Environmental Certificate of Calibration	BRATION DATE: per 11, 2021
Calibration Certification Information	
Cal. Date: September 11, 2020 Rootsmeter S/N: 438320 Ta: 297 °K	
	m Hg
	пп
Calibration Model #: TE-5025A Calibrator S/N: 2154	
Vol. Init Vol. Final ΔVol. ΔTime ΔP ΔΗ	
Run (m3) (m3) (m3) (min) (mm Hg) (in H2O)	
1 1 2 1 1.4510 3.3 2.00	
2 3 4 1 1.0340 6.4 4.00	
3 5 6 1 0.9260 8.0 5.00	
4 7 8 1 0.8780 8.9 5.50	
5 9 10 1 0.7250 13.0 8.00	
Data Tabulation	
Vstd Qstd $\sqrt{\Delta H \left(\frac{Pa}{Pstd}\right) \left(\frac{Tstd}{Ta}\right)}$ Qa $\sqrt{\Delta H \left(Ta/Pa\right)}$	
(m3) $(x-axis)$ $(y-axis)$ Va $(x-axis)$ $(y-axis)$	
0.9929 0.6843 1.4123 0.9956 0.6862 0.8868	
0.9888 0.9563 1.9973 0.9915 0.9589 1.2541	
0.9867 1.0656 2.2330 0.9894 1.0685 1.4021	
0.9855 1.1225 2.3420 0.9882 1.1255 1.4705	
0.9801 1.3519 2.8246 0.9828 1.3556 1.7735	
m= 2.11508 m= 1.32442	
QSTD b= -0.02962 QA b= -0.01860	
r= 0.99993 r= 0.99993	
Calculations	
Vstd= ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta) Va= ΔVol((Pa-ΔP)/Pa)	
Qstd= Vstd/ΔTime Qa= Va/ΔTime	
For subsequent flow rate calculations:	
$\mathbf{Qstd} = 1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right) - b\right) \qquad \mathbf{Qa} = 1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right) - b\right)$	
Standard Conditions	
Tstd: 298.15 °K RECALIBRATION	
Pstd: 760 mm Hg	oor 1009
Key US EPA recommends annual recalibration p ΔH: calibrator manometer reading (in H2O) 40 Code of Federal Regulations Part 50 t	
ΔH: calibrator manometer reading (in H2O)40 Code of Federal Regulations Part 50 tΔP: rootsmeter manometer reading (mm Hg)Appendix B to Part 50, Reference Method	
Ta: actual absolute temperature (°K) Determination of Suspended Particulate M	1
Pa: actual barometric pressure (mm Hg) the Atmosphere, 9,2,17, page 30	
b: intercept	
m: slope	

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RECALIBRATION DUE DATE:

June 4, 2022

Certificate of Calibration

			Calibration	Certificati	on Informat	ion		
Cal. Date:	June 4, 202	1	Roots	meter S/N:	438320	Ta:	294	°K
Operator:	Jim Tisch	sch				Pa:	750.3	mm Hg
Calibration	Model #:	TE-5025A	Calil	brator S/N:	2456			
		Vol. Init	Vol. Final	ΔVol.	ΔTime	ΔΡ	ΔΗ	
	Run	(m3)	(m3)	(m3)	(min)	(mm Hg)	(in H2O)	
	1	1	2	1	1.4450	3.2	2.00	
	2	3	4	1	1.0220	6.4	4.00	
	3	5	6	1	0.9070	8.0	5.00	
	4	7	8	1	0.8650	8.8	5.50	
	5	9	10	1	0.7130	12.8	8.00	
			C	Data Tabula	tion			
	Vstd	Qstd	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right)}$)(<u>Tstd</u>)		Qa	$\sqrt{\Delta H (Ta/Pa)}$	
	(m3)	(x-axis)	(y-ax	is)	Va	(x-axis)	(y-axis)	
	0.9964	0.6896	1.414	47	0.9957	0.6891	0.8853	
	0.9922	0.9708	2.000	chind bon control on the province of the	0.9915	0.9701	1.2519	
	0.9900	1.0915	2.230	58	0.9893	1.0908	1.3997	3
	0.9890	1.1433	2.340		0.9883	1.1425	1.4680	
	0.9836	1.3795	2.829	and and a subscription of the subscription of	0.9829	1.3786	1.7705	
			2.047	NAMES OF TAXABLE PARTY OF TAXAB		m=	1.28199	
	QSTD	b=	0.005		QA	b=	0.00358	8
		r=	0.999	96		۲= ۲=	0.99996	
				Calculatio				
			/Pstd)(Tstd/Ta	a)	Contraction in the International Contraction of the International Contractional Contractionan Contractional Contract	ΔVol((Pa-ΔI Va/ΔTime		
	Qstd=	Vstd/∆Time						
			For subsequ	ent flow ra				
	Qstd=	$1/m\left(\sqrt{\Delta H}\right)$	Pa Pstd / Tstd Ta))-b)	Qa=	1/m ((√∆⊦	I(Та/Ра))-b)	
***********************	Standard	Conditions	1					
Tstd:	1				April 1995 And Anna Anna Anna Anna Anna Anna Anna	RECA	LIBRATION	talah mang beratmak na mang beratak semanang
Pstd:	And the second s	mm Hg				mana and a		n nor 1000
Ally calibrat		ey or roading (in	n H2O)				nnual recalibrations Part 5	-
	or manomete ter manome						+	
	osolute temp		(IIIII IIg)				Reference Meth	
	arometric pro		Hg)				ended Particulate	
b: intercept	and the second se				the	e atmosphe	re, 9.2.17, page 3	50
o. micricept			1					

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TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project · Co	ntract No. HY	//2019/01 - H	long Kong-7	huhai-Macac	Bride			Date of	Calibration:	16-Jul-21
Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Location : AMS2						ge			oration Date:	
Brand:								Technician:	-	
Model:		TE-5170		S/N:	HVS	-01			rechnician.	ring Chan
woder.				0/N.	1100	-01				
				COND	ITION	IS				
	Se	ea Level Pres	ssure (hPa):	1013.2		Corre	cted Pressu	re (mm Hg):	760	
		Tempe	erature (°C):	23.4			Temp	perature (K):	297	
		Make:		CALIBRATI Tisch	ON O				2.11508	
		Model:		TE-5025A			Qstd Slope: td Intercept:		-0.02962	
	Calib	ration Date:		11-Sep-20			Expiry Date:		-0.02902 11-Sep-21	
		S/N:		2154			Expiry Date.		11 000 21	
				CALIB	RATIO	ON				
	H2O (L)	H2O (R)	H2O	Qstd		I	IC		LINEAR	
Plate No.	(in)	(in)	(in)	(m ³ /min)	(C	chart)	(corrected)	I	REGRESSIC	N
18	7.40	-3.80	11.200	1.600		60.00	60.15	Slope =	27.7246	
13	6.80	-2.90	9.700	1.490		56.00	56.14	Intercept =	14.7766	
10	5.20	-2.10	7.300	1.295		49.00	49.12	Corr. coeff.:	0.9943	
7	4.30	-0.30	4.600	1.030		43.00	43.10			
5	2.80	0.20	2.600	0.778		37.00	37.09			
Calculation										
-	Sqrt(H2O(Pa		a))-b]				FLO	OW RATE CI	HART	
	Pa/Pstd)(Tstd					70.00				
	dard flow rate									
	ed chart resp art response					60.00				
	tor Qstd slop					50.00				
	or Qstd interc				<u>S</u>	50.00				
	temperature	-	ation (dea K)		esponse (IC)	40.00				
	pressure dur	•			ods					
Tstd = 298 deg K					30.00					
Pstd = 760 mm Hg			Char	20.00						
For subsequent calculation of sampler flow:				al C	20.00					
1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)				Actual Chart R	10.00					
m = sampler slope										
b = sampler intercept					0.00		00 1 000	1.500		
I = chart response						0.	.000 0.50	00 1.000	1.500	2.000
Tav = daily a	average temp	perature					Stand	dard Flow Rate	(m ³ /min)	
Pav = daily average pressure									······	

Tory

Wan Ka Ho Project Consultant

Report Date: 17/7/2021



Room 723 & 725, 7/F, Block B, Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Fong, Hong Kong.

