AECOM Asia Company Limited Tisch TSP Mass Flow Controlled High Volume Air Sampler Field Calibration Report

Station	Block B, Merit Industrial Centre (E-A14a)			Operator:	(am Yuen		
Cal. Date:	30/4/2024	_		— Next Due Date:	- 30/6	•	
Model No.:	TE-5170			Serial No.	10	10380	
Equipment No.:	A-001-15T	_				11	-
			Ambient	Condition			
Temperatur	e, Ta (K)	298.0	Pressure,	Pa (mmHg)		763.8	
			Orifice Transfer St	andard Information	n		
Serial	No:	843	Slope, mc	2.02	2014	Intercept, bc	-0.04198
Last Calibra	tion Date:	15-Jan-24		may Oatel I be	- (III.v. (D-/700)	(2007 - v1/2 *	
Next Calibra	tion Date:	16-Jan-25		mc x Qsta + bo	c = [H x (Pa/760) x	(298/1a)] , ,	
		,				8	
			Calibration of	TSP Sampler			
			Orfice		HV	S Flow Recorder	
Resistance Plate No.	DH (orifice), in. of water	[DH x (Pa/760) x (298/Ta)] ^{1/2}		Qstd (m³/min) X - axis	Flow Recorder Reading (CFM)	Continuous Flow Reading IC (CFI	
18	7.0		2.65	1.33	45.0	45.11	
13	6.0		2.46	1.24	40.0	40.10	
10	5.0		2.24	1.13	37.0	37.09	
7	3.9	1.98		1.00	32.0	32.08	
5	3.1		1.77	0.89	26.0	26.06	
By Linear Regress Blope , mw = Correlation Coeffic If Correlation Coeff	41.3577 cient* =		9946 ate.	Intercept, bw = _	-10.1	1963	8
	=-	٠	(4)				
			Set Point C	alculation			
From the TSP Field	Calibration Curve	e, take Qstd = 1.	30m³/min				
rom the Regression	n Equation, the "	Y" value accordir	ng to				
		mw x	c Qstd + bw = IC x	[(Pa/760) x (298/Ta)] ^{1/2}		
herefore, Set Point	;; IC = (mw x Qst	d + bw) x [(760	/ Pa) x (Ta / 298)] ^{1/2} =	:-	43.46	
Remarks:					il .		
QC Reviewer:	WS CHAN		Signature:	2-1	Date:	30/4/2024	



TE-5025A

RECALIBRATION DUE DATE:

January 15, 2025

Certificate of Calibration

Calibration Certification Information

Cal. Date: January 15, 2024

Rootsmeter S/N: 438320

Calibrator S/N: 0843

Ta: 293 °K

Pa: 755.9

°K

Operator: Jim Tisch
Calibration Model #:

mm Hg

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3890	3.2	2.00
2	3	4	1	0.9890	6.4	4.00
3	5	6	1	0.8790	8.0	5.00
4	7	8	1	0.8430	8.8	5.50
5	9	10	1	0.6960	12.8	8.00

Data Tabulation								
Vstd	Qstd	$\sqrt{\Delta H \left(\frac{Pa}{Pstd}\right) \left(\frac{Tstd}{Ta}\right)}$		Qa	$\sqrt{\Delta H \Big(Ta/Pa \Big)}$			
(m3)	(x-axis)	(y-axis)	Va	(x-axis)	(y-axis)			
1.0073	0.7252	1.4224	0.9958	0.7169	0.8805			
1.0030	1.0142	2.0116	0.9915	1.0026	1.2452			
1.0009	1.1387	2.2490	0.9894	1.1256	1.3921			
0.9998	1.1860	2.3588	0.9884	1.1724	1.4601			
0.9945	1.4288	2.8448	0.9831	1.4125	1.7609			
	m=	2.02014		m=	1.26498			
QSTD[b=	-0.04198	QA	b=	-0.02599			
	r=	0.99994		r=	0.99994			

	Calculation	S
Vstd=	ΔVoI((Pa-ΔP)/Pstd)(Tstd/Ta)	Va = ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/∆Time	Qa= Va/ΔTime
	For subsequent flow rate	e calculations:
Qstd=	$1/m \left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) \cdot b $	$\mathbf{Qa} = 1/m \left(\left(\sqrt{\Delta H \left(\text{Ta/Pa} \right)} \right) - b \right)$

	Standard	Conditions
Tstd:	298.15	'K
Pstd:	760	mm Hg
	К	ey
		er reading (in H2O)
		eter reading (mm Hg)
Ta: actual ab	solute temp	perature (°K)
	rometric pr	essure (mm Hg)
b: intercept		
m: slope		

