrt{(\Delta H\ (Ta\ /\ Pa))}$

#1785

輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C102904

Certificate of Calibration

This is to certify that the equipment

Description : Sound Level Meter

Manufacturer : Rion

Model No. : NL-31

Serial No. : 00410224

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C102904.

The equipment is supplied by

Co. Name : Envirotech Services Co.

Address : Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road, Hong Kong

Date of Issue : 31 May 2010

Certified by : K C Lee

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel: 2927 2606 Fax: 2744 8656 E-mail: call@s-suncreation.com Website: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C106297

Certificate of Calibration

This is to certify that the equipment

Description : Integrating Sound Level Meter

Manufacturer : Bruel & Kjaer

Model No. : 2238

Serial No. : 2448529

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C106297.

The equipment is supplied by

Co. Name : Hyder Consulting Limited

Address : 47/F., Hopewell Centre, 183 Queen's Road East, Wanchai, Hong Kong

Date of Issue : 16 November 2010

Certified by : K C Lee

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C096839

Certificate of Calibration

This is to certify that the equipment

Description : Integrating Sound Level Meter

Manufacturer : Bruel & Kjaer

Model No. : 2238

Serial No. : 2562782

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C096839.

The equipment is supplied by

Co. Name : Envirotech Services Co.

Address : Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road, Hong Kong

Date of Issue : 29 December 2009

Certified by : K C Lee

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

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. **07436** Page 1 of 3 Pages

Customer : Hyder Consulting Limited

Address : 47/F., Hopewell Centre, 183 Queens Road East, Wanchai, Hong Kong

Order No. : Q02884 **Date of receipt :** 28-Dec-10

Item Tested

Description : Sound Level Meter

Manufacturer : B&K

Model : 2238 **Serial No. :** 2562782

Test Conditions

Date of Test : 29-Dec-10 **Supply Voltage :** --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: Z01.

Test Results

All results were within the IEC 651 Type 1 & IEC 804 Type 1 specification.

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

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	04062	NIM-PRC & SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).
The test results apply to the above Unit-Under-Test only

Calibrated by : P. F. Wong

Approved by : Dorothy Cheuk

Date: 30-Dec-10

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

Calibration Certificate

Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range	Freq. Wgt.	Bandwith	Center Freq.		
20 ~ 100	A	BB/F	--	94.0	94.1
	A	BB/S	--		94.1
	C	BB/F	--		94.0
40 ~ 120	A	BB/F	--	94.0	94.1
	A	BB/F	--	114.0	113.9

IEC 651 Type 1 Spec. : ± 0.7 dB
Uncertainty : ± 0.1 dB

2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. : ± 0.3 dB
Uncertainty : ± 0.01 dB

3. Linearity

3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
140	114.0	114.3	+0.2	± 0.7 dB
130	104.0	104.3	+0.2	
120	94.0	94.1 (Ref.)	- -	
110	84.0	83.9	-0.2	
100	74.0	73.9	-0.2	
90	64.0	63.9	-0.2	
80	54.0	54.2	+0.1	

Uncertainty : ± 0.1 dB

Calibration Certificate

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	-0.2	± 0.4 dB
	94.0	94.1 (Ref.)	- -	
	95.0	95.1	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	-40.0	- 39.4 dB, ± 1.5 dB
63 Hz	-26.7	- 26.2 dB, ± 1.5 dB
125 Hz	-16.6	- 16.1 dB, ± 1 dB
250 Hz	-9.1	- 8.6 dB, ± 1 dB
500 Hz	-3.5	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.5	+ 1.2 dB, ± 1 dB
4 kHz	+1.3	+ 1.0 dB, ± 1 dB
8 kHz	-0.7	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.3	- 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	40.0	
$1/10^3$	40.0	40.5	± 1.0 dB
$1/10^4$	40.0	41.0	

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 : 1 012 hPa.

---------- END ----------

Brüel & Kjær

Calibration Chart

Type 4231 Serial No. 2699361

Sound Pressure Level: 94.00 or 114.00 dB ±0.20 dB
(re 20 µPa at reference conditions)

Frequency: 1000 Hz ±0.1%

Distortion: <1%

Reference Conditions:

Temperature:	23°C
Pressure:	101.325 kPa
Humidity:	50% RH
Load:	0.25 cm^3 (½" Brüel & Kjær Mic.)