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Co	ntract No. HY	(/2019/01 - H	long Kong-Z	huhai-Macac	Bric	dge		[Date of (Calibration:	13-Sep-2
Location : A	MS2							Nex	t Calibr	ation Date:	12-Dec-2
Brand:		Tisch							٦	Fechnician:	Ting Char
Model:		TE-5170		S/N:	HVS	S-01					
				COND	ΙΤΙΟ	NS					
	Se	ea Level Pres	ssure (hPa):	1006.7		Corre	cted Press	sure (mn	n Hg):	755	
l		Tempe	erature (°C):	30.9			Ter	nperatur	e (K):	304	
				CALIBRATI	ON (ORIFICE	1				
		Make:		Tisch			Qstd Slop	e:		2.04731	
		Model:		TE-5025A		Qs	td Intercep	ot:		0.00573	
l	Calib	ration Date:		11-Sep-20			Expiry Dat	e:		11-Sep-21	
		S/N:		2456							
				CALIB	RAT						
Plate No.	H2O (L)	H2O (R)	H2O	Qstd		I	IC			LINEAR	
	(in)	(in)	(in)	(m ³ /min)	(chart)	(corrected			EGRESSI	NC
18	11.00	-7.40	18.400	2.065		60.00	59.2		ope =	26.5492	
13	8.60	-6.80	15.400	1.889		56.00	55.2		cept =	4.6122	
10	7.30	-5.40	12.700	1.715		50.00	49.3		coeff.=	0.9963	
7	4.60	-4.10	8.700	1.419		44.00	43.4				
5	2.80	-3.30	6.100	1.188		36.00	35.5	2			
Calculation $Ostd = 1/ml^3$	∣ s: Sqrt(H2O(Pa	/Pstd)(Tstd/T	a))-bl								
-	a/Pstd)(Tstd		()) []				F		ATE CH	IART	
	dard flow rate					70.00					
	ed chart resp										
	art response					60.00					
	tor Qstd slop				0	50.00					
b = calibrate	or Qstd interd	cept			esponse (IC)						
Ta = actual	temperature	during calibra	ation (deg K)		onse	40.00					
Pa = actual	pressure dur	ing calibratio	n (mm Hg)		espo				«		
Tstd = 298 c	std = 298 deg K			L L L	30.00						
Pstd = 760 mm Hg		Actual Chart R	20.00								
For subsequent calculation of sampler flow:				al (20.00						
1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)				Acti	10.00						
m = sampler slope											
b = sampler intercept						0.00			1 1 5		2 500
I = chart re	•					0.	.000 0.50	0 1.00	00 1.5	00 2.000	2.500
	average temp						Sta	indard Flo	w Rate ((m³/min)	
Pav = daily a	average pres	sure								· /	

Tory

Wan Ka Ho Project Consultant

Report Date: 13/9/2021



Room 723 & 725, 7/F, Block B, Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Fong, Hong Kong.

