

## Certificate of Calibration

Calibration Certification Information			
Cal. Date: September 11, 2020	Rootsmer S/N: 438320	Ta: 297 °K	
Operator: Jim Tisch		Pa: 755.4 mm Hg	
Calibration Model #: TE-5025A	Calibrator S/N: 2154		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (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 (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (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
QSTD	m=	2.11508	QA	m=	1.32442
	b=	-0.02962		b=	-0.01860
	r=	0.99993		r=	0.99993

Calculations	
Vstd= $\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	Va= $\Delta Vol((Pa-\Delta P)/Pa)$
Qstd= $Vstd/\Delta Time$	Qa= $Va/\Delta Time$
For subsequent flow rate calculations:	
Qstd= $1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa= $1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmer manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

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

# Certificate of Calibration

## Calibration Certification Information

Cal. Date: June 4, 2021      Rootsmer S/N: 438320      Ta: 294 °K  
Operator: Jim Tisch      Pa: 750.3 mm Hg  
Calibration Model #: TE-5025A      Calibrator S/N: 2456

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (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

## Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis)
0.9964	0.6896	1.4147	0.9957	0.6891	0.8853
0.9922	0.9708	2.0007	0.9915	0.9701	1.2519
0.9900	1.0915	2.2368	0.9893	1.0908	1.3997
0.9890	1.1433	2.3460	0.9883	1.1425	1.4680
0.9836	1.3795	2.8294	0.9829	1.3786	1.7705
QSTD	m=	2.04731	QA	m=	1.28199
	b=	0.00573		b=	0.00358
	r=	0.99996		r=	0.99996

## Calculations

Vstd=	$\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	Va=	$\Delta Vol((Pa-\Delta P)/Pa)$
Qstd=	Vstd/ΔTime	Qa=	Va/ΔTime
For subsequent flow rate calculations:			
Qstd=	$1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa=	$1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$

## Standard Conditions

Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmer manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

## RECALIBRATION

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

**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 16-Jul-21	
Location : AMS2				Next Calibration Date: 15-Sep-21	
Brand:	Tisch			Technician: Ting Chan	
Model:	TE-5170	S/N:	HVS-01		

**CONDITIONS**

Sea Level Pressure (hPa):	1013.2	Corrected Pressure (mm Hg):	760
Temperature (°C):	23.4	Temperature (K):	297

**CALIBRATION ORIFICE**

Make:	Tisch	Qstd Slope:	2.11508
Model:	TE-5025A	Qstd Intercept:	-0.02962
Calibration Date:	11-Sep-20	Expiry Date:	11-Sep-21
S/N:	2154		

**CALIBRATION**

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m <sup>3</sup> /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	7.40	-3.80	11.200	1.600	60.00	60.15	Slope = 27.7246 Intercept = 14.7766 Corr. coeff.: 0.9943
13	6.80	-2.90	9.700	1.490	56.00	56.14	
10	5.20	-2.10	7.300	1.295	49.00	49.12	
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	

**Calculations:**

$$Qstd = 1/m[\sqrt{H2O(Pa/Pstd)(Tstd/Ta))}-b]$$

$$IC = I[\sqrt{Pa/Pstd)(Tstd/Ta)]}$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

**For subsequent calculation of sampler flow:**

$$1/m((I)[\sqrt{298/Tav})(Pav/760)]-b)$$

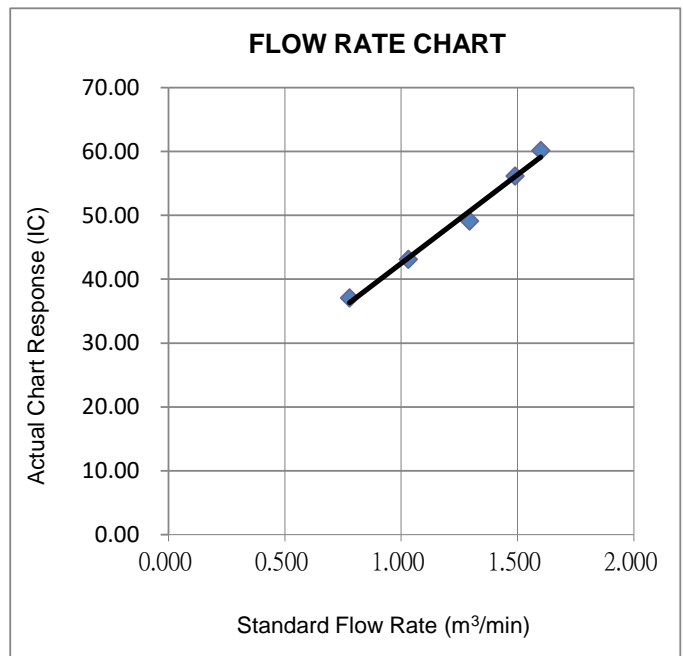
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure




**Wan Ka Ho**  
Project Consultant

**Report Date:** 17/7/2021



**FUGRO TECHNICAL SERVICES LIMITED**

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 : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 13-Sep-21	
Location : AMS2				Next Calibration Date: 12-Dec-21	
Brand:	Tisch			Technician: Ting Chan	
Model:	TE-5170	S/N:	HVS-01		

**CONDITIONS**

Sea Level Pressure (hPa):	1006.7	Corrected Pressure (mm Hg):	755
Temperature (°C):	30.9	Temperature (K):	304

**CALIBRATION ORIFICE**

Make:	Tisch	Qstd Slope:	2.04731
Model:	TE-5025A	Qstd Intercept:	0.00573
Calibration Date:	11-Sep-20	Expiry Date:	11-Sep-21
S/N:	2456		

**CALIBRATION**

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m <sup>3</sup> /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	11.00	-7.40	18.400	2.065	60.00	59.21	Slope = 26.5492 Intercept = 4.6122 Corr. coeff.: 0.9963
13	8.60	-6.80	15.400	1.889	56.00	55.26	
10	7.30	-5.40	12.700	1.715	50.00	49.34	
7	4.60	-4.10	8.700	1.419	44.00	43.42	
5	2.80	-3.30	6.100	1.188	36.00	35.52	

**Calculations:**
$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta)) - b]$$
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

**For subsequent calculation of sampler flow:**
$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)] - b)$$

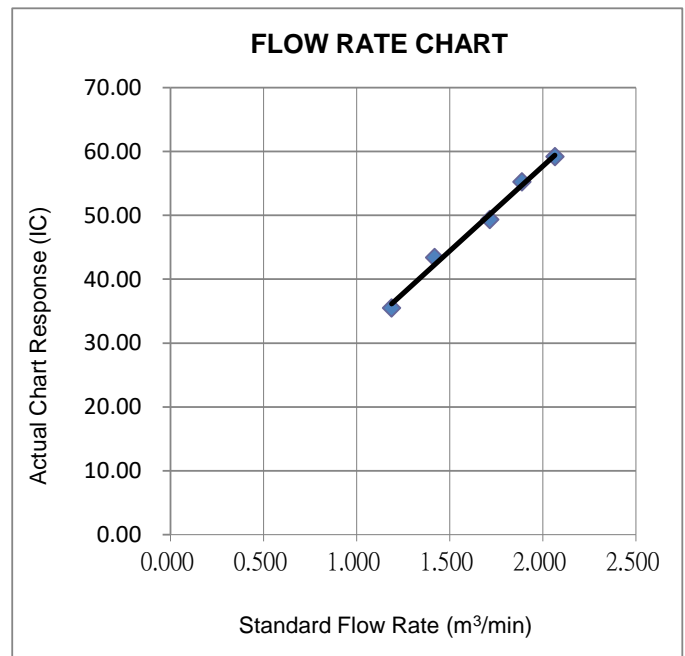
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



**Wan Ka Ho**  
Project Consultant

**Report Date:** 13/9/2021

**FUGRO TECHNICAL SERVICES LIMITED**

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 : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 16-Jul-21	
Location : AMS3C				Next Calibration Date: 15-Sep-21	
Brand:		Tisch		Technician: Ting Chan	
Model:		TE-5170	S/N:	HVS-02	

**CONDITIONS**

Sea Level Pressure (hPa):	1013.2	Corrected Pressure (mm Hg):	760
Temperature (°C):	23.4	Temperature (K):	297

**CALIBRATION ORIFICE**

Make:	Tisch	Qstd Slope:	2.11508
Model:	TE-5025A	Qstd Intercept:	-0.02962
Calibration Date:	11-Sep-20	Expiry Date:	11-Sep-21
S/N:	2154		

**CALIBRATION**

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m <sup>3</sup> /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.90	-11.40	17.300	1.985	59.00	59.14	Slope = 30.5359 Intercept = -2.3129 Corr. coeff.: 0.9971
13	4.80	-10.20	15.000	1.850	53.00	53.13	
10	3.70	-9.10	12.800	1.710	50.00	50.12	
7	3.00	-6.40	9.400	1.467	42.00	42.10	
5	2.10	-4.30	6.400	1.213	35.00	35.08	