Date: 29/12/9 Signed:

Brüel & Kjær

Sound Calibrator Type 4231

Levels for Brüel & Kjær ½" Microphones:

Equivalent Free Field:	93.85 dB or 113.85 dB
Equivalent Diffuse Field:	94.00 dB or 114.00 dB
Pressure Field:	94.00 dB or 114.00 dB

Frequency: 1000 Hz

Conforms to:
ANSI S1.40–1984 and IEC 60942 (2003) Class 1 & LS

Ambient Conditions:

Temperature:	−10° to 50°C, Class LS +16° to 30°C
Pressure:	65 kPa to 108 kPa
Humidity:	25% to 90% RH

For further information refer to the User Manual

BC0210–12

Brüel & Kjær

Packing Note

Item	Description
-4231---	Sound Calibrator Class 1 and LS, 94 and 114 dB, 1 kHz Akustischer Kalibrator der Klasse 1 - 94 dB / 1 kHz und 114 dB / 1 kHz - Bauartgeprüft und eichfähig Calibreur acoustique de classe 1 (94 et 114 dB à 1kHz)

Item	Qty	Description
BA-5341---	1	Trilingual Manual Pack for Type 4231 Trilingual Manual Pack for Type 4231 Trilingual Manual Pack for Type 4231
BC-0210---	1	Calibration Chart Type 4231 Calibration Chart Type 4231 Calibration Chart Type 4231
KE-0317---	1	Leather Case for 4231 Teilverpackung Leather Case for 4231
QB-0013---	2	Battery 1,5V Alkaline, Non-Rechargeable, size AA (LR6) ø14,5x 50,5mm Battery 1,5V Alkaline, Non-Rechargeable, size AA (LR6) ø14,5x 50,5mm Battery 1,5V Alkaline, Non-Rechargeable, size AA (LR6) ø14,5x 50,5mm

QI
Performed by:

If the accessories included in the Product Data Sheet or Manual differ from the items supplied, the items mentioned on the Packing Note/List are valid.

A27111

Brüel & Kjær

Incorporating LDS and Lochard

Packing List

Delivery Number	Ship Date (DD-MM-YYYY)	Page
2314552	05-02-2010	1/1

Ship To

Spectris China Ltd.
Attn. Jacky Leung
132 Nathan Road
Unit 706, 7/F Miramar Tower
Tsimshatsui
Kowloon
Hong Kong

Forwarder	**Geodis Wilson / Airfreight**
Sales Order Number	**6551240**
Your Reference	**SR# 1-201034558**
Our Reference	

No. of Colli **1** Gross Weight **1 kg** Net Weight **0.45 kg** Volume **0.006 m³**

Colli	B&K Item No.	QTY	Net Weight	Serial No.	Description	Included in Item
1	-4231---	1	0.45 kg	2699361	Sound Calibrator Class 1 and LS, 94 and 114 dB, 1 kHz	

Note

If the accessories included specified in the Product Data Sheet or Manual differ from the items supplied, the items mentioned on the Packing Slip are valid.
In case of any question, please contact your local Brüel & Kjær office.

Brüel & Kjær Sound & Vibration Measurement A/S
Skodsborgvej 307 • DK-2850 Nærum • Denmark
CVR : 23 95 84 14 • VAT : DK11 94 84 56
Tel : +45 77 41 20 00 • Fax : +45 45 80 14 05
E-mail : info@bksv.com
Website : www.bksv.com

Danske bank : Account : 3001-3015 081260
Swift address : DABADKKK
IBAN nos :
(DKK) DK 75 3000 3015081260
(EUR) DK 25 3000 3001963589
(USD) DK 26 3000 4451045504

Hong Kong Calibration Ltd.
香 港 校 正 有限公司

Calibration Certificate

Certificate No. **07437** Page 1 of 2 Pages

Customer : Hyder Consulting Limited

Address : 47/F., Hopewell Centre, 183 Queens Road East, Wanchai, Hong Kong

Order No. : Q02884 **Date of receipt :** 28-Dec-10

Item Tested

Description : Sound Level Calibrator

Manufacturer : B&K

Model : Type 4231 **Serial No. :** 2699361

Test Conditions

Date of Test : 29-Dec-10 **Supply Voltage :** --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

Test Results

All results were within the IEC 942 Class 1 specification.