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Proiect : Co	ntract No. HY	//2019/01 - H	ona Kona-Z	huhai-Macad	Brid	dae		11271	D	ate of	Calibration:	16-Jul-2
Location : A			egeg _			.90					ration Date:	
Brand:		Tisch							-		Technician:	
Model:		TE-5170		S/N:	HVS	S-02						0 -
			<i>"</i> –)	COND					,			
	Se	ea Level Pres		1013.2		Corre	ected F		ure (mm	•	760	
		Tempe	erature (°C):	23.4				Tem	perature	e (K):	297	
				CALIBRATI	ON	ORIFICE						
		Make:		Tisch			Qstd S	Slope	:		2.11508	
		Model:		TE-5025A		Qs	td Inte	rcept	:		-0.02962	
	Calib	ration Date:		11-Sep-20			Expiry	Date	:		11-Sep-21	
		S/N:		2154								
				CALIB	RAT	ION						
Plate No.	H2O (L)	H2O (R)	H2O	Qstd		I	IC				LINEAR	
	(in)	(in)	(in)	(m ³ /min)	((chart)	(corre		·		REGRESSI	
18	5.90	-11.40	17.300	1.985		59.00		59.14		pe =	30.5359	
13	4.80	-10.20	15.000	1.850		53.00		53.13		•	-2.3129	
10	3.70	-9.10	12.800	1.710		50.00		50.12		oeff.=	0.9971	
7	3.00	-6.40	9.400	1.467		42.00		12.10				
5	2.10	-4.30	6.400	1.213		35.00		35.08				
Calculation	i s: Sqrt(H2O(Pa	/Pstd)(Tstd/T	a))-b]									
=	Pa/Pstd)(Tstd		u)) b]					FL	OW RA	TE CH	HART	
	dard flow rate					70.00						
	ed chart resp											
	art response					60.00					1	
	tor Qstd slop				0	50.00						
b = calibrate	or Qstd interc	cept) e	00.00						
Ta = actual	temperature	during calibra	ation (deg K)		esponse (IC)	40.00				_/		
Pa = actual	pressure dur	ing calibratio	n (mm Hg)		espe					1		
Tstd = 298 o	std = 298 deg K			22	30.00							
Pstd = 760 r	std = 760 mm Hg			Cha	20.00							
For subsequent calculation of sampler flow:				Actual Chart R	20.00							
1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)				Acti	10.00							
m = sampler slope												
b = sampler intercept					0.00	.000	0.500) 1.000	7 14	500 2.000	2.500	
I = chart re	•					0	.000	0.500	, 1.00	J 1	2.000	2.300
-	average temp							Star	idard Flo	w Rate	(m³/min)	
Pav = daily average pressure											. ,	

Tory

Wan Ka Ho Project Consultant

Report Date: 17/7/2021



Room 723 & 725, 7/F, Block B, Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Fong, Hong Kong.

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project Co	ntract No. HY	//2019/01 - H	ong Kong-7	huhai-Macar	Brid	ne		Date of	Calibration:	13-Sep-21
Location : A		/2013/01 - 11	ong Kong-z		Dila	ge			oration Date:	-
Brand:							NEXT Gain	Technician:		
Model:		TE-5170		S/N:	HVS	-02			recrimician.	Ting Chan
wouer.		12-5170		0/IN.	1100	-02				
				COND	ITIO	NS				
	Se	ea Level Pres	sure (hPa):	1006.7		Corre	ected Pressu	re (mm Hg):	755	
		Tempe	erature (°C):	30.9			Temp	perature (K):	304	
				CALIBRATI	ON C	DRIFICE				
		Make:		Tisch			Qstd Slope:		2.04731	
	_	Model:		TE-5025A			std Intercept:		0.00573	
		ration Date:		4-Jun-21			Expiry Date:		4-Jun-22	
		S/N:		2456						
			1100	CALIB	RATI		10			
Plate No.	H2O (L)	H2O (R)	H2O	Qstd	,		IC		LINEAR	211
- 10	(in)	(in)	(in)	(m ³ /min)	(0	chart)	(corrected)		REGRESSI	JN
18	11.00	-8.30	19.300	2.115		62.00	61.18	Slope =	27.7723	
13	8.80	-7.20	16.000	1.925		56.00	55.26	Intercept =	1.7337	
10	7.10	-6.20	13.300	1.755		50.00	49.34	Corr. coeff.:	0.9978	
7 5	4.60 2.40	-4.30	8.900	1.435 1.128		42.00	41.45			
Calculation		-3.10	5.500	1.120		34.00	33.55			
	i s. Sqrt(H2O(Pa	/Pstd)(Tstd/T	a))-b]							
-	Pa/Pstd)(Tstd		()) [2]				FLO	OW RATE C	HART	
	dard flow rate					70.00				
IC = correct	ed chart resp	onse				~~ ~~				
	art response					60.00				
	tor Qstd slope	Э			0	50.00				
b = calibrate	or Qstd interc	ept			e (IC					
Ta = actual	temperature (during calibra	ation (deg K)	1	esponse (IC)	40.00		/		
Pa = actual	pressure duri	ing calibration	n (mm Hg)		esp					
Tstd = 298 deg K			2 2 2	30.00						
Pstd = 760 mm Hg			Actual Chart R	20.00						
For subsequent calculation of sampler flow:				ual (20.00					
1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)				Acti	10.00					
m = sampler slope										
b = sampler intercept						0.00	.000 0.500	1.000 1.	.500 2.000	2.500
	I = chart response						.000 0.300	1.000 1.	.500 2,000	2.500
· ·	average temp						Stand	dard Flow Rate	e (m³/min)	
Pav = daily average pressure										

