# Aecom Asia Company Limited TSP High Volume Sampler Field Calibration Report

Last Calibration Date:   4-Nov-08   Next Calibration Date:   4-Nov-09   Qstd = {[DH x (Pa/760) x (298/Ta]]}   \frac{12}{12} \ Qstd = {[DH x (Pa/760) x (298/Ta]]}   \frac{12}{12} \ Details   Intercept, bw = \frac{1}{2} \ 3.616   Correlation Coefficient < 0.990, check and recalibrate.   Set Point; IC = ( mw x Qstd + bw ) x [( 760 / Pa ) x ( Ta / 298/Ta)]   \frac{12}{12} \ Qstd \text{ (m3/min) } \ X   Flow Recorder   Continuous Flow Recorder   Reading (CFM)   Reading IC (CFM)   Y-ax   Y-ax   Reading IC (CFM)   Y-ax   Y-ax	Station	Access Road to	Po Shan Mansio	ns (CA1)	Operator:	Shum Ka	am Yuen	
Amblent Condition   Temperature, Ta (K)   306   Pressure, Pa (mmHg)   755.5	Cal. Date:	1-Sep-09			Next Due Date:	1-Nc	v-09	<b>:</b> _
Temperature, Ta (K)   306   Pressure, Pa (mmHg)   755.5	Equipment No.: A.001.46T				Serial No. 10217		217	-
Calibration Date:   A-Nov-08   Slope, mc   2.02158   Intercept, bc   -0.021				Ambient	Condition		······································	
Equipment No.:   843   Slope, mc   2.02158   Intercept, bc   -0.022	Temperatu	re, Ta (K)	306	Pressure,	Pa (mmHg)		755.5	
Equipment No.:								
Last Calibration Date:   4-Nov-08   mc x Qstd + bc = [DH x (Pa/760) x (298/Ta)]   1/2   Next Calibration Date:   4-Nov-09   Qstd = {[DH x (Pa/760) x (298/Ta)]   1/2   -bc} / mc					1			·
Next Calibration Date:   4-Nov-09   Qstd = {[DH x (Pa/760) x (298/Ta)]^{1/2} -bc} / mc				Slope, mc				-0.02524
Calibration of TSP Sampler			4-Nov-08					
Cesistance Plate No.   DH (orifice)   IDH x (Pa/760) x (298/Ta)]   1/2   Qstd (m³/min) X   Flow Recorder   Reading (CFM)   Reading IC (CFM)   Y-ax	Next Calibra	ation Date:	4-Nov-09		Qstd = {[DH x (	Pa/760) x (298/Ta)]	<sup>1/2</sup> -bc} / mc	
Cesistance Plate No.   DH (orifice)   IDH x (Pa/760) x (298/Ta)]   1/2   Qstd (m³/min) X   Flow Recorder   Reading (CFM)   Reading IC (CFM)   Y-ax			•	Calibration of	of TSP Sampler			
No.   DH (orifice), in. of water   [DH x (Pa/760) x (298/Ta)]   Variance   Continuous How Record   Reading (CFM)   Reading IC (CFM)   Y-ax			(			HV	S Flow Recorder	
13 7.3 2.66 1.33 42.0 41.32  10 5.4 2.29 1.14 34.0 33.45  7 3.7 1.89 0.95 28.0 27.55  5 2.7 1.62 0.81 22.0 21.65   By Linear Regression of Y on X  Slope , mw = 38.6106 Intercept, bw = -9.7516  Correlation Coefficient* = 0.9971  If Correlation Coefficient < 0.990, check and recalibrate.  Set Point Calculation  From the TSP Field Calibration Curve, take Qstd = 1.30m³/min  From the Regression Equation, the "Y" value according to  mw x Qstd + bw = IC x [(Pa/760) x (298/Ta)] 1/2  Therefore, Set Point; IC = (mw x Qstd + bw ) x [(760 / Pa) x (Ta / 298)] 1/2 41.10		DH (orifice),	[DH x (Pa/7	760) x (298/Ta)] <sup>1/2</sup>	, ,			
