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

Station	Block B, Merit Industrial Centre (E-A14a)	Operator:	Shum Kam Yuen	
Cal. Date:	1/3/2024	Next Due Date:	1/5/2024	
Model No .:	TE-5170	Serial No.	10380	_
Equipment No.:	A-001-15T			

Ambient Condition				
Temperature, Ta (K)	289.0	Pressure, Pa (mmHg)	776.0	

Orifice Transfer Standard Information							
Serial No: 843 Slope, mc 2.02014 Intercept, bc -0.0419							
Last Calibration Date:	15-Jan-24	mc x Qstd + bc = [H x (Pa/760) x (298/Ta)] ^{1/2}					
Next Calibration Date:	16-Jan-25						

		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 (m ³ /min) X · axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis	
18	7.1	2.73	1.37	45.0	46.17	
13	6.0	2.51	1.26	40.0	41.04	
10	5.1	2.32	1.17	36.0	36.94	
7	4.1	2.08	1.05	30.0	30.78	
5	2.8	1.72	0.87	24.0	24.63	
By Linear Regress Slope , mw = Correlation Coeffic	ion of Y on X 43.3192 cient* =	0.9975	Intercept, bw =	-13.7044		
From the TSP Field	Calibration Curve,	Set Point C take Qstd = 1.30m ³ /min	alculation			
Therefore, Set Point	t; IC = (mw x Qstd	mw x Qstd + bw = IC x + bw) x [(760 / Pa) x (Ta / 298)	[(Pa/760) x (298/Ta] ^{1/2} =	a)] ^{1/2}	41.53	
Remarks:						
QC Reviewer:	WS CHAN	Signature:	Pr	Date:	1/3/2024	

C:\HVS Calibration Certificate (Existing)\Central Kwc



RECALIBRATION

DUE DATE:

January 15, 2025

Certificate of Calibration

			Calibration	Certificati	on Informat	tion		
Cal. Date:	January 15	, 2024	Roots	smeter S/N: 438320 Ta: 293			293	°K
Operator:	Jim Tisch			Pa:			755.9	mm Hg
Calibration	Model #:	TE-5025A	Calil	brator S/N:	0843			0
		Vol Init	Val Einal	A\/	ATimes	AD		1
	Run	(m3)	(m3)	(m3)	(min)	(mm Hg)	Δri (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 Tabula	tion			
		1	/ Pa	V Tetel V			· · · · · · · · · · · · · · · · · · ·	
	Vstd	Qstd	$\sqrt{\Delta H \left(\frac{\Gamma a}{Pstd} \right)}$	$-)(-\frac{1510}{Ta})$		Qa	√ΔH(Ta/Pa)	
	(m3)	(x-axis)	(y-ax	is)	Va	(x-axis)	(y-axis)	
	1.0073	1.0073 0.7252 1.42		24	0.9958	0.7169	0.8805	
	1.0030	.0030 1.0142 2.01		16	0.9915	1.0026	1.2452	
	1.0009	1.1387	2.249	90	0.9894	1.1256	1.3921	
	0.9998	1.1860	2.358	38	0.9884	1.1724	1.4601	
	0.9945	1.4288	2.844	18	0.9831	1.4125	1.7609	
	Actor	m=	2.020	014 198 QA 994			1.26498	
	עזיטן		-0.041			D =	-0.02599	
	L	1-				[0.99994	
				Calculatio	ns			
	Vstd=	ΔVol((Pa-ΔP)	/Pstd)(Tstd/Ta	Va= ΔVol((Pa-ΔP)/Pa) Qa= Va/ΔTime			P)/Pa)	
	Qstd=	Vstd/∆Time					a/ΔTime	
			For subsequ	ent flow ra	te calculation	ns:		
	Qstd=	1/m 🛛 🗸 🗸 🕹	Pa Pstd (Tstd Ta))-b)	Qa=	1/m ((√ΔH	(Ta/Pa))-b)	
	Standard	Conditions	1					
Tstd:	298.15	K		Ì		RECA	IBRATION	
Pstd:	760	mm Hg					f 111	
Mile and the set	K	ey	1100)		US EPA reco	mmends ar	inual recalibratio	n per 1998
AL: Callotato	JI manomet	er reading (II	1 H2U)		40 Code	or Federal F	egulations Part 5	U to 51,
ar actual at	solute tem	erature /ºK	<u>, , , , , , , , , , , , , , , , , , , </u>		Appendix B to Part 50, Reference Method for the			
Pa: actual ha	arometric pr	essure (mm l	Hg)		Determinat	ion of Suspi	ended Particulate	Matter in
: intercept					the	e Atmosphe	re, 9.2.17, page 3	0
n: slope				L				

Tisch Environmental, Inc.

145 South Miami Avenue

Village of Cleves, OH 45002

<u>www.tisch-env.com</u> TOLL FREE: (877)263-7610 FAX: (513)467-9009

Type:	Type: Laser Dust Monitor						
Manufact	urer/Brand:		SIBATA				-
Model No	D.:		LD-3B				-
Equipme	Equipment No.: A.005.16a				-		
Sensitivit	y Adjustment Sca	le Setting:	521 CPM				-
		-	·			•	
Operator	:		WS CHAN	l			-
Standard	Equimment						
	- 4						
Equipme	nt:		High Volu	me Samp	ler		_
Venue:			Ma Wan	Chung Vill	age		_
Model No	b .:		TE-5170				
Serial No.	:		3383				-
Last Calib	ration Date:		4-Aug-23				
Calibratia	n Decult						
Calibratic	in Result						
Sonsitivit	v Adjustment Sca	le Setting (Befor	e Calibrati	on).		521	CPM
Sensitivit	v Adjustment Sca	le Setting (After	Calibratio	n).		521	
Scholente	y Augustinent seu		canoratio				-
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	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	Monitor			
	③ Count/minu	ite was calculate	ed by (Tota	l Count/60	0)		
By Linear	Regression of Y o	on X					
-,	Slope (K-factor)	:	0.0015				
Correlation coefficient:		0.9981		-			
					•		
Validity o	f Calibration Reco	ord:	15-A	ug-24	-		
Remarks							
nemarks.							

Laser Dust Monitor Calibration

Туре:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3B
Equipment No.:	A.005.16a
Sensitivity Adjustment	
Scale Setting:	521 CPM

Hour	Count/Minute	C
	X-axis	
1	26.15	
2	22.25	
3	29.07	



Prepare by:	WS CHAN
Date	15-Aug-23

QC Reviewer:

Y.W. Fung

Signature:

Date: 15-Aug-23

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Type:	Type: Lase			aser Dust Monitor			
Manufact	urer/Brand:		SIBATA				
Model No.:			LD-3				
Equipmen	Equipment No.:			a			
Sensitivity	v Adjustment Sca	le Setting:	557CPM				
Operator:			WS CHAN				
Standard	Equimment						
Equipmen	it:		High Volu	me Samp	ler		
Venue:			Ma Wan	Chung Vill	age		
Model No	.:		TE-5170				
Serial No.	:		3383				
Last Calib	ration Date:		4-Aug-23				
Calibratio	n Result						
Calibratio	intestit						
Sensitivity	v Adjustment Sca	le Setting (Befor	re Calibrati	on):		557	СРМ
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:	1 Monitoring	data was measu	ired by Hig	h Volume	Sampler	-	-
	 Total Count 	was logged by L	aser Dust	Monitor			
	③ Count/minu	te was calculate	ed by (Tota	l Count/60))		
By Linear	Regression of Y C	on X	0.0045				
Slope (K-factor):		0.0015		-			
	Correlation coe	fficient:	0.9975				
Validity of Calibration Record:		15-Aug-24					
Remarks:							

Laser Dust Monitor Calibration

Туре:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3
Equipment No.:	A.005.07a
Sensitivity Adjustment	
Scale Setting:	557 CPM

Hour	Count/Minute	C
	X-axis	
1	25.70	
2	22.58	
3	29.87	



Prepare by:	WS CHAN
Date	15-Aug-23

Y.W. Fung

Signature:

Date: 15-Aug-23

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Type:	be: Laser Dust		t Monitor				
Manufacturer/Brand:		SIBATA				1	
Model No.:		LD-3					
Equipmer	nt No.:		A.005.09a	a			
Sensitivity	y Adjustment Sca	le Setting:	797 CPM				r r
Operator	:		WS CHAN	1			
Standard	Equimment						
Equipmer	nt:		High Volu	ime Sampl	er		r
Venue:			Ma Wan (Chung Villa	age		r
Model No	D.:		TE-5170				
Serial No.	:		3383				
Last Calib	ration Date:		4-Aug-23				,
Calibratio	n Result						
Sensitivity	y Adjustment Sca	le Setting (Befor	e Calibrati	ion):		797	CPM
Sensitivity	y Adjustment Sca	le Setting (After	Calibratio	n):		797	CPM
Hour	Date	Time	Ambient	Condition	Concentration(1)	Total Count(2)	Count/
nour	(dd/mm/w/)	Time	Temp (°C)		(mg/m3)		Minute (3)
	(00/1111/ 99)		Temp (e)	11.11.(70)	(116/1115)		Number (
-					Y-axis		X-axis
1	15/08/23	9:00-10:00	32.0	80	Y-axis 0.038	1580	X-axis 26.33
2	15/08/23 15/08/23	9:00-10:00 11:30-12:30	32.0 32.0	80 80	Y-axis 0.038 0.035	1580 1360	X-axis 26.33 22.67
1 2 3	15/08/23 15/08/23 15/08/23	9:00-10:00 11:30-12:30 13:50-14:50	32.0 32.0 32.0	80 80 80	Y-axis 0.038 0.035 0.041	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note:	15/08/23 15/08/23 15/08/23 ① Monitoring	9:00-10:00 11:30-12:30 13:50-14:50 data was measu	32.0 32.0 32.0 red by Hig	80 80 80 h Volume	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note:	15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L	32.0 32.0 32.0 red by Hig aser Dust I	80 80 80 h Volume Monitor	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note:	15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate	32.0 32.0 32.0 Ired by Hig aser Dust I d by (Tota	80 80 h Volume Monitor I Count/60	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note:	15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate	32.0 32.0 32.0 aser Dust l d by (Tota	80 80 h Volume Monitor I Count/60	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note: By Linear	15/08/23 15/08/23 15/08/23 15/08/23 1 Monitoring 2 Total Count 3 Count/minu Regression of Y c	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate	32.0 32.0 ired by Hig aser Dust I d by (Tota	80 80 h Volume Monitor l Count/60	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note: By Linear	15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y of Slope (K-factor)	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate on X :	32.0 32.0 32.0 ired by Hig aser Dust I d by (Tota 0.0015	80 80 h Volume Monitor I Count/60	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note: By Linear	15/08/23 15/08/23 15/08/23 15/08/23 1 Monitoring 2 Total Count 3 Count/minu Regression of Y of Slope (K-factor) Correlation coe	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate on X : fficient:	32.0 32.0 ired by Hig aser Dust I ed by (Tota 0.0015 0.9985	80 80 h Volume Monitor I Count/60	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note: By Linear	15/08/23 15/08/23 15/08/23 15/08/23 1 Monitoring 2 Total Count 3 Count/minu Regression of Y of Slope (K-factor) Correlation coe	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate on X : fficient:	32.0 32.0 32.0 Ired by Hig aser Dust I d by (Tota 0.0015 0.9985 15-Au	80 80 h Volume Monitor I Count/60	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note: By Linear Validity o Remarks:	15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y of Slope (K-factor) Correlation coe f Calibration Reco	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate on X : fficient:	32.0 32.0 32.0 Irred by Hig aser Dust I d by (Tota 0.0015 0.9985 15-Au	80 80 h Volume Monitor I Count/60	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20
1 2 3 Note: By Linear Validity o Remarks:	15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y of Slope (K-factor) Correlation coe f Calibration Reco	9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate on X : fficient:	32.0 32.0 32.0 ired by Hig aser Dust I ed by (Tota 0.0015 0.9985 15-Au	80 80 h Volume Monitor I Count/60	Y-axis 0.038 0.035 0.041 Sampler	1580 1360 1752	X-axis 26.33 22.67 29.20

Laser Dust Monitor Calibration

Туре:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3
Equipment No.:	A.005.09a
Sensitivity Adjustment	
Scale Setting:	797 CPM

Hour	Count/Minute	C
	X-axis	
1	26.33	
2	22.67	
3	29.20	



Prepare by:	WS CHAN
Date	15-Aug-23

QC Reviewer:

Y.W. Fung

Signature:

Date: 15-Aug-23

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Type:		Laser Dust Monitor		t Monitor			
Manufacturer/Brand:		SIBATA					
Model No.:		LD-3					
Equipme	Equipment No.:		A.005.10a	a			
Sensitivit	y Adjustment Sca	le Setting:	753 CPM				
Operator	:		WS CHAN				
Standard	Equimment						
Equipme	nt:		High Volu	me Samp	ler		
Venue:			Ma Wan	Chung Vill	age		
Model No	D.:		TE-5170				
Serial No.	:		3383				
Last Calib	ration Date:		4-Aug-23				
Caliburatia							
Calibratic	n Result						
Sensitivit	v Adiustment Sca	le Setting (Befor	re Calibrati	on):		753	СРМ
Sensitivit	v Adiustment Sca	le Setting (After	Calibratio	n):		753	CPM
	, ,	0.		,			
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	-	
	 Total Count 	was logged by L	aser Dust	Monitor			
	3 Count/minu	ite was calculate	ed by (Tota	l Count/60))		
By Linear	Regression of Y of	on X					
	Slope (K-factor):		0.0015				
	Correlation coe	fficient:	0.9979				
Validity o	f Calibration Reco	ord:	15-A	ug-24			
Remarks:							

Laser Dust Monitor Calibration

Туре:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3
Equipment No.:	A.005.10a
Sensitivity Adjustment	
Scale Setting:	753 CPM

Hour	Count/Minute	С
	X-axis	
1	26.63	
2	22.03	
3	28.55	



Prepare by:	WS CHAN
Date	15-Aug-23

QC Reviewer:

Signature:

Y.W. Fung

Date: 15-Aug-23

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Type:			Laser Dust Monitor				
Manufacturer/Brand:		SIBATA					
Model No.:			LD-3				
Equipme	nt No.:		A.005.11a	a			
Sensitivit	y Adjustment Sca	le Setting:	799 CPM				
Operator	:		WS CHAN				
	F . 1						
Standard	Equimment						
Equipme	nt:		High Volu	me Samp	ler		
Venue:			Ma Wan (Chung Vill	age		
Model No	o.:		TE-5170				
Serial No.	.:		3383				
Last Calib	oration Date:		4-Aug-23				
Calibratio	on Result						
canoratie							
Sensitivit	y Adjustment Sca	le Setting (Befor	e Calibrati	on):		799	СРМ
Sensitivity Adjustment Scale Setting (After		Calibration): 799					
Sensitivit	y Adjustment Sca	le Setting (After	Calibration	n):		799	CPM
Sensitivit	y Adjustment Sca	le Setting (After	Calibration	n):		799	СРМ
Sensitivit	y Adjustment Sca	le Setting (After	Calibration	n): Condition	Concentration ①	799 Total Count②	CPM Count/
Sensitivit	y Adjustment Sca Date (dd/mm/yy)	le Setting (After	Calibration Ambient (Temp (°C)	n): Condition R.H.(%)	Concentration① (mg/m3)	799 Total Count②	CPM Count/ Minute③
Sensitivit	y Adjustment Sca Date (dd/mm/yy)	le Setting (After	Calibration Ambient (Temp (°C)	n): Condition R.H.(%)	Concentration① (mg/m3) Y-axis	799 Total Count②	CPM Count/ Minute③ X-axis
Sensitivit	y Adjustment Sca Date (dd/mm/yy) 15/08/23	le Setting (After ^{Time} 9:00-10:00	Calibration Ambient (Temp (°C) 32.0	n): Condition R.H.(%) 80	Concentration① (mg/m3) Y-axis 0.038	799 Total Count② 1536	CPM Count/ Minute③ X-axis 25.60
Sensitivit	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23	le Setting (After Time 9:00-10:00 11:30-12:30	Calibration Ambient (Temp (°C) 32.0 32.0	n): Condition R.H.(%) 80 80	Concentration① (mg/m3) Y-axis 0.038 0.035	799 Total Count② 1536 1321	CPM Count/ Minute③ X-axis 25.60 22.02
Sensitivit	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 15/08/23	le Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50	Calibration Ambient (Temp (°C) 32.0 32.0 32.0	n): Condition R.H.(%) 80 80 80	Concentration① (mg/m3) Y-axis 0.038 0.035 0.041	799 Total Count② 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 15/08/23 (1) Monitoring	le Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu	Calibration Ambient (Temp (°C) 32.0 32.0 32.0 red by Hig	n): Condition R.H.(%) 80 80 80 h Volume	Concentration① (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count② 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit Hour 1 2 3 Note:	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count	le Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L	Ambient of Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust I	n): Condition R.H.(%) 80 80 80 h Volume Vonitor	Concentration① (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count② 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu	Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L te was calculate	Ambient of Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust I ed by (Total	n): Condition R.H.(%) 80 80 h Volume Monitor I Count/60	Concentration(1) (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count② 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu	Ie Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate	Calibration Ambient (Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust I ed by (Total	n): Condition R.H.(%) 80 80 h Volume Monitor I Count/60	Concentration① (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count② 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit Hour 1 2 3 Note: By Linear	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y c	Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L te was calculate on X	Calibration Ambient of Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust f od by (Total	n): Condition R.H.(%) 80 80 h Volume Monitor I Count/60	Concentration(1) (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count② 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y of Slope (K-factor)	Ie Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate on X :	Calibration Ambient (Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust I ed by (Total 0.0015	n): Condition R.H.(%) 80 80 h Volume Monitor I Count/60	Concentration(1) (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count(2) 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y of Slope (K-factor) Correlation coe	Ie Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L te was calculate on X : fficient:	Calibration Ambient of Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust I od by (Total 0.0015 0.9982	n): Condition R.H.(%) 80 80 h Volume Monitor I Count/60	Concentration(1) (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count② 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit Hour 1 2 3 Note: By Linear	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y of Slope (K-factor) Correlation coe f Calibration Reco	Ie Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L te was calculate on X : fficient: ord:	Calibration Ambient of Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust I od by (Total 0.0015 0.9982 15-Au	n): Condition R.H.(%) 80 80 h Volume Monitor I Count/60	Concentration(1) (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count② 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit Hour 1 2 3 Note: By Linear Validity o	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y of Slope (K-factor) Correlation coe f Calibration Reco	Ie Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L ite was calculate on X : fficient: ord:	Calibration Ambient (Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust I ed by (Total 0.0015 0.9982 15-Au	n): Condition R.H.(%) 80 80 h Volume Monitor I Count/60	Concentration(1) (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count(2) 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68
Sensitivit Hour 1 2 3 Note: By Linear Validity o Remarks:	y Adjustment Sca Date (dd/mm/yy) 15/08/23 15/08/23 (1) Monitoring (2) Total Count (3) Count/minu Regression of Y of Slope (K-factor) Correlation coe f Calibration Reco	Ie Setting (After Time 9:00-10:00 11:30-12:30 13:50-14:50 data was measu was logged by L te was calculate on X : fficient: ord:	Calibration Ambient of Temp (°C) 32.0 32.0 32.0 red by Hig aser Dust I od by (Total 0.0015 0.9982 15-Au	n): Condition R.H.(%) 80 80 h Volume Monitor I Count/60	Concentration(1) (mg/m3) Y-axis 0.038 0.035 0.041 Sampler	799 Total Count(2) 1536 1321 1721	CPM Count/ Minute③ X-axis 25.60 22.02 28.68

Laser Dust Monitor Calibration

Туре:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3
Equipment No.:	A.005.11a
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
Date	15-Aug-23

QC Reviewer:

Y.W. Fung

Signature:

Date: 15-Aug-23

Туре:	Laser Dust Monitor
Manufacturer/Brand:	SIBATA
Model No.:	LD-3B
Equipment No.:	A.005.13a
Sensitivity Adjustment Scale Setting:	643 CPM
Operator:	WS CHAN
Standard Equimment	
Equipment:	High Volume Sampler
Venue:	Ma Wan Chung Village
Model No.:	TE-5170
Serial No.:	3383
Last Calibration Date:	4-Aug-23

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): Sensitivity Adjustment Scale Setting (After Calibration): 643 CPM 643 CPM

Hour	Date	Time	Ambient Condition		Concentration(1)	Total Count ⁽²⁾	Count/
	(dd/mm/yy)		Temp (°C) R.H.(%)		(mg/m3)	g/m3)	
					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 measured by High Volume Sampler

(2) Total Count was logged by Laser Dust Monitor

③ Count/minute was calculated by (Total Count/60)

By Linear Regression of Y on X

Slope (K-factor):	0.0015
Correlation coefficient:	0.9989

Validity of Calibration Record:

15-Aug-24

Signature:

Remarks:

QC Reviewer:

Y.W. Fung

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



Prepare by:WS CHANDate15-Aug-23



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CERTIFICATE OF CALIBRATION





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23CA0427 01-03

Output Sound Pressure

Level Setting

dB

94.00

CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:	23CA0427 01-03	í.	Page:	1	of	2		Cert	ificate No.:	23CA0
Item tested							_	1.	Measured Sound	Pressure I
Description:	Acoustical Calibr	ator (Class 1)						- ,		E
Manufacturer:	B & K								The output Sound F	Pressure Le
Type/Model No.:	4231								a calibrated laborat	ory standard
Serial/Equipment No .:	3006428								the estimated unce	rtainties.
Adaptors used:	-								Frequency	Outr
Itom submitted by									Shown	Out
item submitted by									Hz	
Curstomer:	AECOM								1000	
Address of Customer:	2								1000	
Request No.:										
Date of receipt:	27-Apr-2023									
Date of test:	29-Apr-2023						_	2,	Sound Pressure L	evel Stabili
Reference equipment	used in the cali	bration					_		The Short Term Flu	ctuations wa
									Term Fluctuation w	as found to l
Description:	Model:	Serial No.	Expiry Date:		Traceal	ole to:				
ab standard microphone	B&K 4180	2412857	23-May-2023		SCL				At 1000 Hz	
Preamplifier	B&K 2673	2743150	28-Jun-2023		CEPRE	1				
Measuring amplifier	B&K 2610	2346941	30-Jun-2023		CEPRE				Estimated expande	d uncertaint
Signal generator	US 360	61227	08-Jun-2023		CEPRE					
Audio analyzor	34401A	US36087050	30-May-2023		CEPRE			-		
Iniversal counter	531324	GD4 1300330	12 Jun 2022		CEPRE					
Universal Counter	55152A	WT4000300Z	13-Jun-2023		GEPRE			3,	Actual Output Free	quency
Ambient conditions									The determination of	of actual out
									the determination (actual out

Temperature: 22 ± 1 °C 55 ± 10 % Relative humidity Air pressure: 1005 ± 5 hPa

Test specifications

The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B 1. 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.





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

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

Company Chop:

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- End Calibrated by: Checked by ung Chi Yin Date: 29-Apr-2023 Date:

standard. The actual output frequency at 1 KHz was:

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are carry no implication regarding the long-term stability of the instrument. The results apply to the item as received,

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At 1000 Hz

At 1000 Hz

Estimated expanded uncertainty

Estimated expanded uncertainty

factor of 2 is assumed unless explicitly stated

Total Noise and Distortion

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.