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Type:			Laser Dus				
	urer/Brand:		SIBATA		•		
Model No.	.:		LD-3B	•			
Equipment No.:			A.005.16a	a			
Sensitivity	Adjustment Scal	le Setting:	521 CPM				•
Operator:			WS CHAN				-
Standard E	quimment						
	•						
Equipmen	t:		High Volu				_
Venue:			Ma Wan (Chung Vill	age		_
Model No.			TE-5170				_
Serial No.:			3383				-
Last Calibr	ation Date:		4-Aug-23				
Calibration	n Result						
Sensitivity	Adjustment Scal	le Setting (Befor	re Calibrati	on):		521	СРМ
Sensitivity	Adjustment Scal	le Setting (After	Calibration	n):		521	CPM
	Date:	There	A h : t	C	Concentration (1)	Total Count 2	Count/
Hour	Date	Time	Ambient (_	Total Count(2)	Count/ Minute③
	(dd/mm/yy)		Temp (°C)	R.H.(%)	(mg/m3) Y-axis		X-axis
1	15/08/23	9:00-10:00	32.0	80	0.038	1569	26.15
2	15/08/23	11:30-12:30	32.0	80	0.035	1335	22.25
3	15/08/23	13:50-14:50	32.0	80	0.041	1744	29.07
Note:	1 Monitoring	data was measu	red by Hig	h Volume	Sampler	-	
	2 Total Count	was logged by L	aser Dust I	Monitor			
	③ Count/minu	te was calculate	ed by (Total	Count/60	0)		
By Linear I	Regression of Y o		0.0015				
	Slope (K-factor): Correlation coef		0.0015		•		
	Correlation coel	incient.	0.9981				
Validity of	Calibration Reco	ord:	15-Au				
Remarks:							
1							
					0/		
QC	Reviewer:	Y.W. Fung	_ s	ignature:		Date:	15-Aug-23

Laser Dust Monitor Calibration

Type: Laser Dust Monitor

Manufacturer/Brand: SIBATA

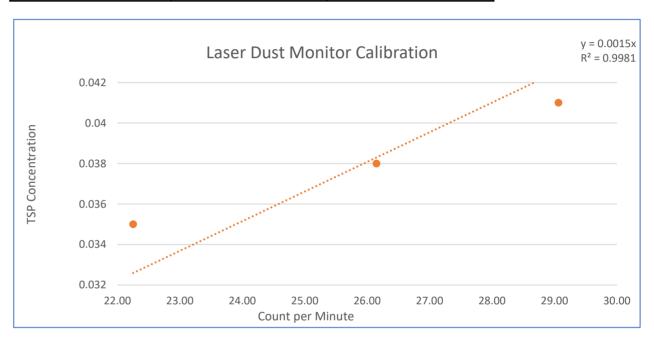
Model No.: LD-3B

Equipment No.: A.005.16a

Sensitivity Adjustment

Scale Setting: 521 CPM

Hour	Count/Minute	Concentration (mg/m3)
	X-axis	Y-axis
1	26.15	0.038
2	22.25	0.035
3	29.07	0.041



Type: Laser Dust Monitor					_		
Manufactu	ırer/Brand:		SIBATA				
Model No.	:		LD-3	•			
Equipment No.:			A.005.07a		=		
	Adjustment Sca	le Setting:	557CPM				•
,	•	J					•
Operator:			WS CHAN	<u> </u>			-
Standard E	Equimment						
Fauinmon	. .		High Valu	ma Camal	lor		
Equipment	Li.			me Sampl			-
Venue:			-	Chung Villa	age		-
Model No.			TE-5170				-
Serial No.:			3383				-
Last Calibr	ation Date:		4-Aug-23				-
Calibration	n Result						
Sensitivity	Adjustment Sca	le Setting (Befor	e Calibrati	on):		557	CPM
Sensitivity	Adjustment Sca	le Setting (After	Calibratio	n):		557	СРМ
Hour	Date	Time	Ambient	Condition	Concentration ①	Total Count 2	Count/
	(dd/mm/yy)		Temp (°C)	R.H.(%)	(mg/m3)		Minute ③
					Y-axis		X-axis
1	15/08/23	9:00-10:00	32.0	80	0.038	1542	25.70
2	15/08/23	11:30-12:30	32.0	80	0.035	1355	22.58
3	15/08/23	13:50-14:50	32.0	80	0.041	1792	29.87
Note:	<u> </u>	data was measu					
	~	was logged by L			ошр.с.		
	Ξ	te was calculate			1)		
	3) County Illino	ite was calculate	tu by (Tota	i Count/oc))		
By Linear F	Regression of Y o	on X					
-,	Slope (K-factor)		0.0015				
	Correlation coef		0.9975				
	Correlation coe	illicient.	0.5575		•		
Validity of Calibration Booms.			15 Aug 24				
Validity of Calibration Record:			15-Aug-24				
Domorka							
Remarks:							
					IA		
					0//		
QC I	Reviewer:	Y.W. Fung	_	Signature:	/	Date:	15-Aug-23

Laser Dust Monitor Calibration

Type: Laser Dust Monitor

Manufacturer/Brand: SIBATA

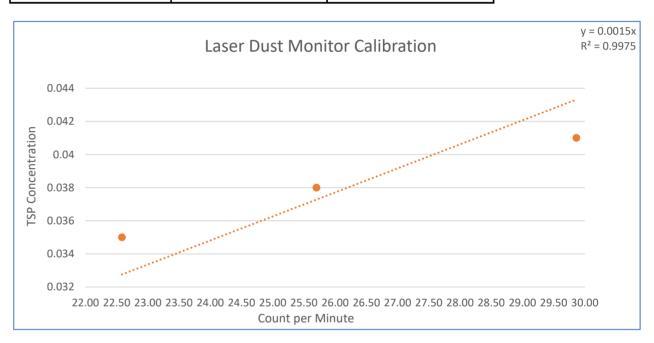
Model No.: LD-3

Equipment No.: A.005.07a

Sensitivity Adjustment

Scale Setting: 557 CPM

Hour	Count/Minute	Concentration (mg/m3)
	X-axis	Y-axis
1	25.70	0.0380
2	22.58	0.0350
3	29.87	0.0410