10 5.4 2.29 1.14 34.0 33.45 7 3.7 1.89 0.95 28.0 27.55 5 2.7 1.62 0.81 22.0 21.65  By Linear Regression of Y on X Slope , mw = 38.6106 Intercept, bw = -9.7516  Correlation Coefficient* = 0.9971  If Correlation Coefficient < 0.990, check and recalibrate.  Set Point Calculation  From the TSP Field Calibration Curve, take Qstd = 1.30m³/min  From the Regression Equation, the "Y" value according to  mw x Qstd + bw = IC x [(Pa/760) x (298/Ta)] 1/2  Therefore, Set Point; IC = ( mw x Qstd + bw ) x [( 760 / Pa ) x ( Ta / 298 )] 1/2 41.10	18	10.2		3.14	1.57	52.0	51.16	;
7 3.7 1.89 0.95 28.0 27.55  5 2.7 1.62 0.81 22.0 21.65  By Linear Regression of Y on X  Slope , mw = 38.6106	13	7.3	2.66		1.33	42.0	41.32	)
5 2.7 1.62 0.81 22.0 21.65  By Linear Regression of Y on X  Slope , mw =	10	5.4	2.29		1.14	34.0	33.45	· )
Sy Linear Regression of Y on X Slope , mw = 38.6106	7	3.7	1.89		0.95	28.0	27.55	, )
Set Point Calculation  From the TSP Field Calibration, the "Y" value according to  mw x Qstd + bw = IC x [(Pa/760) x (298/Ta)] 1/2  Therefore, Set Point; IC = ( mw x Qstd + bw ) x [( 760 / Pa ) x ( Ta / 298 )] 1/2  Remarks:	5	2.7		1.62	0.81	22.0	21.65	· ;
From the TSP Field Calibration Curve, take Qstd = 1.30m <sup>3</sup> /min  From the Regression Equation, the "Y" value according to  mw x Qstd + bw = IC x [(Pa/760) x (298/Ta)] <sup>1/2</sup> Therefore, Set Point; IC = ( mw x Qstd + bw ) x [( 760 / Pa ) x ( Ta / 298 )] <sup>1/2</sup> = 41.10  Remarks:	Slope , mw = Correlation Coef	38.6106 fficient* =	0.		Intercept, bw =	-9.7	516	-
From the TSP Field Calibration Curve, take Qstd = 1.30m³/min  From the Regression Equation, the "Y" value according to  mw x Qstd + bw = IC x [(Pa/760) x (298/Ta)] <sup>1/2</sup> Therefore, Set Point; IC = ( mw x Qstd + bw ) x [( 760 / Pa ) x ( Ta / 298 )] <sup>1/2</sup> =  41.10  Remarks:		······································		Sat Point	Calculation	· · · · · · · · · · · · · · · · · · ·		
Therefore, Set Point; IC = ( mw x Qstd + bw ) x [( 760 / Pa ) x ( Ta / 298 )] 1/2 41.10  Remarks:	rom the TSP Fie	eld Calibration Cu	ırve_take Ostd =		Calculation			
mw x Qstd + bw = IC x [(Pa/760) x (298/Ta)] <sup>1/2</sup> Therefore, Set Point; IC = ( mw x Qstd + bw ) x [( 760 / Pa ) x ( Ta / 298 )] <sup>1/2</sup> =  41.10  Remarks:								
Therefore, Set Point; IC = ( mw x Qstd + bw ) x [( 760 / Pa ) x ( Ta / 298 )] 1/2 = 41.10  Remarks:	9.77	,,	*					
Remarks:			mw	x Qstd + bw = IC	x [(Pa/760) x (298/	Га)] <sup>1/2</sup>		
Remarks:								
	herefore, Set Po	oint; IC = ( mw x i	Qstd + bw ) x [( 7	60 / Pa ) x ( Ta / 29	8)] <sup>1/2</sup> =		41.10	_
							***************************************	
	kemarks:	9 <del>4 - 3 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1</del>			ı	· · · · · · · · · · · · · · · · · · ·	······································	
		······································			<u> </u>			
QC Reviewer: \vertu Signature: \vertue Date: \( \rightarrow \)		1.		•			\ (	) (