Page: 2 of 2

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

	(Output level in dB re 20 µPa)				
Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB				
94.22	0.10				

Sound Pressure Level Stability - Short Term Fluctuations

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

STF = 0.016 dB

0.005 dB

he 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

Actual Frequency = 1000.0 Hz

0.1 Hz Coverage factor k = 2.2

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:

TND = 0.7 %

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

> Chan Yuk Yiu 02-May-2023



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





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

Measured Sound Pressure Level

the estimated uncertainties

Frequency

Shown

Hz

1000

At 1000 Hz

At 1000 Hz

At 1000 Hz

4.

Term Fluctuation was found to be:

Estimated expanded uncertainty

Estimated expanded uncertainty

Estimated expanded uncertainty

Total Noise and Distortion

Actual Output Frequency

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

Output Sound Pressure

Level Setting

dB

94.00

23CA1109 04-02

Certificate No.: 23CA1109 04-02 Page: 1 of 2							Cert	ificate No.:
Item tested							1.	Measur
Description: Manufacturer: Type/Model No.: Serial/Equipment No.: Adaptors used:	Acoustical Calib B & K 4231 3014024 / N004.	rator (Class 1) .04					- 1	The out a calibra the estir
Item submitted by								
Curstomer: Address of Customer: Request No.: Date of receipt:	AECOM ASIA C - - 09-Nov-2023	O LIMITED						
Date of test:	13-Nov-2023						2,	Sound F
Reference equipment	used in the cali	ibration						The Sho output of
Description: Lab standard microphone Preamplifier	Model: B&K 4180 B&K 2673	Serial No. 3257888 3353200	Expiry Date: 15-Aug-2024 13-Jun-2024	Traceable SCL CEPREI	to:			Term Flu
Measuring amplifier Signal generator Digital multi-meter Audio analyzer	B&K 2610 DS 360 34401A 8903B	2346941 33873 US36087050 GB41300350	13-Jun-2024 31-Jan-2024 01-Jun-2024 13-Jun-2024	CEPREI CEPREI CEPREI				Estimate
Universal counter	53132A	MY40003662	07-Jun-2024	CEPREI			3,	Actual C
Ambient conditions								The date

Ambient conditions Temperature: 21 ± 1 °C Relative humidity: $60 \pm 10\%$ 1010 ± 5 hPa Air pressure:

Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B 1. 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.
- 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.



Comments: The results reported in this certificate refer to the conditon 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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standard. The actual output frequency at 1 KHz was:

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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(Continuation Page)

Page: 2 of 2

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

	(Output level in dB re 20 μPa)
Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB
94.08	0.10

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

STF = 0.017 dB

0.005 dB

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

Actual Frequency = 1000.0 Hz

0.1 Hz Coverage factor k = 2.2

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:

TND = 0.8 %

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

Chan Yuk Yiu

14-Nov-2023

Checked by

Date:



APPRICATE OF ALLIDDATION





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CERTIFICATE OF CALIBRATION

						(Continuation Page)				
Certificate No.:	24CA0229 06-02		Page:	1 of 2	Certificate No.	.: 240/	A0229 06-02	Pa	ge: 2 of	2
Item tested					1, Measur	red Sound Pressure	e Level			
Description: Manufacturer: Type/Model No.: Serial/Equipment No.:	Acoustical Calibrator Rion Co., Ltd. NC-74 34246490 / N.004.10	r (Class 1) D			The out a calibra the estin	tput Sound Pressure rated laboratory stand imated uncertainties.	Level in the calibrator he dard microphone and inse	ad was measured at the sett ert voltage technique. The res	ng and frequency ults are given in (Output level in d	y shown using below with B re 20 μPa) Expanded
Adaptors used:	-					Shown	Level Setting	Sound Pressure Level	Uncert	tainty
Item submitted by						1000	94.00	94.43	0.1	0
Curstomer: Address of Customer: Request No.: Date of receipt:	AECOM ASIA CO LI - - 29-Feb-2024	MITED				1000	34.00	57.75		
Date of test:	04-Mar-2024				2, Sound	Pressure Level Sta	bility - Short Term Fluct	tuations	imum of the fast	t weighted DC
Reference equipment	used in the calibra	tion			output o Term Fl	of the B&K 2610 mea Fluctuation was found	asuring amplifier over a 2 to be:	0 second time interval as req	uired in the stand	lard. The Sho
Description: Lab standard microphone Preamplifier	Model: B&K 4180 B&K 2673	Serial No. 3257888 3353200	Expiry Date: 15-Aug-2024 13-Jun-2024	Traceable to: SCL CEPREI	At 1000 Estimat	0 Hz ted expanded uncerta	ainty	STF = 0.009 dB 0.005 dB		
Measuring amplifier Signal generator Digital multi-meter Audio analyzer	B&K 2610 DS 360 34401A 8903B	2346941 61227 US36087050 GB41300350	13-Jun-2024 28-Jun-2024 01-Jun-2024 13-Jun-2024	CEPREI CEPREI CEPREI CEPREI	3. Actual	Output Frequency				
Universal counter	53132A	MY40003662	07-Jun-2024	CEPREI	The det	termination of actual	output frequency was ma	ide using a B&K 4180 microp	hone together wi	ith a B&K 267
Ambient conditions Temperature: Relative humidity: Air pressure:	20 ± 1 ℃ 60 ± 10 % 1010 + 5 bPa				preamp counter standard	blifier connected to a r which was used to d rd. The actual output	B&K 2610 measuring am determine the frequency a frequency at 1 KHz was:	plifier. The AC output of the averaged over 20 second of c	3&K 2610 was ta peration as requi	iken to an uni ired by the
Test specifications					Estimat	ted expanded uncerta	ainty	0.1 Hz Co	verage factor k =	2.2
 The Sound Calibrat and the lab calibrat The calibrator was i 	or has been calibrated ir ion procedure SMTP004 tested with its axis vertica	accordance with the -CA-156. al facing downwards a	e requirements as specif	fied in IEC 60942 1997 Anne y using insert voltage technic	4, Total N	Noise and Distortion	1			
 The results are rour pressure of 1013.25 	nded to the nearest 0.01 5 hectoPascals as the ma	dB and 0.1 Hz and haker's information ind	ave not been corrected licates that the instrume	for variations from a referen ent is insensitive to pressure	For the connect	e Total Noise and Dist cted to an Agilent Typ	tortion measurement, the e 8903 B distortion analy	unfiltered AC output of the B ser. The TND result at 1 KHz	&K 2610 measur was:	ring amplifier
changes.					At 1000	0 Hz		TND = 1.8 %		
Test results					Estimat	ted expanded uncerta	ainty	0.7 %		
Details of the performed me	easurements are present	ted on page 2 of this	certificate.	S ENGINEERING	The exp of uncer factor of	panded uncertainties ertainty in measureme of 2 is assumed unles	have been calculated in ent", and gives an interva as explicitly stated.	accordance with the ISO Put I estimated to have a level of	lication "Guide to confidence of 95	o the express 5%. A coveraç
Approved Signatory: <	Feng Junqi	Date: 05-Mar-2	2024 Company Cl	hop: 105 * 011	Calibrat	ted by: Fung Ct Date: 04-Mar-	hi Yip -2024	Checked by:	/ iuk Yiu r-2024	
Comments: The results rep carry no implication regardi	ported in this certificate range the long-term stability	efer to the conditon o of the instrument. Th	of the instrument on the interest of the interest of the iterest o	date of calibration and em as received.	The standard(s) calibrated on a s	s) and equipment use schedule to maintain	ed in the calibration are transfer to the required accuracy le	aceable to national or internativel.	ional recognised	standards ar
			Earry No.		@ Soile & Materials En				Form No CARDIES 28	sue 1/Rev C/01/0

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53132A

CERTIFICATE OF CALIBRATION



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CERTIFICATE OF CALIBRATION

(Continuation Page)