(By

Wan Ka Ho Project Consultant

Report Date: 13/9/2021



CALIBRATION REPORT OF WIND METER

Project: Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge Date of Calibration: 30-Jun-2021 Location: AMS3C Next Calibration Date: 29-Dec-2021 Technician: Ting Chan **Global Water** Brand: GL500-7-2 Model: Anemometer Brand: Smart Sensor Serial No: H0423689 Model: AR816 Procedures: 1. Wind Still Test: The wind speed sensor was held by hand until stabilized. 2. Wind Speed Test: The wind meter was calibrated in-situ and compared with the Anemometer. 3. Wind Direction Test: The wind meter was calibrated in-situ and compared with a marine compass from four directions.

Wind Still Test:

Wind Speed (m/s)
0.00

Wind Speed Test:

Global Water (m/s)	Anemometer (m/s)
0.7	0.9
2.3	2.4
3.2	3.1

Wind Direction Test:

	Marine Compass (o)
1	360
70	71
242	242
310	312

CRY

Report Date: 1/7/2021

Wan Ka Ho Project Consultant



Report no.: 940891CA202793(1)

Page 1 of 1

CALIBRATION CERTIFICATE OF DUST METER

Client : Fugro Technical Services Limited

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	: Laser dust monitor
Manufacturer	: SIBATA
Model No.	: LD-5R
Serial No.	: 761106
Specification Limit	: NA
Next Calibration Date	: 26-Nov-2021

Laboratory Information

Description	: 1. Balance 2. TSP high volume air sampler						
Equipment ID. / Seri	D. : 1. C-065-9 2. 4350						
Date of Calibration	27-Nov-2020 Ambient Temperature : 25 ± 10	°C					
Calibration Location : General Chemical Laboratory of FTS and Ma Wan A1 Site Boundary							
Method Used	By direct comparison the weight of dust particle trapped	in a filter paper using high					
volume sampler (TSP method) for a certain period, with the reading of the UUT. They							
y en w	hould be placed at the same location and powered on a	and off at the same time.					

Calibration Results :

Reference concentration (mg/m ³)	Total count for 1 hour	CPM (Count per minute)
0.3486	5134	85.57
0.1257	4394	73.23
0.0943	4408	73.47

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.

- 2. The interpolation equation : Concentration $(mg/m^3) = K \times [UUT reading (CPM)]$, where K = 0.002448
- 3. Correlation coefficient (r): 0.9916

Checked by :	Conny	_Date :_	30-12-2020	_ Certified by :_	K.T. Leung	_ Date :	5-1-2021
CA-R-297 (22/07/20	09)			Leung	Kwok Tai (Assist	ant Mana	ger)

** End of Report **

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Report no.: 940891CA202730(7)

Page 1 of 1

CALIBRATION CERTIFICATE OF DUST METER

Client : Fugro Technical Services Limited

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Laser dust monitor
SIBATA
LD-5R
882146
NA
22-Nov-2021
The second secon

Laboratory Information

Description		: 1. Balance		2. TSP high volume air sampler			
Equipment ID. / Seria	al i	no.: 1.C-065-9		2. 4350			
Date of Calibration	:	23-Nov-2020	A	mbient Temperature : 25 ± 10 °C			
Calibration Location	:	General Chemical La	abc	pratory of FTS and Ma Wan A1 Site Boundary			
Method Used	:	By direct comparison	n th	e weight of dust particle trapped in a filter paper using high			
	volume sampler (TSP method) for a certain period, with the reading of the UUT. They						
		should be placed at the same location and powered on and off at the same time.					