# Aecom Asia Company Limited TSP High Volume Sampler Field Calibration Report

Equipment No.:  Temperature, Ta (  Equipment No.:  Equipment No.:  Last Calibration Da  Next Calibration Da  Next Calibration Da  18  13  10  7  5  By Linear Regression of Slope, mw = 38  Correlation Coefficient	ate:	843 4-Nov-08 4-Nov-09	Ambient Pressure, F  Orifice Transfer S  Slope, mc  Calibration o	tandard Information 2.02158 mc x Qstd + bc Qstd = {[DH x (	103	(298/Ta)] <sup>1/2</sup>	-0.02524
Equipment No.:  Last Calibration Dane Next Calibration Dane Next Calibration Dane No.  Resistance Plate No.  18  13  10  7  5  By Linear Regression of Slope, mw = 38 Correlation Coefficient	(K) ate: ate: (orifice), of water	843 4-Nov-08 4-Nov-09	Pressure, I  Orifice Transfer S  Slope, mc	Condition Pa (mmHg)  tandard Information 2.02158 mc x Qstd + bc Qstd = {[DH x (	on Interce = [DH x (Pa/760) x	755.5 ept, bc (298/Ta)] <sup>1/2</sup>	-0.02524
Equipment No.:  Last Calibration Day  Next Calibration Day  Resistance Plate No.  18  13  10  7  5   By Linear Regression of Slope, mw = 38  Correlation Coefficient	ate: ate: (orifice), of water	843 4-Nov-08 4-Nov-09	Pressure, I  Orifice Transfer S  Slope, mc	tandard Information 2.02158 mc x Qstd + bc Qstd = {[DH x (	Interce = [DH x (Pa/760) x	ept, bc (298/Ta)] <sup>1/2</sup>	-0.02524
Equipment No.:  Last Calibration Day  Next Calibration Day  Resistance Plate No.  18  13  10  7  5  By Linear Regression of Slope, mw = 38  Correlation Coefficient	ate: ate: (orifice), of water	843 4-Nov-08 4-Nov-09	Orifice Transfer S Slope, mc	tandard Information 2.02158 mc x Qstd + bc Qstd = {[DH x (	Interce = [DH x (Pa/760) x	ept, bc (298/Ta)] <sup>1/2</sup>	-0.02524
Last Calibration Da  Next Calibration Da  Resistance Plate No.  18  13  10  7  5   By Linear Regression of Slope, mw = 38  Correlation Coefficient	ate: ate: (orifice), of water	843 4-Nov-08 4-Nov-09	Slope, mc	2.02158 mc x Qstd + bc Qstd = {{DH x (	Interce = [DH x (Pa/760) x	(298/Ta)] <sup>1/2</sup>	-0.02524
Last Calibration Da  Next Calibration Da  Resistance Plate No.  18  13  10  7  5   By Linear Regression of Slope, mw = 38  Correlation Coefficient	ate: ate: (orifice), of water	843 4-Nov-08 4-Nov-09	Slope, mc	2.02158 mc x Qstd + bc Qstd = {{DH x (	Interce = [DH x (Pa/760) x	(298/Ta)] <sup>1/2</sup>	-0.02524
Last Calibration Da  Next Calibration Da  Resistance Plate No.  18  13  10  7  5   By Linear Regression of Slope, mw = 38  Correlation Coefficient	ate: ate: (orifice), of water	4-Nov-08 4-Nov-09		mc x Qstd + bc Qstd = {[DH x (	= [DH x (Pa/760) x	(298/Ta)] <sup>1/2</sup>	-0.02524
Next Calibration Date  Resistance Plate No.  18  13  10  7  5   By Linear Regression of Slope, mw = 35  Correlation Coefficient	(orifice),	4-Nov-09	Calibration o	Qstd = {[DH x (			
Resistance Plate No.  18  13  10  7  5   By Linear Regression of Slope, mw = 38  Correlation Coefficient	(orifice), of water		Calibration o		Pa/760) x (298/Ta)]	<sup>1/2</sup> -bc} / mc	
No.  18  13  10  7  5   By Linear Regression of Slope, mw = 38  Correlation Coefficient	of water		Calibration o	(700.0			
No.  18  13  10  7  5   By Linear Regression of Slope, mw = 38  Correlation Coefficient	of water		Calibration o	(7000			
No.  18  13  10  7  5   By Linear Regression of Slope, mw = 38  Correlation Coefficient	of water	T		T ISP Sampler			
No.  18 13 10 7 5  By Linear Regression of Slope, mw = 38  Correlation Coefficient	of water		Orfice		HVS	S Flow Recorder	
13 10 7 5  By Linear Regression of Slope, mw = 38  Correlation Coefficient	10.0	[DH x (Pa/7	(60) x (298/Ta)] <sup>1/2</sup>	Qstd (m <sup>3</sup> /min) X - axis	Flow Recorder Reading (CFM)	Continuous Flow Reading IC (CFI	
10 7 5  By Linear Regression of Slope, mw = 35  Correlation Coefficient	10.0	3.11		1.55	48.0	47.23	
7 5  By Linear Regression of Slope, mw = 35  Correlation Coefficient	7.6	2.71		1.35	40.0	39.36	3
5  By Linear Regression of Slope, mw = 38  Correlation Coefficient	5.5	2.31		1.15	34.0	33.45	
By Linear Regression of Slope , mw =35	4.0		1.97	0.99	28.0	27.55	 j
Slope , mw = 35 Correlation Coefficient	2.5		1.56	0.78	20.0	19.68	}
*If Correlation Coefficien	5.0842 * =		9978 brate.	Intercept, bw =	-7.4	387	•
	·	***********************************	Set Point	Calculation		OCCUPANT CONTRACTOR OF THE CON	
From the TSP Field Calil	oration Cur	ve_take Ostd =		Out Calactori			
From the Regression Eq							
			9				
		mw	x Qstd + bw = IC x	c [(Pa/760) x (298/T	a)] <sup>1/2</sup>		
Therefore, Set Point; IC:	= ( mw x Q	std + bw ) x [( 76	60 / Pa ) x ( Ta / 298	3 )] <sup>1/2</sup> =		38.79	_
Remarks:						Garage Control of the	
***************************************			· · · · · · · · · · · · · · · · · · ·	A,			
ĺ	ř	<del>194</del>	_	. 1			Sep C