23CA1030 01-03

Output Sound Pressure

Level Setting

dB

94 00

23CA1030 01-03	3	Page:	1 o	2					Cert	ificate No.:	23CA1030
									1,	Measured Sound	Pressure Leve
Acoustical Calibr MVI CAL21 34113610(2011)	rator (Class 1) / N.004.11									The output Sound I a calibrated laborat the estimated unce	Pressure Level ory standard mi rtainties.
Yes (BAC21)										Frequency Shown Hz	Output : Le
AECOM ASIA CO -	O., LTD.									1000	
- 30-Oct-2023											
01-Nov-2023									2,	Sound Pressure L	evel Stability -
t used in the cali	bration	Evnin/ Dato:	Tra	apple to:						The Short Term Flu output of the B&K 2 Term Fluctuation w	ctuations was c 610 measuring as found to be:
B&K 4180	3257888	15-Aug-2024	SCL							At 1000 Hz	
B&K 2673 B&K 2610 DS 360 34401A 8903B	3353200 2346941 33873 US36087050 GB41300350	13-Jun-2024 13-Jun-2024 31-Jan-2024 01-Jun-2024	CEF CEF CEF	REI REI REI REI						Estimated expande	d uncertainty
	23CA1030 01-03 Acoustical Calib MVI CAL21 34113610(2011) Yes (BAC21) AECOM ASIA C - - 30-Oct-2023 01-Nov-2023 t used in the cali B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B	23CA1030 01-03 Acoustical Calibrator (Class 1) MVI CAL21 34113610(2011) / N.004.11 Yes (BAC21) AECOM ASIA CO., LTD. - - - 30-Oct-2023 01-Nov-2023 t used in the calibration Model: Serial No. B&K 4180 3257888 B&K 2673 3353200 B&K 2610 2346941 DS 360 33873 34401A US36087050 8903B GB41300350	23CA1030 01-03 Page: Acoustical Calibrator (Class 1) MVI MVI CAL21 34113610(2011) / N.004.11 Yes (BAC21) AECOM ASIA CO., LTD. - - - 30-Oct-2023 01-Nov-2023 01-Nov-2023 13-Un-2024 B&K 4180 3257888 15-Aug-2024 B&K 2673 3353200 13-Jun-2024 B&K 2610 2346941 13-Jun-2024 B&K 2610 23403 13-J	23CA1030 01-03 Page: 1 of Acoustical Calibrator (Class 1) MVI CAL21 MVI CAL21 34113610(2011) / N.004.11 Yes (BAC21) AECOM ASIA CO., LTD. - - - 30-Oct-2023 01-Nov-2023 01-Nov-2023 13-Jun-2024 CEP B&K 4180 3257888 15-Aug-2024 SCL B&K 2673 3353200 13-Jun-2024 CEP B&K 2610 2346941 13-Jun-2024 CEP DS 360 33873 31-Jan-2024 CEP 903B GB41300350 13-Jun-2024 CEP	23CA1030 01-03 Page: 1 of 2 Acoustical Calibrator (Class 1) MVI CAL21 34113610(2011) / N.004.11 Yes (BAC21) - - - AECOM ASIA CO., LTD. - 30-Oct-2023 - - - - 01-Nov-2023 - - - - b 3257888 15-Aug-2024 SCL B&K 2673 S257888 B&K 2673 3353200 13-Jun-2024 CEPREI B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 33873 31-Jan-2024 CEPREI B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 33873 31-Jan-2024 CEPREI B&K 2610 2346930 13-Jun-2024 CEPREI DS 360 33873 31-Jan-2024 CEPREI B&B GB41300350 13-Jun-2024 CEPREI B&B GB41300350 13-Jun-2024 CEPREI B&B GB41300350 13-Jun-2024 CEPREI	23CA1030 01-03 Page: 1 of 2 Acoustical Calibrator (Class 1) MVI CAL21 34113610(2011) / N.004.11 Yes (BAC21) - - - AECOM ASIA CO., LTD. - - - - 30-Oct-2023 01-Nov-2023 - - - Model: Serial No. Expiry Date: Traceable to: B&K 4180 3257888 15-Aug-2024 CEPREI B&K 2673 3353200 13-Jun-2024 CEPREI B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 33873 31-Jan-2024 CEPREI DS 360 33873 31-Jan-2024 CEPREI BAK 410A US36087050 01-Jun-2024 CEPREI DS 38B GB41300350 13-Jun-2024 CEPREI	23CA1030 01-03 Page: 1 of 2 Acoustical Calibrator (Class 1) MVI CAL21 34113610(2011) / N.004.11 Yes (BAC21) AECOM ASIA CO., LTD. - 30-Oct-2023 01-Nov-2023 01-Nov-2023 Model: Serial No. Expiry Date: Traceable to: B&K 180 3257888 15-Aug-2024 SCL B&K 2673 B&K 2673 3353200 13-Jun-2024 CEPREI DS 360 33873 31-Jan-2024 CEPREI DS 360 33873 34-01A US36087050 B&B (B41300350 13-Jun-2024 CEPREI B&K 2610 2346941 DS 360 33873 31-Jan-2024 CEPREI B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 33873 31-Jan-2024 CEPREI B&K 2610 2346941 13-Jun-2024 CEPREI	23CA1030 01-03 Page: 1 of 2 Acoustical Calibrator (Class 1) MV CAL21 34113610(2011) / N.004.11 Yes (BAC21) AECOM ASIA CO., LTD. - - 30-Oct-2023 01-Nov-2023 01-Nov-2023 Model: Serial No. 3257888 Serial No. B&K 4180 S257888 15-Aug-2024 B&K 2673 SCL 3353200 B&K 4180 3257888 15-Aug-2024 SCL B&K 2610 B&K 4180 3257888 15-Aug-2024 SCL B&K 2610 B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 B&K 2610 2346941 13-Jun-2024 CEPREI B&K 2610 B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 B&K 2610 2346941 13-Jun-2024 CEPREI DS 360 B&K 2610 2346941 B&K 2610 2346941	23CA1030 01-03 Page: 1 of 2 Acoustical Calibrator (Class 1) MVI CAL21 34113510(2011) / N.004.11 Yes (BAC21) AECOM ASIA CO., LTD. - - - - - - - - - - - - - - - - - - -	23CA1030 01-03 Page: 1 of 2 Cert Acoustical Calibrator (Class 1) MVI CAL21 34113610(2011) / N.004.11 Yes (BAC21) 1, 1, AECOM ASIA CO., LTD. 30-Oct-2023 - - - 01-Nov-2023 01-Nov-2023 2, 2, tused in the calibration 15-Aug-2024 B&K 2673 SCL 335200 SCL 33-Jun-2024 CEPREI B&K 2673 3353200 13-Jun-2024 CEPREI B&K 2673 2, Model: Serial No. 3360370350 Expiry Date: 13-Jun-2024 Traceable to: CEREI B&K 2670 2346941 13-Jun-2024 CEPREI B&K 2670 2346941 13-Jun-2024 CEPREI B&K 2670 2346941 13-Jun-2024 CEPREI B&K 2670 CE	23CA1030 01-03 Page: 1 of 2 Certificate No.: Acoustical Calibrator (Class 1)

Ambient conditions

Universal counter

Temperature: 22 ± 1 °C Relative humidity: 55 ± 10 % Air pressure: 1005 ± 5 hPa

Test specifications

The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B 1. and the lab calibration procedure SMTP004-CA-156.

MY40003662

07-Jun-2024

- 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: Fena Juna



Comments: The results reported in this certificate refer to the conditon 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.

Date:

02-Nov-2023

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

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000 Hz

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

4. **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

Estimated expanded uncertainty

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.