Type:			Laser Dust Monitor					
Manufacturer/Brand:			SIBATA		•			
Model No.:			LD-3					
Equipment No.:			A.005.09a	3			·	
Sensitivity	Adjustment Sca	le Setting:	797 CPM				ı	
Operator:			WS CHAN				-	
Ctandard F	Equimment							
Standard	Equimment							
Equipmen	+•		High Volu	me Samn	ler			
Venue:	. .		Ma Wan (•	
Model No.	:		TE-5170	onang viii	<u> </u>		•	
Serial No.:			3383				•	
	ation Date:		4-Aug-23					
							,	
Calibration	n Result							
Sensitivity	Adjustment Scal	le Setting (Befor	re Calibrati	on):		797	СРМ	
Sensitivity	Adjustment Scal	le Setting (After	Calibratio	n):		797	СРМ	
Hour	Date	Time	Ambient	Condition	Concentration ①	Total Count 2	Count/	
	(dd/mm/yy)		Temp (°C)	R.H.(%)	(mg/m3)		Minute(3)	
					Y-axis		X-axis	
1	15/08/23	9:00-10:00	32.0	80	0.038	1580	26.33	
2	15/08/23	11:30-12:30	32.0	80	0.035	1360	22.67	
3	15/08/23	13:50-14:50	32.0	80	0.041	1752	29.20	
Note:	(1) Monitoring				Sampler			
	2 Total Count							
	③ Count/minu	te was calculate	ed by (Total	Count/60))			
Dulingari	Regression of Y o	un V						
by Lilleal I	Slope (K-factor)		0.0015					
	Correlation coef		0.9985		•			
	Correlation coel	incient.	0.3363		•			
Validity of Calibration Record:			15-Aug-24					
Remarks:								
iterriarks.								
,								
,								
					9/			
QC I	Reviewer:	Y.W. Fung	_	ignature:		Date:	15-Aug-23	

Laser Dust Monitor Calibration

Type: Laser Dust Monitor

Manufacturer/Brand: SIBATA

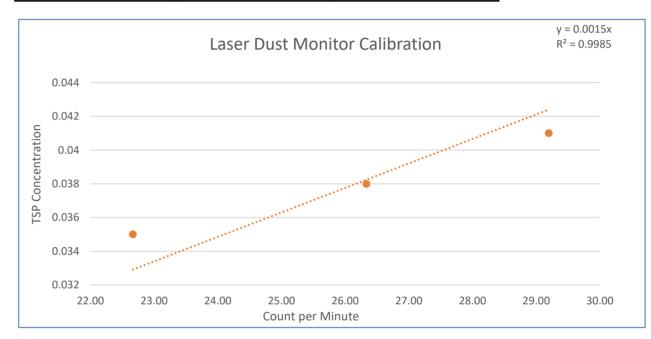
Model No.: LD-3

Equipment No.: A.005.09a

Sensitivity Adjustment

Scale Setting: 797 CPM

Hour	Count/Minute	Concentration (mg/m3)
	X-axis	Y-axis
1	26.33	0.0380
2	22.67	0.0350
3	29.20	0.0410



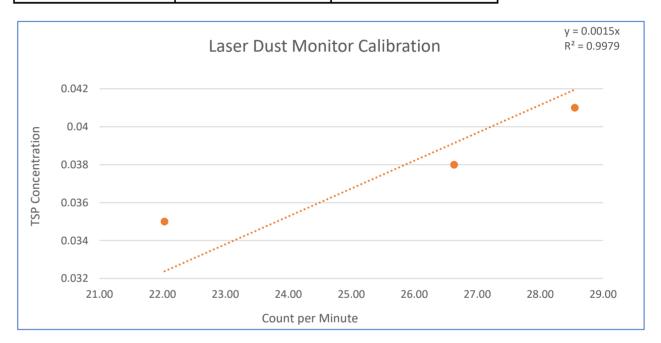
Type:			Laser Dus	_			
Manufacturer/Brand:			SIBATA	_			
Model No.	.:		LD-3	-			
Equipmen	t No.:		A.005.10a	-			
Sensitivity	Adjustment Sca	le Setting:	753 CPM				-
Operator:			WS CHAN				-
оролисо				<u> </u>			-
Standard E	quimment						
Equipmen	t:		High Volu	me Sampl	ler		_
Venue:			Ma Wan	Chung Villa	age		_
Model No.	.:		TE-5170				_
Serial No.:			3383				_
Last Calibr	ation Date:		4-Aug-23				_
							_
Calibration	n Result						
•	Adjustment Sca			-		753	_CPM
Sensitivity	Adjustment Sca	le Setting (After	Calibratio	n):		753	_CPM
							•
Hour	Date	Time	Ambient	Condition	Concentration 1	Total Count 2	Count/
	(dd/mm/yy)		Temp (°C)	R.H.(%)	(mg/m3)		Minute(3)
					Y-axis		X-axis
1	15/08/23	9:00-10:00	32.0	80	0.0380	1598	26.63
2	15/08/23	11:30-12:30	32.0	80	0.0350	1322	22.03
3	15/08/23	13:50-14:50	32.0	80	0.0410	1713	28.55
Note:	1 Monitoring	data was measu	ired by Hig	h Volume	Sampler		
	2 Total Count	was logged by L	aser Dust I	Monitor			
	③ Count/minu	te was calculate	ed by (Tota	Count/60	0)		
By Linear F	Regression of Y c	n X					
	Slope (K-factor)	:	0.0015				
	Correlation coef	fficient:	0.9979				
Validity of Calibration Record:			15-Aug-24				
Remarks:							
					10		
					0/		
QC I	Reviewer:	Y.W. Fung	_	Signature:	/	Date:	15-Aug-23