## **EQUIPMENT CALIBRATION RECORD**

Туре:				Laser Du	ıst Moni	tor		
	facturer/Brand:			SIBATA		·····		
Model		•		LD-3		<del> </del>		
	ment No.:		-	A.005.07				
Sensi	tivity Adjustment	Scale Setting:		557 CP/	1			
Opera	ator:			Mike She	k (MSKN	1)		
Standa	rd Equipment							
·				( ( _ · _ · _ · _ · _ · _ · _ · _ ·	TCOL®			
Equip		Rupprecht				ahaal)	······································	<del></del>
Venue Model		Cyberport		ing Seco	nuary Sc	illool)		
		Series 140 Control:	·	AB21989	00002			
Serial	NO:			00C14365	· · · · · · · · · · · · · · · · · · ·	K <sub>o</sub> : 12500	· · · · · · · · · · · · · · · · · · ·	<del></del>
Last C	Calibration Date*:	Sensor: : 5 June 20		0014300	19003	K <sub>o</sub> : <u>12500</u>		vocanium en
				1.1				
*Remar	ks: Recommend	led interval for ha	ardwar	e calibrat	ion is 1 y	/ear		
Calibra	tion Result							
		Scale Setting (B Scale Setting (A			•	557 CP		
Hour	Date	Time		Amb	ient	Concentration <sup>1</sup>	Total	Count/
	(dd-mm-yy)			Conc	lition	(mg/m <sup>3</sup> )	Count <sup>2</sup>	Minute <sup>3</sup>
	`			Temp	R.H.	Y-axis		X-axis
				(°C)	(%)			
1	06-06-09	09:00 - 1	0:00	30.2	76	0.04175	1392	23.20
2	06-06-09	10:00 - 1	1:00	30.6	76	0.03983	1330	22.17
3	06-06-09		2:00	31.0	75	0.04025	1339	22.31
4	06-06-09	T-12-00-00-00-00-00-00-00-00-00-00-00-00-00	4:00	31.2	76	0.04271	1426	23.77
Slope	2. Total Count 3. Count/minu ar Regression of (K-factor):	0.00	aser [ l by (T 018	Dust Moni	tor	shnick TEOM <sup>™</sup>		
Correl	ation coefficient:	0.99	965					
Validit	y of Calibration F	Record: 5 Ju	ıne 20	10				
Remark	s:				rancoman martin			······
QC Re	eviewer: <i>YW F</i>	=una	Signat	ure:	1.	Date	e: 8 June	2009