Calibration Results :

Reference concentration (mg/m ³)	Total count for 1 hour	CPM (Count per minute)
0.0915	2788	46.47
0.0469	2287	38.12
0.1172	3129	52.15

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.

- 2. The interpolation equation : Concentration $(mg/m^3) = K \times [UUT reading (CPM)]$, where K = 0.001869
- 3. Correlation coefficient (r): 0.9990

CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)	Checked by :	_ Date :_	15-12-2020	_ Certified by :_	K.T. Tenna	Date : 15-12-2020
	CA-R-297 (22/07/2009)			Leung	Kwok Tai (Assist	ant Manager)

** End of Report **

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5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report no.: 203258CA202302(1)

Page 1 of 1

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT

Description	:	Sound Level Meter	
Manufacturer	:	Casella	
		Meter	
Model No.	:	CEL-63X	

		Meter	Microphone	Preamplifier
Model No.	:	CEL-63X	CE-251	CEL-495
Serial No.	:	1488295	02795	003538
Equipment ID	:	N-54		

Next Calibration Date		29-Oct-2021
Specification Limit	:	EN 61672-1: 2003 Class 1

Laboratory Information

Details of Reference Equipment -

Description :		B & K Acoustic Multifunction Calib	rator 4226 (Traditional fr	ee	field setting)
Equipment ID. :		R-108-1			
Date of Calibration	;	30-Oct-2020			
Calibration Location	:	Calibration Laboratory of FTS	Ambient Temperature	:	20±2 °C
Method Used		By direct comparison	Relative Humidity	:	<80% R.H.

Calibration Results :

Paramet	ters	Mean Value (dB)	Specific	Limit(dB)	
	4000Hz	1.0	2.6	to	-0.6
	2000Hz	-0.2	2.8	to	-0.4
	1000Hz	0.0	1.1	to	-1.1
A-weigthing frequency	500Hz	-3.3	-1.8	to	-4.6
response	250Hz	-8.7	-7.2	to	-10.0
	125Hz	-16.2	-14.6	to	-17.6
	63Hz	-26.1	-24.7	to	-27.7
	31.5Hz	-38.7	-37.4	to	-41.4
Differential level	94dB-104dB	0.0		± 0.6	6
linearity	104dB-114dB	0.1		± 0.6	6

Remarks:

- 1. The equipment used in this calibration is traceable to recognized National Standards.
- 2. The mean value is the average of four measurements.
- 3. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighting is fast.
- 4. The UUT does comply with EN 61672-1: 2003 Class 1 sound level meter for the above measurement.
- 5 The values given in this Calibration Certificate only relate to the values at the time of the test and any uncertainties will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during tranportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by :	Lilliam	Date :	4-11-2020	_ Certified by : _	K.T. Toung	_ Date : _	4.11.2020
CA-R-297 (22/07/2009)			Leung	Kwok Tai (Assista	nt Manager)
			** E	nd of Report **			



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report no.: 203258CA202083(1)

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CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT

Description	:	Sound Level Meter		
Manufacturer	:	Casella		

		Meter	Microphone	Preamplifier
Model No.	:	CEL-63X	CE-251	CEL-495
Serial No.	;	1488300	03456	002850
Equipment ID	:	N/A		
Next Calibration Date	÷	04-Oct-2021		
Specification Limit	:	EN 61672-1: 2003 Class	1	

Laboratory Information

Details of Reference Equipment -

Description :	B & K Acoustic Multifunction Calil	prator 4226 (Traditional free field setting)	
Equipment ID. :	R-108-1		
Date of Calibration :	05-Oct-2020		
Calibration Location :	Calibration Laboratory of FTS	Ambient Temperature : 20±2 °C	
Method Used :	By direct comparison	Relative Humidity : <80% R.H.	