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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Page: 2 of 2

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

	(Output level in dB re 20 µPa)
Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB
94.14	0.10

nd Pressure Level Stability - Short Term Fluctuations

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

STF = 0.013 dB

0.005 dB

0.1 Hz Coverage factor k = 2.2

TND = 1.7 %

0.7 %

Checked by Chan Yuk Yiu Date: 02-Nov-2023





CERTIFICATE OF CALIBRATION

Certificate No.:	23CA1109 04-01		Page	1 of	2
Item tested					
Description: Manufacturer: Type/Model No.: Serial/Equipment No.: Adaptors used:	Sound Level Meter (C B & K 2250 3001291 -	Class 1)	Microphone B & K 4189 3005374	Preamp B & K ZC0032 31351	
Item submitted by					
Customer Name: Address of Customer: Request No.: Date of receipt:	AECOM ASIA CO LIN - - 09-Nov-2023	ИITED			
Date of test:	13-Nov-2023				
Reference equipment u	sed in the calibrat	ion			
Description: Multi function sound calibrator Signal generator	Model: B&K 4226 DS 360	Serial No. 2288444 33873	Expiry Date: 28-Aug-2024 31-Jan-2024	Traceable CIGISMEC CEPREI	e to:
Ambient conditions					
Temperature: Relative humidity: Air pressure:	21 ± 1 °C 60 ± 10 % 1010 ± 5 hPa				
Test specifications					
 The Sound Level Meter and the lab calibration The electrical tests we replaced by an equiva The acoustic calibratic between the free-field 	er has been calibrated in procedure SMTP004-C re performed using an lent capacitance within in was performed using and pressure response	n accordance with the r CA-152. electrical signal substitu a tolerance of <u>+</u> 20%. an B&K 4226 sound c ss of the Sound Level I	equirements as spec uted for the micropho alibrator and correctic Meter.	ified in BS 758 ne which was r ons was applied	0: Part 1: 1997 removed and d for the difference
Test results					
This is to certify that the Sound was performed.	d Level Meter conforms	s to BS 7580: Part 1: 19	97 for the conditions	under which th	ne test
Details of the performed meas	urements are presente	d on page 2 of this cert	ificate.		
Actual Measurement data are	documented on worksh	neets.		MIER	ENGINEEPHS 除合試驗 S
Approved Signatory:	Feng Junqi	Date: 14-Nov-2023	3 Company Ch	op:	限公司 1008米 011

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.CARP152-1/Issue 1/Rev.C/01/02/2007

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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

CERTIFICATE OF CALIBRATION

The electrical tests were perfomed using an equivalent capacitance substituted for are given in below with test status and the estimated uncertainties. The "Pass" mea the tolerances stated in the test specifications. The "-" means the result of test is orTest:Subtest:Status:Self-generated noiseAPassCPassLinLinearity range for LeqAt reference range , Step 5 dB at 4 kHzPassLinearity range for SPLAt reference range , Step 5 dB at 4 kHzPassLinearity range for SPLAt reference range , Step 5 dB at 4 kHzPassLinearity range for SPLAt reference range , Step 5 dB at 4 kHzPassLinearity range for SPLAt reference range , Step 5 dB at 4 kHzPassLinearity range for SPLAt reference range , Step 5 dB at 4 kHzPassCPassLinPassLinearity range for SPLAt reference range , Step 5 dB at 4 kHzPassFrequency weightingsAPassPassCPassSingle Burst FastPassLinPassSingle Burst SlowPassPeak responseSingle 100 µs rectangular pulsePassR.M.S. accuracyCrest factor of 3PassTime weighting 1Single burst 5 ms at 2000 HzPassTime averaging1 ms burst duty factor 1/10³ at 4 kHzPassTime averaging1 ms burst duty factor 1/10³ at 4 kHzPassSund exposure levelSingle burst 10 ms at 4 kHzPass		
The electrical tests were performed using an equivalent capacitance substituted for are given in below with test status and the estimated uncertainties. The "Pass" mee the tolerances stated in the test specifications. The "-" means the result of test is o Test: Subtest: Status: Self-generated noise A Pass C Pass Linearity range for Leq At reference range, Step 5 dB at 4 kHz Pass Linearity range for SPL At reference SPL on all other range Pass 2 dB below upper limit of each range Pass 2 dB below upper limit of each range Pass 2 dB below upper limit of each range Pass C Pass C Pass C Pass 2 dB below upper limit of each range Pass C Pass Linearity range for SPL At reference range , Step 5 dB at 4 kHz Frequency weightings A Pass C Pass C Lin Pass C Lin Pass Single Burst Fast Pass Frequency weightings Single Burst Fast Pass Single burst Slow Pass Sing		
Test:Subtest:Status:Self-generated noiseAPassCPassLinPassLinearity range for LeqAt reference range , Step 5 dB at 4 kHzPassLinearity range for LeqAt reference SPL on all other rangesPass2 dB below upper limit of each rangePass2 dB above lower limit of each rangePassCPassCPassCPassCPassCPassLine weightingsSingle Burst FastPeak responseSingle 100µs rectangular pulseR.M.S. accuracyCrest factor of 3Time weighting ISingle burst 5 ms at 2000 HzRepeated at frequency of 100 HzPassTime averaging1 ms burst duty factor 1/10 ³ at 4kHzPulse rangeSingle burst 10 ms at 4 kHzSound exposure levelSingle burst 10 ms at 4 kHzPass	the microphone ans the result of utside these tole	. The results the test is inside erances.
Test:Subtest:Status:Self-generated noiseAPassCPassLinearity range for LeqAt reference range, Step 5 dB at 4 kHzPassLinearity range for LeqAt reference range, Step 5 dB at 4 kHzPassLinearity range for SPLAt reference SPL on all other rangePass2 dB below upper limit of each rangePass2 dB above lower limit of each rangePass2 dB above lower limit of each rangePass2 dB above lower limit of each rangePassCPassCPassCPassCPassLinPassCPassCPassLinPassSingle Burst FastPassSingle Burst SlowPassPeak responseSingle 100µs rectangular pulseR.M.S. accuracyCrest factor of 3Time weighting ISingle burst 5 ms at 2000 HzRepeated at frequency of 100 HzPassTime averaging1 ms burst duty factor 1/10 ³ at 4kHzPulse rangeSingle burst 10 ms at 4 kHzSound exposure levelSingle burst 10 ms at 4 kHzPass	Expan	nded Cove
Self-generated noiseAPassCPassLinPassLinearity range for LeqAt reference range , Step 5 dB at 4 kHzPassReference SPL on all other rangesPass2 dB below upper limit of each rangePass2 dB above lower limit of each rangePassLinearity range for SPLAt reference range , Step 5 dB at 4 kHzFrequency weightingsAPassCPassCPassLinPassCPassCPassSingle Burst FastPassSingle Burst SlowPassPeak responseSingle 100µs rectangular pulseR.M.S. accuracyCrest factor of 3Time weighting 1Single burst 5 ms at 2000 HzRepeated at frequency of 100 HzPassTime averaging1 ms burst duty factor 1/10³ at 4kHzPulse rangeSingle burst 10 ms at 4 kHzPulse rangeSingle burst 10 ms at 4 kHzSound exposure levelSingle burst 10 ms at 4 kHzPass	Uncertan	ity (dB) Fa
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LinPassLinearity range for LeqAt reference range , Step 5 dB at 4 kHzPassReference SPL on all other rangesPass2 dB below upper limit of each rangePass2 dB above lower limit of each rangePassCPassCPassCPassSingle Burst FastPassSingle Burst SlowPassPeak responseSingle burst 5 ms at 2000 HzRepeated at frequency of 100 HzPassRepeated at frequency of 100 HzPassTime averaging1 ms burst duty factor 1/10 ³ at 4kHz1 ms burst duty factor 1/10 ⁴ at 4kHzPassPulse rangeSingle burst 10 ms at 4 kHzPassSound exposure levelSingle burst 10 ms at 4 kHzPass	0.8	3
Linearity range for LeqAt reference range, Step 5 dB at 4 kHzPassReference SPL on all other ranges2 dB below upper limit of each rangePass2 dB above lower limit of each rangeSingle Burst Fast2 dB above lower limit of each rangePass2 dB above lower limit of each rangePass <t< td=""><td>1.6</td><td>5</td></t<>	1.6	5
Reference SPL on all other rangesPass2 dB below upper limit of each rangePass2 dB above lower limit	0.3	3
2 dB below upper limit of each range 2 dB above lower limit of each range 2 dB above lower limit of each range PassPass PassLinearity range for SPL Frequency weightingsAt reference range , Step 5 dB at 4 kHz PassPass PassC LinPassTime weightingsSingle Burst Fast Single Burst SlowPassPeak response R.M.S. accuracySingle 100 µs rectangular pulse Crest factor of 3 Repeated at frequency of 100 Hz 	0.3	3
2 dB above lower limit of each rangePassLinearity range for SPLAt reference range, Step 5 dB at 4 kHzPassFrequency weightingsAPassCPassLinPassTime weightingsSingle Burst FastPassSingle Burst SlowPassPeak responseSingle 100µs rectangular pulsePassR.M.S. accuracyCrest factor of 3PassTime weighting ISingle burst 5 ms at 2000 HzPassTime averaging1 ms burst duty factor 1/10³ at 4kHzPassPulse rangeSingle burst 10 ms at 4 kHzPassSound exposure levelSingle burst 10 ms at 4 kHzPass	0.3	3
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LinPassTime weightingsSingle Burst FastPassSingle Burst SlowPassPeak responseSingle 100µs rectangular pulsePassR.M.S. accuracyCrest factor of 3PassTime weighting ISingle burst 5 ms at 2000 HzPassTime averaging1 ms burst duty factor 1/10³ at 4kHzPassPulse rangeSingle burst 10 ms at 4 kHzPassSound exposure levelSingle burst 10 ms at 4 kHzPass	0.3	3
Time weightingsSingle Burst Fast Single Burst SlowPassPeak responseSingle 100µs rectangular pulsePassR.M.S. accuracyCrest factor of 3PassTime weighting ISingle burst 5 ms at 2000 HzPassTime averaging1 ms burst duty factor 1/10³ at 4kHzPassPulse rangeSingle burst 10 ms at 4 kHzPassSound exposure levelSingle burst 10 ms at 4 kHzPass	0.3	3
Single Burst SlowPassPeak responseSingle 100µs rectangular pulsePassR.M.S. accuracyCrest factor of 3PassTime weighting ISingle burst 5 ms at 2000 HzPassTime averaging1 ms burst duty factor 1/10³ at 4kHzPassPulse rangeSingle burst 10 ms at 4 kHzPassSound exposure levelSingle burst 10 ms at 4 kHzPass	0.3	3
Peak response Single 100µs rectangular pulse Pass R.M.S. accuracy Crest factor of 3 Pass Time weighting I Single burst 5 ms at 2000 Hz Pass Time averaging 1 ms burst duty factor 1/10 ³ at 4kHz Pass Pulse range Single burst 10 ms at 4 kHz Pass Sound exposure level Single burst 10 ms at 4 kHz Pass	0.3	3
R.M.S. accuracy Crest factor of 3 Pass Time weighting I Single burst 5 ms at 2000 Hz Pass Repeated at frequency of 100 Hz Pass Time averaging 1 ms burst duty factor 1/10 ³ at 4kHz Pass Pulse range Single burst 10 ms at 4 kHz Pass Sound exposure level Single burst 10 ms at 4 kHz Pass	0.3	3
Time weighting I Single burst 5 ms at 2000 Hz Pass Repeated at frequency of 100 Hz Pass Time averaging 1 ms burst duty factor 1/10 ³ at 4kHz Pass Pulse range Single burst 10 ms at 4 kHz Pass Sound exposure level Single burst 10 ms at 4 kHz Pass	0.3	3
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1 ms burst duty factor 1/10 ⁴ at 4kHz Pass Pulse range Single burst 10 ms at 4 kHz Pass Sound exposure level Single burst 10 ms at 4 kHz Pass	0.3	s
Pulse range Single burst 10 ms at 4 kHz Pass Sound exposure level Single burst 10 ms at 4 kHz Pass	0.3	3
Sound exposure level Single burst 10 ms at 4 kHz Pass	0.4	ł
engle server i uoo	0.4	ł
Overload indication SPL Pass	0.3	5
Leq Pass	0.4	ł.