# **EQUIPMENT CALIBRATION RECORD**

Mode Equip	facturer/Brand:	t Scale Setting:	Laser D SIBATA LD-3 A.005.1 <sup>-</sup> 799 CP	1a	itor	e.	
Opera	ntor:		Mike Sh	ek (MSKI	<u>M)</u>		
Standa	rd Equipment						
	e: No.: No: Calibration Date*	Sensor: 1	ii Ying Seco B 140AB2198 1200C1436	ondary S 99803 59803	K <sub>o</sub> : 12500		
Calibra	tion Result						
Sensit	ivity Adjustment	Scale Setting (Befor Scale Setting (After			799 CP 799 CP		~
Hour	Date (dd-mm-yy)	Time	I	bient dition R.H. (%)	Concentration <sup>1</sup> (mg/m <sup>3</sup> ) <b>Y-axis</b>	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
1	04-07-09	11:00 - 12:00		78	0.03713	1498	24.97
2	04-07-09	12:00 - 13:00	29.7	78	0.03520	1404	23.41
3	04-07-09	14:00 - 15:00		81	0.03891	1553	25.91
4	04-07-09	15:00 - 16:00		81	0.04025	1618	26.97
Slope Correla	2. Total Count 3. Count/minut ar Regression of (K-factor): ation coefficient:	0.0015 0.9907	r Dust Mon	itor	ISHNICK TEOM®		
Validity	∕ of Calibration F	Record: 3 July 2	010				
Remark	S;						
QC Re	viewer: <u>YW F</u>	<i>ung</i> Sign	ature:	r/-	Date	: 6 July 2	2009



## 綜合試驗有限公司 SOILS & MATERIALS ENGINEERING CO., LTD.

G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. 香港黃竹坑道37號利達中心地下,9樓,12樓,13樓及20樓 E-mail: smec@cigismec.com Website: www.cigismec.com

Tel: (852) 2873 6860 Fax: (852) 2555 7533



### CERTIFICATE OF CALIBRATION

Certificate No.:

09CA0611 01

Page

of

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Item tested

Description:

Sound Level Meter (Type 1)

Microphone

Manufacturer: Type/Model No.: RION CO., LTD.

RION CO., LTD.

Serial/Equipment No.:

**NL-31** 

UC-53A 88783

Adaptors used:

00320528 / N.007.03A

Item submitted by

Customer Name:

ENSR ASIA (HK) LTD.

Address of Customer:

Room 1213-1219, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Rd, Sha Tin, New Territories, HK

Request No.: Date of request:

10-Jun-2009

Date of test:

11-Jun-2009

Reference equipment used in the calibration

Description:

Model:

Serial No.

**Expiry Date:** 

Traceable to:

Multi function sound calibrator Signal generator

**B&K 4226** DS 360

2288444 33873

12-Jan-2010 12-Jun-2009

CIGISMEC CEPREI

Signal generator

DS 360

61227

18-Jul-2009

CEPREI

**Ambient conditions** 

Temperature:

23 ± 1 °C

Relative humidity:

55 ± 15 %

Air pressure:

995 ± 15 hPa

### Test specifications

The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 1, and the lab calibration procedure SMTP004-CA-152.

2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.

3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

#### **Test results**

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:

Date:

12-Jun-2009

Company Chop:

Huang Jian Mih/Feng Jun Qi

The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

Soils & Materials Engineering Co., Ltd

Form No.CARP152-1/Issue 1/Rev.C/01/02/2007



## 綜合試驗有限公司 SOILS & MATERIALS ENGINEERING CO., LTD.

G/E., 9/E., 12/E., 13/F. & 20/E., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. 香港黃竹坑道37號利達中心地下,9樓,12樓,13樓及20樓 E-mait: smec@cigismec.com Website: www.cigismec.com

Tel: (852) 2873 6860 Fax: (852) 2555 7533



## **CERTIFICATE OF CALIBRATION**

Certificate No.:

09CA0710 04-04

Page:

2

Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer:

Rion Co., Ltd.

Type/Model No.:

NC-73

Serial/Equipment No.:

10307223

Adaptors used;

Item submitted by

Curstomer:

ENSR ASIA (H.K.) LTD.

Address of Customer:

Request No.: Date of request:

10-Jul-2009

Date of test:

14-Jul-2009

#### Reference equipment used in the calibration

Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter Audio analyzer	Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B	Serial No. 2341427 2239857 2346941 61227 US36087050 GB41300350	Expiry Date: 23-Jun-2010 02-Dec-2009 03-Dec-2009 22-Jun-2010 03-Dec-2009 27-Nov-2009	Traceable to: SCL CEPREI CEPREI CEPREI CIGISMEC CEPREI
Universal counter	53132A	MY40003662	23-Jun-2010	CEPREI

#### Ambient conditions

Temperature:

23 ± 1 °C

Relative humidity:

55 ± 10 %

Air pressure:

995 ± 10 hPa

#### Test specifications

- 1. The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique. 2,
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference 3, pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

#### Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on page 2 of this certificate.

Huang-Jián M

**Approved Signatory:** 

Date:

14-Jul-2009

Company Chop:

Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

@ Soils & Materials Engineering Co., Ltd.

Form No.CARP156-1/Issue 1/Rev.D/01/03/2007