Laser Dust Monitor Calibration

Type: Laser Dust Monitor Manufacturer/Brand: SIBATA LD-3 Model No.: A.005.10a Equipment No.: Sensitivity Adjustment

753 CPM Scale Setting:

Hour	Count/Minute	Concentration (mg/m3)
	X-axis	Y-axis
1	26.63	0.0380
2	22.03	0.0350
3	28.55	0.0410



Prepare by: WS CHAN 15-Aug-23 Date

Type:			Laser Dus	t Monitor			
	ufacturer/Brand:			SIBATA			
Model No.	.:		LD-3				-
Equipmen	t No.:		A.005.11a	1			-
Sensitivity	Adjustment Sca	le Setting:	799 CPM	-			
Operator:			WS CHAN	-			
Standard E	Equimment						
	•						
Equipmen	t:		High Volu				-
Venue:			Ma Wan (Chung Vill	age		-
Model No.			TE-5170				-
Serial No.:			3383				-
Last Calibr	ation Date:		4-Aug-23				-
Calibration	n Result						
-	Adjustment Sca					799	CPM
Sensitivity	Adjustment Sca	le Setting (After	Calibration	ո)։		799	CPM
Hour	Date	Time	Ambient (Condition	Concentration 1	Total Count 2	Count/
lioui	(dd/mm/yy)	Time	Temp (°C)	R.H.(%)	(mg/m3)	Total count	Minute 3
	(uu/11111/yy)		Temp (c)	11.11.(70)	Y-axis		X-axis
1	15/08/23	9:00-10:00	32.0	80	0.038	1536	25.60
2	15/08/23	11:30-12:30	32.0	80	0.035	1321	22.02
3	15/08/23	13:50-14:50	32.0	80	0.041	1721	28.68
Note:	1 Monitoring	data was measu	red by Hig	h Volume	Sampler	-	-
	2 Total Count	was logged by L	aser Dust I	Monitor			
	③ Count/minu	te was calculate	ed by (Total	Count/60	0)		
Dulinon		V					
Бу Шеаг і	Regression of Y o Slope (K-factor)		0.0015				
	Correlation coef		0.9982				
			0.3302				
Validity of	Calibration Reco	ord:	15-Au	ıg-24			
Remarks:							
·							
					14		
					1/		
QC	Reviewer:	Y.W. Fung	_ S	ignature:	//	Date:	15-Aug-23

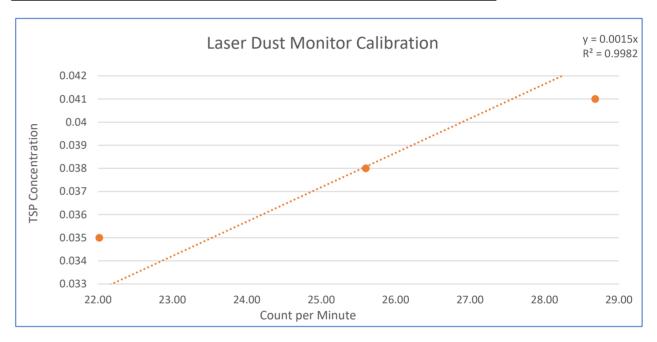
Laser Dust Monitor Calibration

Type: Laser Dust Monitor Manufacturer/Brand: SIBATA LD-3 Model No.: A.005.11a Equipment No.:

Sensitivity Adjustment

Scale Setting: 799 CPM

Hour	Count/Minute	Concentration (mg/m3)
	X-axis	Y-axis
1	25.60	0.0380
2	22.02	0.0350
3	28.68	0.0410