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

Main Test equipment used:

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

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).
The test results apply to the above Unit-Under-Test only

Calibrated by : P. F. Wong

Approved by : Dorothy Cheuk

Date: 30-Dec-10

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

Calibration Certificate

Certificate No. 07437

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.02	± 0.3 dB
114	114.10	

Uncertainty : ± 0.1 dB

2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	1.000 kHz	± 2 %

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

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

4. Total Harmonic Distortion : < 0.5 %
IEC 942 Class 1 Spec. : < 3 %
Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test
2. The above measured values are the mean of 3 measurement.
3. The uncertainty claimed is for a confidence probability of not less than 95%.
4. Atmospheric Pressure : 1012 hPa.

---------- END ----------

CERTIFICATE OF ANALYSIS

Batch: HK1022261
Date of Issue: 24/09/2010
Client: HYDER CONSULTING LTD
Client Reference:

Calibration of Mulitimeter

Item : Turbidimeter
ALS Lab ID: HK1022261 -001
Date of Calibration: 24 September, 2010.

Model No.: Eutech Instruments TN-100
Serial No.: 215619

Testing Results :

Turbidity

Expected Reading	Recording Reading
0.00 NTU	0.18 NTU
4.00 NTU	3.97 NTU
40.0 NTU	36.9 NTU
80.0 NTU	76.0 NTU
400 NTU	424 NTU
Allowing Deviation	± 10%

Testing Method:

APHA (19th edition), 2130B

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

CERTIFICATE OF ANALYSIS

Work Order: HK1030685
Date of Issue: 31/12/2010
Client: HYDER CONSULTING LIMITED
Client Reference: DC2007/12 DESIGN AND CONSTRUCTION OF TSUEN WAN DRAINAGE TUNNEL

Calibration of Turbidity System

Item : Turbidimter
ALS Lab ID: HK1030685-001
Date of Calibration: 28 December, 2010

Model No.: Eutech Instruments TN-100
Equipment No.: --
Serial No.: 215619

Testing Results :

Turbidity

Expected Reading	Recording Reading
0.00 NTU	0.29 NTU
4.00 NTU	3.97 NTU
40.0 NTU	39.7 NTU
80.0 NTU	74.2 NTU
400 NTU	433 NTU
800 NTU	783 NTU
Allowing Deviation	± 10%

Testing Method:

APHA (19th edition), 2130B

Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

CERTIFICATE OF ANALYSIS

Batch: HK1019746
Date of Issue: 28/08/2010
Client: HYDER CONSULTING LIMITED
Client Reference:

Calibration of Mulitimeter

Item : pH , DO & Temperature
ALS Lab ID: HK1019746 -001
Date of Calibration: 27 August, 2010

Model No.: WTW pH/Oxi 340i
Serial No.: 08101283

Testing Results :

pH

Expected Reading	Recording Reading
4.00	4.03
7.00	7.15
10.0	9.93
Allowing Deviation	± 0.2 unit

Testing Method:

APHA (20th edition), 4500-H^+B

Temperature

Expected Reading	Recording Reading
15.5 °C	15.5 °C
25.0 °C	24.3 °C
36.5 °C	35.8 °C
Allowing Deviation	±2.0°C

Testing Method:

In-House Method

DO

Expected Reading	Recording Reading
5.25 mg/L	5.28 mg/L
5.95 mg/L	5.97 mg/L
7.85 mg/L	7.82 mg/L
Allowing Deviation	± 0.2 mg/L

Testing Method:

APHA (20th edition), 4500-OC & G

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Laboratory Manager - Hong Kong

CERTIFICATE OF ANALYSIS

Work Order: HK1028665
Date of Issue: 03/12/2010
Client: HYDER CONSULTING LIMITED
Client Reference:

Calibration of Mulitimeter

Item : Mulitimeter
ALS Lab ID: HK102866 -001
Date of Calibration: 03 December 2010

Model No.: WTW pH/Oxi 340i
Serial No.: 08101283

Testing Results :

pH

Expected Reading	Recording Reading
4.00	4.03
7.00	7.18
10.0	10.1
Allowing Deviation	± 0.2 unit

Testing Method:

APHA (20th edition), 4500-H^+B

Temperature

Expected Reading	Recording Reading
12.5 °C	12.6 °C
20.5 °C	20.8 °C
37.0 °C	37.1 °C
Allowing Deviation	±2.0^{0}C

Testing Method:

In-House Method

Dissolved Oxygen

Expected Reading	Recording Reading
4.67 mg/L	4.75 mg/L
5.97 mg/L	5.89 mg/L
8.01 mg/L	8.02 mg/L
Allowing Deviation	± 0.2 mg/L

Testing Method:

APHA (20th edition), 4500-OC & G

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