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	

3, Response to associated sound calibrator

N/A

2,

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.



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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(Continuation Page)

Checked by: Chan Yuk Yiu Date: 14-Nov-2023







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CERTIFICATE OF CALIBRATION

	CERTIFIC	ATE OF CAI	LIBRATION			C	(Continuation Page)	SKATIO	N		
Certificate No.:	24CA0229 06-01		Page	1 of 2	Certificate	e No.: 24	4CA0229 06-01	Page	2 0	of 2	
Item tested					1, Ele	ectrical Tests					
Description: Manufacturer: Type/Model No.: Serial/Equipment No.:	Sound Level Meter B & K 2250-L 2681366	(Class 1)	Microphone B & K 4950 2665582	Preamp B & K ZC0032 17190	Th are the	e electrical tests were e given in below with te e tolerances stated in t	perfomed using an equivalent capacitance a est status and the estimated uncertainties. T he test specifications. The "-" means the rea	substituted for t 'he "Pass" mea sult of test is ou	he microphon ns the result o tside these tol Expa	e. The resu of the test is lerances. Inded	lts inside Coverage
Adaptors used:	-		-	-	Те	est:	Subtest:	Status:	Uncerta	nity (dB)	Factor
Customer Name: Address of Customer: Request No.: Date of receipt:	AECOM ASIA CO L - - 29-Feb-2024	TD			Se Lin	elf-generated noise nearity range for Leq	A C Lin At reference range , Step 5 dB at 4 kHz Reference SPL on all other ranges	Pass Pass Pass Pass Pass	0 0 1 0 0	.3 .8 .6 .3 .3	
							2 dB below upper limit of each range 2 dB above lower limit of each range	Pass Pass	0 0	.3 .3	
Date of test: Reference equipment u	04-Mar-2024 Ised in the calibra	ation			Lin Fre	nearity range for SPL equency weightings	At reference range , Step 5 dB at 4 kHz A C	Pass Pass Pass Pass	0.00	.3 .3 .3	
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 CEPREI	Tir Pe R.I	me weightings eak response M.S. accuracy	Single Burst Fast Single Burst Slow Single 100µs rectangular pulse Crest factor of 3	Pass Pass Pass Pass	0 0 0 0	.3 .3 .3 .3	
Ambient conditions	20 ± 1 °C 55 + 10 %				Tin Tin	me weighting I me averaging	Single burst 5 ms at 2000 Hz Repeated at frequency of 100 Hz 1 ms burst duty factor 1/10 ³ at 4kHz 1 ms burst duty factor 1/10 ⁴ at 4kHz	Pass Pass Pass Pass	0 0 0 0	.3 .3 .3 .3	
Air pressure: Test specifications	1010 ± 5 hPa				Pu So Ov	ulse range bund exposure level verload indication	Single burst 10 ms at 4 kHz Single burst 10 ms at 4 kHz SPL Leq	Pass Pass Pass Pass	0 0 0 0	.4 .4 .3 .4	
 The Sound Level Met and the lab calibration The electrical tests we replaced by an equiva The acoustic calibration between the free-field 	er has been calibrated n procedure SMTP004 ere performed using a alent capacitance with on was performed usi and pressure respon	I in accordance with t -CA-152. n electrical signal sub in a tolerance of <u>+</u> 209 ng an B&K 4226 sour sess of the Sound Le	the requirements as spect ostituted for the micropho %. nd calibrator and correction vel Meter.	cified in BS 7580: Part 1: 199 one which was removed and ons was applied for the diffe	2, Ac Th wi 800	coustic tests le complete sound leve ith 1000Hz and SPL 94 00 Hz are given in belo	el meter was calibrated on the reference ran dB. The sensitivity of the sound level mete ww with test status and the estimated uncert	ge using a B&K r was adjusted. ainties.	4226 acousti The test resu	c calibrator It at 125 Hz	and
-					Те	est:	Subtest	Status	Expa Uncerta	nded nity (dB)	Coverage Factor
This is to certify that the Sour was performed.	nd Level Meter conform	ns to BS 7580: Part 1	1: 1997 for the conditions	under which the test	Ac	coustic response	Weighting A at 125 Hz Weighting A at 8000 Hz	Pass Pass	0	.3 .5	
Details of the performed mea	surements are preser	ted on page 2 of this	certificate.		3, Re	esponse to associated	d sound calibrator				
Actual Measurement data are	e documented on work	sheets.		SENGINEEPING ENGINEEPING ENGINEEPING SENGINE	N//	A					
Approved Signatory:	Feng Junqi	Date: 05-Mar-	2024 Company Ch	op: 有限公司。 第35105 * 011	Th of fac	e expanded uncertaint uncertainty in measure ctor of 2 is assumed ur	ies have been calculated in accordance with ement", and gives an interval estimated to ha nless explicitly stated.	n the ISO Public ave a level of co	cation "Guide to confidence of 9	to the expre 5%. A cove	ssion rage
Comments: The results re carry no implication regarding	ported in this certifica the long-term stabilit	te refer to the condition of the instrument. T	on of the instrument on the results apply to the ite	ne date of calibration and em as received.	Cal	librated by:	- End -	: Chan Yuk			
© Soils & Materials Engineering Co., Ltd.			Form No.	CARP152-1/Issue 1/Rev.C/01/02/2007	The standa calibrated	Date: 04-M ard(s) and equipment u on a schedule to main	Mar-2024 Date used in the calibration are traceable to natio tain the required accuracy level.	: 05-Mar-2	2024 nal recognised	d standards	and are