Prepare by: WS CHAN 15-Aug-23 Date

Type:			Laser Dust Monitor				
Manufactu	urer/Brand:		SIBATA	·			•
Model No.	:		LD-3B				•
Equipment	t No.:		A.005.13a	3			•
	Adjustment Sca	le Setting:	643 CPM				•
							•
Operator:			WS CHAN				
Standard E	Equimment						
Equipment	t·		High Volu	me Sampl	ler		
Venue:				Chung Villa			•
Model No.	:		TE-5170				•
Serial No.:			3383				•
	ation Date:		4-Aug-23				•
							•
Calibration	n Result						
Sensitivity	Adjustment Sca	le Setting (Befor	e Calibratio	on):		643	CPM
Sensitivity	Adjustment Sca	le Setting (After	Calibration	n):		643	CPM
Hour	Date	Time	Ambient	Condition	Concentration ①	Total Count 2	Count/
	(dd/mm/yy)		Temp (°C)	R.H.(%)	(mg/m3)		Minute ③
					Y-axis		X-axis
1	15/08/23	9:00-10:00	32.0	80	0.038	1512	25.20
2	15/08/23	11:30-12:30	32.0	80	0.035	1338	22.30
3	15/08/23	13:50-14:50	32.0	80	0.041	1703	28.38
Note:	1 Monitoring	data was measu	red by Higl	h Volume :	Sampler		
	2 Total Count	was logged by L	aser Dust N	Monitor			
	③ Count/minu	ite was calculate	d by (Total	Count/60)		
By Linear F	Regression of Y o	n X					
	Slope (K-factor)		0.0015				
	Correlation coef	fficient:	0.9989				
Validity of	Calibration Reco	ord:	15-A	ug-24			
Remarks:							
					M		
001	Daviaa	V.W. Free=		``		D-1	1F A 22
QC	Reviewer:	Y.W. Fung	-	Signature:		. Date:	15-Aug-23

Laser Dust Monitor Calibration

Type: Laser Dust Monitor

Manufacturer/Brand: SIBATA

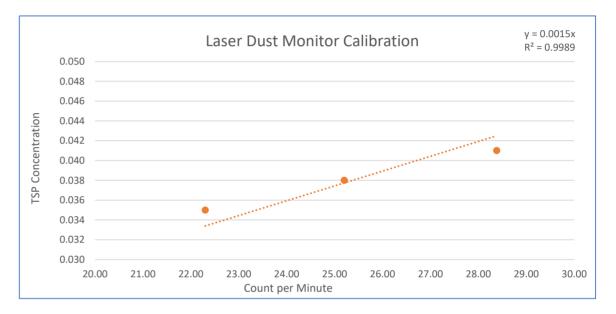
Model No.: LD-3B

Equipment No.: A.005.13a

Sensitivity Adjustment

Scale Setting: 643 CPM

Hour	Count/Minute	Concentration (mg/m3)
	X-axis	Y-axis
	0.00	0.0000
1	25.20	0.0380
2	22.30	0.0350
3	28.38	0.0410





香港新界葵涌永基路22-24號好爸爸創科大廈 Good Ba Ba Hitech Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong Tel: (852) 2873 6860 Fax: (852) 2555 7533 E-mail: smec@cigismec.com Website: www.cigismec.com





CERTIFICATE OF CALIBRATION

Certificate No.:

23CA1109 04-02

Page:

2

Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer:

B&K 4231

Type/Model No.: Serial/Equipment No.:

3014024 / N004.04

Adaptors used

Item submitted by

Curstomer Address of Customer:

Request No.

AECOM ASIA CO LIMITED

Date of receipt

09-Nov-2023

Date of test:

13-Nov-2023

Reference equipment used in the calibration

Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter	Model:	Serial No.	Expiry Date:	Traceable to:
	B&K 4180	3257888	15-Aug-2024	SCL
	B&K 2673	3353200	13-Jun-2024	CEPREI
	B&K 2610	2346941	13-Jun-2024	CEPREI
	DS 360	33873	31-Jan-2024	CEPREI
	34401A	US36087050	01-Jun-2024	CEPREI
0 0	34401A 8903B 53132A	US36087050 GB41300350 MY40003662		

Ambient conditions

Temperature:

21 ± 1 °C

Relative humidity: Air pressure:

60 ± 10 % 1010 ± 5 hPa

Test specifications

- 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 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

Approved Signatory:

14-Nov-2023

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. The results apply to the item as received

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

宗合試驗

有限公司

HKAS has accredited this laboratory (Reg. No. HOKLAS 028) under HOKLAS for specific calibration activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this certificate are traceable to the International System of Units (SI) or recognised measurement standards. The results relate only to the item(s) calibrated. This certificate shall not be reproduced except in full without approval of the laboratory.



綜 合 試 驗 有 限 公 司 SOILS & MATERIALS ENGINEERING CO., LTD.

香港新界葵涌永基路22-24號好爸爸創科大廈 Good Ba Ba Hitech Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong Tel: (852) 2873 6860 Fax: (852) 2555 7533 E-mail: smec@cigismec.com Website: www.cigismec.com



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

23CA1109 04-02

of

Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

			(Output level in dB re 20 μPa
Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB
1000	94.00	94.08	0.10

Sound Pressure Level Stability - Short Term Fluctuations 2.

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz

STF = 0.017 dB

Estimated expanded uncertainty

0.005 dB

3. **Actual Output Frequency**

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz

Actual Frequency = 1000.0 Hz

Estimated expanded uncertainty

0.1 Hz

Coverage factor k = 2.2

Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz

TND = 0.8 %

Estimated expanded uncertainty

0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date:

Fung Chi Yip 3-Nov-2023 Checked by

Date:

14-Nov-2023

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

- End

C Soils & Materials Engineering Co., Ltd.