**Calculations:**
$$Qstd = 1/m[\sqrt{H2O(Pa/Pstd)(Tstd/Ta)}] - b]$$
$$IC = I[\sqrt{Pa/Pstd)(Tstd/Ta)}]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

**For subsequent calculation of sampler flow:**
$$1/m((I)[\sqrt{298/Tav}(Pav/760)] - b)$$

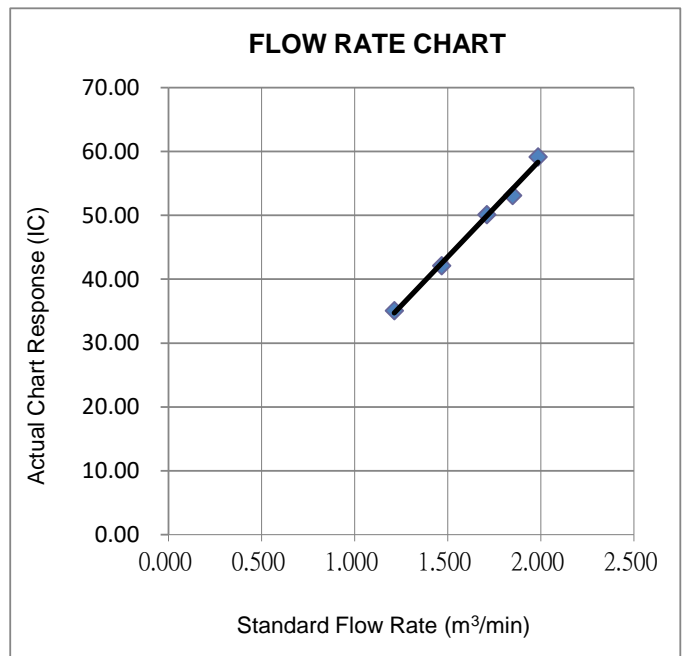
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



**Wan Ka Ho**  
Project Consultant

**Report Date:** 17/7/2021

**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 13-Sep-21	
Location : AMS3C				Next Calibration Date: 12-Dec-21	
Brand:	Tisch			Technician: Ting Chan	
Model:	TE-5170	S/N:	HVS-02		

**CONDITIONS**

Sea Level Pressure (hPa):	1006.7	Corrected Pressure (mm Hg):	755
Temperature (°C):	30.9	Temperature (K):	304

**CALIBRATION ORIFICE**

Make:	Tisch	Qstd Slope:	2.04731
Model:	TE-5025A	Qstd Intercept:	0.00573
Calibration Date:	4-Jun-21	Expiry Date:	4-Jun-22
S/N:	2456		

**CALIBRATION**

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m <sup>3</sup> /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	11.00	-8.30	19.300	2.115	62.00	61.18	Slope = 27.7723 Intercept = 1.7337 Corr. coeff.: 0.9978
13	8.80	-7.20	16.000	1.925	56.00	55.26	
10	7.10	-6.20	13.300	1.755	50.00	49.34	
7	4.60	-4.30	8.900	1.435	42.00	41.45	
5	2.40	-3.10	5.500	1.128	34.00	33.55	

**Calculations:**

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta)) - b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

**For subsequent calculation of sampler flow:**

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)] - b)$$

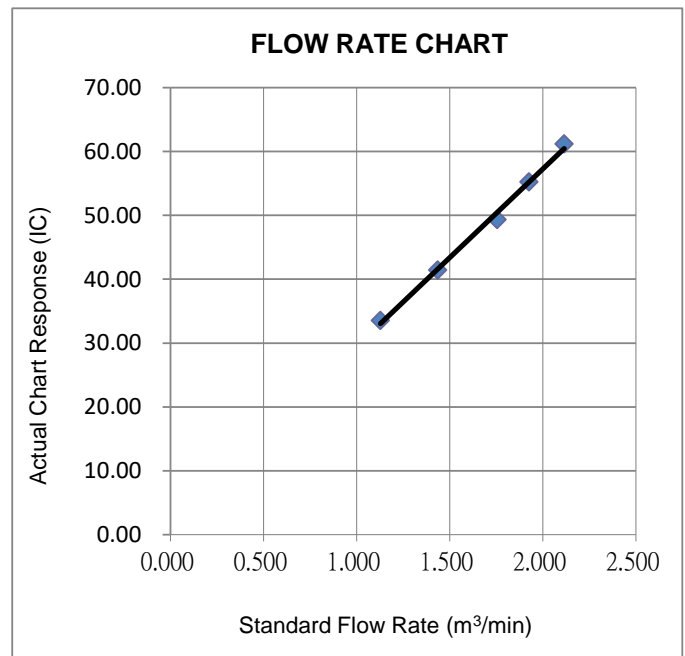
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure




**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**Location:** AMS3C**Date of Calibration:** 30-Jun-2021**Next Calibration Date:** 29-Dec-2021**Technician:** Ting Chan**Brand:** Global Water**Model:** GL500-7-2**Anemometer****Brand:** Smart Sensor**Model:** AR816**Serial No:** H0423689**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

**Wan Ka Ho**  
Project Consultant**Report Date:** 1/7/2021

Report no. : 940891CA202793(1)

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## **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. / Serial no. : 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 should be placed at the same location and powered on and off at the same time.

### **Calibration Results :**

Reference concentration (mg/m <sup>3</sup> )	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<sup>3</sup>) = K x [ UUT reading (CPM) ], where K = 0.002448
3. Correlation coefficient (r) : 0.9916

Checked by : Cherry Date : 30-12-2020 Certified by : K.T. Leung Date : 5-1-2021

CA-R-297 (22/07/2009)

Leung Kwok Tai (Assistant Manager)

**\*\* End of Report \*\***



Report no. : 940891CA202730(7)

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## **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. : 882146  
Specification Limit : NA  
Next Calibration Date : 22-Nov-2021

### **Laboratory Information**

Description : 1. Balance 2. TSP high volume air sampler  
Equipment ID. / Serial no. : 1. C-065-9 2. 4350  
Date of Calibration : 23-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 should be placed at the same location and powered on and off at the same time.

### **Calibration Results :**

Reference concentration (mg/m <sup>3</sup> )	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<sup>3</sup>) = K x [ UUT reading (CPM) ], where K = 0.001869
3. Correlation coefficient (r) : 0.9990

Checked by : C. Wang Date : 15-12-2020 Certified by : K.T. Leung Date : 15-12-2020

CA-R-297 (22/07/2009)

Leung Kwok Tai (Assistant Manager)

**\*\* End of Report \*\***

Report no.: 203258CA202302(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

Model No. :

Meter	Microphone	Preamplifier
CEL-63X	CE-251	CEL-495
1488295	02795	003538

Serial No. :

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 &amp; K Acoustic Multifunction Calibrator 4226 (Traditional free 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 : &lt;80% R.H.

### **Calibration Results :**

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	1.0	2.6 to -0.6
	2000Hz	-0.2	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	-16.2	-14.6 to -17.6
	63Hz	-26.1	-24.7 to -27.7
	31.5Hz	-38.7	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.0	± 0.6
	104dB-114dB	0.1	± 0.6

### **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 transportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by : Lillian Date : 4-11-2020 Certified by : K.T. Leung Date : 4-11-2020  
CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

\*\* End of Report \*\*

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

Model No. :

CEL-63X

Serial No. :

1488300

Equipment ID :

N/A

Next Calibration Date :

04-Oct-2021

Specification Limit :

EN 61672-1: 2003 Class 1

Meter	Microphone	Preamplifier
CEL-63X	CE-251	CEL-495
1488300	03456	002850

### **Laboratory Information**

#### **Details of Reference Equipment -**

Description : B &amp; K Acoustic Multifunction Calibrator 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 : &lt;80% R.H.

#### **Calibration Results :**

Parameters	Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	0.8
	2000Hz	1.2
	1000Hz	0.0
	500Hz	-3.3
	250Hz	-8.7
	125Hz	-16.1
	63Hz	-26.2
	31.5Hz	-39.2
Differential level linearity	94dB-104dB	± 0.6
	104dB-114dB	± 0.6

#### **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 transportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by : William Date : 7-10-2020 Certified by : K.T. Leung Date : 8-10-2020  
CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

\*\* End of Report \*\*



Report no.: 203258CA202146(2)

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**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. : 2383707  
Equipment ID : 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 :  $20 \pm 2$  °C

Method Used : By direct comparison Relative Humidity : &lt;80% R.H.

**Calibration Results :**

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

**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 : William Date : 19-10-2020 Certified by : K.T. Leung Date : 19-10-2020  
CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

**\*\* End of Report \*\***



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## **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	

#### **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 : Cenny Date : 20-7-2021 Certified by : K.T. Leung Date : 20-7-2021  
CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

**\*\* End of Report \*\***