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CERTIFICATE OF CALIBRATION

Certificate No.:	23CA1030 01-02		Page	1 of 2	
Item tested					
Description: Manufacturer: Type/Model No.: Serial/Equipment No.: Adaptors used:	Sound Level Mete B & K 2270 3007965 -	r (Type 1)	, Microphone , B & K , 4189 , 2846461 , -	Pream B & K ZC0032 17965	
Item submitted by					
Customer Name: Address of Customer: Request No.:	AECOM ASIA CO - -	. LTD.			
Date of receipt:	30-Oct-2023				
Date of test:	31-Oct-2023				
Reference equipment	used in the calib	ration			
Description: Multi function sound calibrator Signal generator	Model: B&K 4226 DS 360	Serial No. 2288444 33873	Expiry Date: 28-Aug-2024 31-Jan-2024	Traceable to: CIGISMEC CEPREI	
Ambient conditions					
Temperature: Relative humidity: Air pressure:	21 ± 1 °C 60 ± 10 % 1005 ± 5 hPa				
Test specifications					
1, The Sound Level Me and the lab calibratio	ter has been calibrate n procedure SMTP00 vere performed using	ed in accordance with 04-CA-152.	the requirements as spe	ecified in BS 7580: Part	1: 1997
replaced by an equiv	alent capacitance wit	hin a tolerance of <u>+</u> 2	0%.	ione which was remove	a and
 The acoustic calibrat between the free-field 	ion was performed us d and pressure respo	sing an B&K 4226 so nsess of the Sound I	und calibrator and correct _evel Meter.	tions was applied for the	e differen

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: 01-Nov-2023 Date:



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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Company Chop:

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Electrical Tests					
The electrical tests we are given in below with the tolerances stated	re perfomed using an equivalent capacitance n test status and the estimated uncertainties. T n the test specifications. The "-" means the res	substituted fo 'he "Pass" me sult of test is o	r the micro eans the re outside the	phone. Th sult of the se tolerar	ne results e test is inside ices.
Test:	Subtest:	Status:	Unce	rtanity (d	B) / Coverag
Self-generated noise	А	Pass		0.3	
	С	Pass		1.0	21
	Lin	Pass		2.0	22
Linearity range for Leo	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 SP	At reference range, Step 5 dB at 4 kHz	Pass		0.3	
Frequency weightings	A	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 1/10 ³ at 4kHz	Pass		0.3	
	1 ms burst duty factor 1/10 ⁴ 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	

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 3.

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.



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

(Continuation Page)

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Checked by

Date:

Chan Yuk Yiu 01-Nov-2023



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CERTIFICATE OF CALIBRATION

Certificate No.:	23CA1030 01-01		Page	1 of	2
Item tested					
Description:	Sound Level Meter	(Type 1)	Microphone	Prea	m
Manufacturer:	B&K	(.),,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	B&K	B&	<
Type/Model No.:	2270	,	4950	700	132
Serial/Equipment No	2644597	,	2879980	2030	8
Adaptors used:	-	,	-	2000	0
Item submitted by		3			
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 calibr	ation			
Description:	Model:	Serial No.	Expiry Date:	Trace	able to:
Multi function sound calibrator	B&K 4226	2288444	28-Aug-2024	CIGIS	MEC
Signal generator	DS 360	33873	31- Jan-2024	CEDE	
		00070	31-3a1-2024	CEFR	
Ambient conditions					
Temperature:	21 ± 1 °C				
Relative humidity:	60 ± 10 %				
Air pressure:	1005 ± 5 hPa				
Test specifications					
1, The Sound Level Me	ter has been calibrate	d in accordance with	the requirements as spe	cified in BS	7580: Part 1: 1997
and the lab calibratio	n procedure SMTP00	4-CA-152.			
The electrical tests w	ere performed using a	an electrical signal su	ubstituted for the microph	one which	was removed and
replaced by an equiv	alent capacitance with	nin a tolerance of +20	0%.		
 The acoustic calibrat between the free-field 	ion was performed us d and pressure respor	ing an B&K 4226 sou sess of the Sound L	and calibrator and correct evel Meter.	tions was a	pplied for the differen
Test results					
This is to certify that the Sou was performed.	nd Level Meter confor	ms to BS 7580: Part	1: 1997 for the condition	s under wh	ich the test
Details of the performed mea	surements are preser	nted on page 2 of this	s certificate.		
		57 - 653			and and a second

Actual Measurement data are documented on worksheets.

Approved Signatory: de Fena Juna

Date: 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.

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

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CERTIFICATE OF CALIBRATION

1,	Electrical Tests					
	The electrical tests were p are given in below with tes the tolerances stated in th	perfomed using an equivalent capacitance s at status and the estimated uncertainties. T e test specifications. The "-" means the res	substituted fo he "Pass" me sult of test is o	r the microp eans the res outside thes	ohone. Ti sult of the se tolerar	he results e test is inside nces.
	Test:	Subtest:	Status:	Uncer	tanity (d	B) / Coverage Fa
	Self-generated noise	A	Pass		0.3	21
	Linearity range for Leq	Lin At reference range , Step 5 dB at 4 kHz	Pass Pass		2.0 0.3	2.2
		Reference SPL on all other ranges 2 dB below upper limit of each range	Pass Pass		0.3 0.3	
	Linearity range for SPL	2 dB above lower limit of each range At reference range , Step 5 dB at 4 kHz A	Pass Pass Pass		0.3 0.3	
	requery weightings	C Lin	Pass Pass		0.3 0.3	
	Time weightings	Single Burst Fast Single Burst Slow	Pass Pass		0.3 0.3	
	Peak response R.M.S. accuracy Time weighting I	Single 100μs rectangular pulse Crest factor of 3 Single burst 5 ms at 2000 Hz	Pass Pass Pass		0.3 0.3	
	Time averaging	Repeated at frequency of 100 Hz 1 ms burst duty factor 1/10 ³ at 4kHz	Pass		0.3 0.3	
	Pulse range	1 ms burst duty factor 1/10 ⁴ at 4kHz Single burst 10 ms at 4 kHz	Pass Pass		0.3 0.4	
	Sound exposure level Overload indication	Single burst 10 ms at 4 kHz SPL Len	Pass Pass Pass		0.4 0.3	
2,	Acoustic tests	LGY	F 835		0.4	
	The complete sound level with 1000Hz and SPL 94 8000 Hz are given in below	meter was calibrated on the reference ranged. dB. The sensitivity of the sound level meter with test status and the estimated uncerta	ge using a B8 was adjuste ainties.	K 4226 acc d. The test	oustic cal result at	ibrator 125 Hz and
	Test:	Subtest	Status	Uncer	tanity (d	B) / Coverage Fa
	Acoustic response	Weighting A at 125 Hz Weighting A at 8000 Hz	Pass Pass		0.3 0.5	
3,	Response to associated	sound calibrator				
	N/A					

End Calibrated by: ung Chi Yip Date: 31-Oct-2023

assumed unless explicitly stated.

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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(Continuation Page)

in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is

Checked by: Chan Yuk Yiu Date: 01-Nov-2023