Form No.CARP156-2/Issue 1/Rev.C/01/05/2005



綜合試驗有限公司

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CERTIFICATE OF CALIBRATION

Certificate No.:

24CA0229 06-02

of

Item tested

Description: Manufacturer: Acoustical Calibrator (Class 1)

AECOM ASIA CO LIMITED

34246490 / N.004.10

Rion Co., Ltd. NC-74

Type/Model No.: Serial/Equipment No.:

Adaptors used:

Item submitted by

Curstomer:

Address of Customer: Request No.:

Date of receipt:

29-Feb-2024

Date of test:

04-Mar-2024

Reference equipment used in the calibration

Expiry Date: Traceable to: Serial No. Description: Model: 15-Aug-2024 Lab standard microphone B&K 4180 3257888 CEPREI 3353200 13-Jun-2024 B&K 2673 Preamplifier **CEPREI** Measuring amplifier B&K 2610 2346941 13-Jun-2024 **CEPREI** 61227 28-Jun-2024 DS 360 Signal generator 01-Jun-2024 CEPREI 34401A US36087050 Digital multi-meter **CEPREI** 8903B GB41300350 13-Jun-2024 Audio analyzer **CEPREI** 07-Jun-2024 MY40003662 53132A Universal counter

Ambient conditions

Temperature:

20 ± 1 °C

Relative humidity:

60 ± 10 %

Air pressure: 1010 ± 5 hPa

Test specifications

- 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 pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure

Test results

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

Approved Signatory:

05-Mar-2024

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. The results apply to the item as received.

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

24CA0229 06-02

Page:

of

Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

(Output level in dB re 20 µPa) Estimated Expanded Measured Output **Output Sound Pressure** Frequency Level Setting Sound Pressure Level Uncertainty Shown 94.43 0.10 1000 94.00

Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz

STF = 0.009 dB

Estimated expanded uncertainty

0.005 dB

Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz

Actual Frequency = 1002.1

Estimated expanded uncertainty

Coverage factor k = 2.2

Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz

TND = 1.8 %

Estimated expanded uncertainty

0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End

Calibrated by: Date:

Fung Chi Yin 04-Mar-2024 Checked by

Date:

05-Mar-2024

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No CARP156-2/Issue 1/Rev.C/01/05/2005



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CERTIFICATE OF CALIBRATION

Certificate No.:

23CA1030 01-03

Page:

of :

Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer: Type/Model No.:

CAL21

Serial/Equipment No.:

34113610(2011) / N.004.11

Adaptors used:

Yes (BAC21)

Item submitted by

Curstomer: Address of Customer: AECOM ASIA CO., LTD.

Request No.:

_

Date of receipt:

30-Oct-2023

Date of test:

01-Nov-2023

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	3257888	15-Aug-2024	SCL
Preamplifier	B&K 2673	3353200	13-Jun-2024	CEPREI
Measuring amplifier	B&K 2610	2346941	13-Jun-2024	CEPREI
Signal generator	DS 360	33873	31-Jan-2024	CEPREI
Digital multi-meter	34401A	US36087050	01-Jun-2024	CEPREI
Audio analyzer	8903B	GB41300350	13-Jun-2024	CEPREI
Universal counter	53132A	MY40003662	07-Jun-2024	CEPREI

Ambient conditions

Temperature:

22 ± 1 °C

Relative humidity: Air pressure: 55 ± 10 % 1005 ± 5 hPa

Test specifications

- 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.
- 2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- 3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference 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.

Approved Signatory:

Feng Jungi

Date: 02-Nov-2023

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. The results apply to the item as received.

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

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 23CA1030 01-03

Page:

of 2

Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

Frequency	Output Sound Pressure	Measured Output	Estimated Expanded
Shown	Level Setting	Sound Pressure Level	Uncertainty
Hz	dB	dB	dB
1000	94.00	94.14	0.10

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz

STF = 0.013 dB

Estimated expanded uncertainty

0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz

Actual Frequency = 1002.4 Hz

Estimated expanded uncertainty

0.1 H

Coverage factor k = 2.2

I, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz

TND = 1.7 %

Estimated expanded uncertainty

0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

End -

Calibrated by:

Date:

Fung Chi Yip 01-Nov-2023 Checked by

Date:

Chan Yuk Yiu 02-Nov-2023

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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CERTIFICATE OF CALIBRATION

Certificate No.:

23CA1109 04-01

Page

Microphone

B&K

3005374

4189

of

Preamp

ZC0032

B&K

31351

Item tested

Description: Manufacturer: Type/Model No.

Adaptors used:

Sound Level Meter (Class 1) 2250

Serial/Equipment No .:

3001291

AECOM ASIA CO LIMITED

Item submitted by

Customer Name: Address of Customer:

Request No.: Date of receipt:

09-Nov-2023

Date of test:

13-Nov-2023

Reference equipment used in the calibration

Multi function sound calibrator Signal generator

B&K 4226

Model: DS 360

Serial No. 2288444 33873

Expiry Date: 28-Aug-2024 31-Jan-2024

Traceable to: CIGISMEC CEPREI

Ambient conditions

Temperature: Relative humidity: 21 ± 1 °C 60 ± 10 % 1010 ± 5 hPa

Air pressure:

Test specifications

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

14-Nov-2023

Company Chop:

有限公司

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. The results apply to the item as received.