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dE		Limit(dB)
	4000Hz	0.8	2.6	to	-0.6
A-weigthing frequency response	2000Hz	1.2	2.8	to	-0.4
	1000Hz	0.0	1.1	to	-1.1
	500Hz	-3.3	-1.8	to	-4.6
	250Hz	-8.7	-7.2	to	-10.0
	125Hz	-16.1	-14.6	to	-17.6
	63Hz	-26.2	-24.7	to	-27.7
	31.5Hz	-39.2	-37.4	to	-41.4
Differential level linearity	94dB-104dB	0.1	± 0.6		3
	104dB-114dB	0.0		± 0.6	3

Remarks:

- 1. The equipment used in this calibration is traceable to recognized National Standards.
- 2. The mean value is the average of four measurements.
- 3. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighting is fast.
- 4. The UUT does comply with EN 61672-1: 2003 Class 1 sound level meter for the above measurement.
- 5 The values given in this Calibration Certificate only relate to the values at the time of the test and any uncertainties will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during tranportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by :	Asilliam	Date :	<u>7- 10 - 2010</u> Certified by :	KLY	Coun & Date :	8.10.2020
CA-R-297 (22/07/2009	9)		Leung	g Kwok Tai (/	Assistant Manage	r)
			** End of Report *		\smile	

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Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report no.: 203258CA202146(2)

CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

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Client : Fugro Technical Services Ltd.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description		: :	Sound Calibrator
Manufacturer		: (Casella (Model CEL-120/1)
Serial No.		: 2	2383707
Equipment ID		: 1	N/A
Next Calibration Date	:	14-(Oct-2021
Specification Limit	:	EN	60942: 2003 Class 1

Laboratory Information

Details of Calibration Equipment

Description :	Reference Sound level meter				
Equipment ID. :	R-119-1				
Date of Calibration :	15-Oct-2020				
Calibration Location :	Calibration Laboratory of FTS	Ambient Temperature : 20±2 °C			
Method Used :	By direct comparison	Relative Humidity : <80% R.H.			

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.1 dB	
114dB	-0.2 dB	±0.4dB

Remarks :

- 1. The equipment used in this calibration is traceable to recognized National Standards.
- 2. The mean value is the average of four measurements.
- 3. The unit under test complies with the specification limit.
- 4. The values given in this Calibration Certificate only relate to the unit-under-test and the values measured at the time of the test. Any uncertainties quoted will not include allowances for the environmental changes, variation and shock during transportation, or the capability of any other laboratory to repeat the measurement.

Checked by :	Lulliam	Date :	19-10-2020	_Certified by :	K.T. Teun (Date :	19-10-2020
CA-R-297 (22/07/2009))			Leung	Kwok Tai (Assist	ant Manag	jer)

** End of Report **



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Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report no.: 212769CA211663

CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description		: Sound Calibrator
Manufacturer		: Casella (Model CEL-120/1)
Serial No.		: 2383886
Equipment ID		: N/A
Next Calibration Date	:	15-Jul-2022
Specification Limit	:	EN 60942: 2003 Class 1

Laboratory Information

Details of Calibration Equipment

Description :	Reference Sound level meter					
Equipment ID. :	R-119-2					
Date of Calibration :	16-Jul-2021					
Calibration Location :	Calibration Laboratory of FTS	Ambient Temperature: 20±2 °C				
Method Used :	By direct comparison	Relative Humidity : <80% R.H.				

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	0.3 dB	±0.4dB
114dB	0.4 dB	±0.40B

Remarks :

- 1. The equipment used in this calibration is traceable to recognized National Standards.
- 2. The mean value is the average of four measurements.
- 3. The expanded uncertainty is 0.3 dB with a coverage factor of 2 at a confidence level of 95%.
- 4. The unit under test complies with the specification limit.
- 5. The values given in this Calibration Certificate only relate to the unit-under-test and the values measured at the time of the test. Any uncertainties quoted will not include allowances for the environmental changes, variation and shock during transportation, or the capability of any other laboratory to repeat the measurement.

Checked by :	_ Date :_	<u> 20-7-2021</u> Certified by :_	r J. Tenny	Date: 20-7-2021
CA-R-297 (22/07/2009)		Leun	g Kwok Tai (Assis	tant Manager)

** End of Report **