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 23CA1109 04-01

Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Expanded Uncertanity (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	
	С	Pass	0.8	
	Lin	Pass	1.6	
Linearity range for Leg	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range		0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
Frequency weightings	Α	Pass	0.3	
500 ST ST	С	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
and the street of the street o	Single Burst Slow	Pass	0.3	
Peak response	Single 100µs rectangular pulse	Pass	0.3	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/103 at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/104 at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Expanded Uncertanity (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date:

Fung Chi Yip 13-Nov-2023-

Date: 14-Nov-2023

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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CERTIFICATE OF CALIBRATION

Certificate No.:

24CA0229 06-01

Microphone

B&K

4950

2665582

of

Preamp

ZC0032

B&K

17190

Item tested

Description: Manufacturer: Type/Model No.:

Adaptors used: Item submitted by Sound Level Meter (Class 1)

2250-L 2681366

Serial/Equipment No.:

AECOM ASIA CO LTD

Customer Name: Address of Customer:

Request No.: 29-Feb-2024 Date of receipt:

Date of test:

04-Mar-2024

Reference equipment used in the calibration

Description:

Multi function sound calibrator Signal generator

Model: B&K 4226 DS 360

Serial No. 2288444

61227

Expiry Date: 28-Aug-2024 28-Jun-2024

Traceable to: CIGISMEC CEPREL

Ambient conditions

Temperature:

20 ± 1 °C

Relative humidity: Air pressure:

55 ± 10 % 1010 ± 5 hPa

Test specifications

- The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- The electrical tests were performed using an electrical signal substituted for the microphone which was removed and 2, replaced by an equivalent capacitance within a tolerance of ±20%.
- 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:

05-Mar-2024

Company Chop:

綜合試驗

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. The results apply to the item as received.

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CERTIFICATE OF CALIBRATION

(Continuation Page)

24CA0229 06-01 of Certificate No.:

Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

		Expanded	Coverage
Subtest:	Status:	Uncertanity (dB)	Factor
A	Pass	0.3	
	Pass	0.8	
Lin	Pass	1.6	
At reference range . Step 5 dB at 4 kHz	Pass	0.3	
	Pass	0.3	
С	Pass	0.3	
Lin	Pass	0.3	
Single Burst Fast	Pass	0.3	
Single Burst Slow	Pass	0.3	
Single 100µs rectangular pulse	Pass	0.3	
Crest factor of 3	Pass	0.3	
Single burst 5 ms at 2000 Hz	Pass	0.3	
Repeated at frequency of 100 Hz	Pass	0.3	
1 ms burst duty factor 1/103 at 4kHz	Pass	0.3	
	Pass	0.3	
	Pass	0.4	
Single burst 10 ms at 4 kHz	Pass	0.4	
SPL	Pass	0.3	
Leq	Pass	0.4	
	A C Lin At reference range, Step 5 dB at 4 kHz Reference SPL on all other ranges 2 dB below upper limit of each range 2 dB above lower limit of each range At reference range, Step 5 dB at 4 kHz A C Lin Single Burst Fast Single Burst Slow Single 100µs rectangular pulse Crest factor of 3 Single burst 5 ms at 2000 Hz Repeated at frequency of 100 Hz 1 ms burst duty factor 1/10³ at 4kHz 1 ms burst duty factor 1/10⁴ at 4kHz Single burst 10 ms at 4 kHz Single burst 10 ms at 4 kHz SPL	A Pass C Pass Lin Pass At reference range , Step 5 dB at 4 kHz Pass Reference SPL on all other ranges 2 dB below upper limit of each range 2 dB above lower limit of each range At reference range , Step 5 dB at 4 kHz A Pass C Pass C Pass Lin Pass Single Burst Fast Pass Single Burst Slow Pass Single Burst Slow Pass Single 100 µs rectangular pulse Pass Crest factor of 3 Pass Repeated at frequency of 100 Hz Pass 1 ms burst duty factor 1/10 ³ at 4kHz Pass 1 ms burst duty factor 1/10 ⁴ at 4kHz Pass Single burst 10 ms at 4 kHz Pass SPL	A Pass 0.3 C Pass 0.8 Lin Pass 1.6 At reference range , Step 5 dB at 4 kHz Pass 0.3 Reference SPL on all other ranges Pass 0.3 2 dB below upper limit of each range Pass 0.3 2 dB above lower limit of each range Pass 0.3 At reference range , Step 5 dB at 4 kHz Pass 0.3 A Pass 0.3 C Pass 0.3 Lin Pass 0.3 Single Burst Fast Pass 0.3 Single Burst Slow Pass 0.3 Single 100μs rectangular pulse Pass 0.3 Crest factor of 3 Pass 0.3 Single burst 5 ms at 2000 Hz Pass 0.3 Repeated at frequency of 100 Hz Pass 0.3 1 ms burst duty factor 1/10 ⁴ at 4kHz Pass 0.3 1 ms burst duty factor 1/10 ⁴ at 4kHz Pass 0.3 Single burst 10 ms at 4 kHz Pass 0.4 <tr< td=""></tr<>

Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

dB) Factor	Uncertanity (dB)	Subtest	Test:
	0.3	onse Weighting A at 125 Hz	Acoustic response
	0.5	Weighting A at 8000 Hz	
			Acoustic response

Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date:

Fung Chi Yip 04-Mar-2024 Checked by

Chan Yuk Yiu 05-Mar-2024 Date:

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

End

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CERTIFICATE OF CALIBRATION

Certificate No.: 23CA1030 01-01 Page of 2 Item tested Description: Sound Level Meter (Type 1) Microphone Pream Manufacturer: B&K B&K B&K Type/Model No.: 2270 4950 ZC0032 Serial/Equipment No.: 2644597 2879980 29398 Adaptors used: Item submitted by Customer Name: AECOM ASIA CO. LTD. Address of Customer Request No.:

Date of test: 31-Oct-2023

Reference equipment used in the calibration

30-Oct-2023

Description: Model: Serial No. **Expiry Date:** Traceable to: Multi function sound calibrator B&K 4226 2288444 28-Aug-2024 CIGISMEC Signal generator DS 360 33873 31-Jan-2024 CEPREL

Ambient conditions

Date of receipt:

21 ± 1 °C Temperature: Relative humidity: 60 ± 10 % 1005 ± 5 hPa Air pressure:

Test specifications

- The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152
- 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%.
- The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference 3. 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

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

Actual Measurement data are documented on worksheets.

Approved Signatory: Fena Juna

01-Nov-2023

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. The results apply to the item as received

C Soils & Materials Engineering Co., Ltd.

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

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No : 23CA1030 01-01

Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Uncertanity (dB) / Coverage Factor
Self-generated noise	A	Pass	0.3
	С	Pass	1.0 2.1
	Lin	Pass	2.0 2.2
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3
	Reference SPL on all other ranges	Pass	0.3
	2 dB below upper limit of each range	Pass	0.3
	2 dB above lower limit of each range	Pass	0.3
Linearity range for SPL	At reference range, Step 5 dB at 4 kHz	Pass	0.3
Frequency weightings	Α	Pass	0.3
	С	Pass	0.3
	Lin	Pass	0.3
Time weightings	Single Burst Fast	Pass	0.3
	Single Burst Slow	Pass	0.3
Peak response	Single 100µs rectangular pulse	Pass	0.3
R.M.S. accuracy	Crest factor of 3	Pass	0.3
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3
	Repeated at frequency of 100 Hz	Pass	0.3
Time averaging	1 ms burst duty factor 1/103 at 4kHz	Pass	0.3
	1 ms burst duty factor 1/104 at 4kHz	Pass	0.3
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4
Overload indication	SPL	Pass	0.3
	Leg	Pass	0.4

Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Uncertanity (dB) / Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3
	Weighting A at 8000 Hz	Pass	0.5

Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by: ung Chi Yip Date: 31-Oct-2023 01-Nov-2023

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No.CARP152-2/Issue 1/Rev.C/01/02/2007



香港新界葵涌永基路22-24號好爸爸創科大廈 Good Ba Ba Hitech Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong Tel: (852) 2873 6860 Fax: (852) 2555 7533 E-mail: smec@cigismec.com Website: www.cigismec.com



CERTIFICATE OF CALIBRATION

Certificate No.: 23CA1030 01-02 of Item tested Description: Sound Level Meter (Type 1) Microphone Pream Manufacturer: B&K B & K B & K Type/Model No.: 2270 4189 ZC0032 Serial/Equipment No.: 3007965 2846461 17965 Adaptors used: Item submitted by Customer Name: AECOM ASIA CO. LTD. Address of Customer: Request No.: Date of receipt: 30-Oct-2023 Date of test: 31-Oct-2023 Reference equipment used in the calibration

Serial No.

2288444

33873

Ambient conditions

Multi function sound calibrator

Description:

Signal generator

Temperature: Relative humidity: Air pressure:

21 ± 1 °C 60 ± 10 % 1005 ± 5 hPa

Model:

DS 360

B&K 4226

Test specifications

- The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 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%.
- 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

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

Actual Measurement data are documented on worksheets

Approved Signatory:

01-Nov-2023

Company Chop:

Expiry Date:

28-Aug-2024

31-Jan-2024

Traceable to:

CIGISMEC

CEPREI

Comments: The results reported in his 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. The results apply to the item as received.

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

HKAS has accredited this laboratory (Reg. No. HOKLAS 028) under HOKLAS for specific calibration activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this certificate are traceable to the International System of Units (SI) or recognised measurement standards. The results relate only to the item(s) calibrated. This certificate shall not be reproduced except in full without approval of the laboratory.



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

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 23CA1030 01-02

Electrical Tests

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Linearity range for SPL	At reference range, Step 5 dB at 4 kHz	Pass	0.3
Frequency weightings	Α	Pass	0.3
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Peak response	Single 100µs rectangular pulse	Pass	0.3
R.M.S. accuracy	Crest factor of 3	Pass	0.3
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3
	Repeated at frequency of 100 Hz	Pass	0.3
Time averaging	1 ms burst duty factor 1/10 ³ at 4kHz	Pass	0.3
	1 ms burst duty factor 1/104 at 4kHz	Pass	0.3
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4
Overload indication	SPL	Pass	0.3
	Leg	Pass	0.4

Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

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Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

End Calibrated by: Funa Chi Yin Date: 31-Oct-2023 Date: 01-Nov-2023

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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