

# Certificate of Calibration

Calibration Certification Information			
Cal. Date: October 21, 2019	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 744.2	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: <b>2456</b>		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4200	3.2	2.00
2	3	4	1	1.0180	6.3	4.00
3	5	6	1	0.9030	7.9	5.00
4	7	8	1	0.8620	8.8	5.50
5	9	10	1	0.7120	12.6	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)	
0.9849	0.6936	1.4066	0.9957	0.7012	0.8904	
0.9808	0.9635	1.9892	0.9915	0.9740	1.2592	
0.9787	1.0838	2.2240	0.9894	1.0957	1.4078	
0.9775	1.1340	2.3325	0.9882	1.1464	1.4765	
0.9724	1.3658	2.8131	0.9831	1.3807	1.7808	
<b>QSTD</b>	<b>m=</b>	<b>2.08799</b>	<b>QA</b>	<b>m=</b>	<b>1.30746</b>	
	<b>b=</b>	<b>-0.03545</b>		<b>b=</b>	<b>-0.02244</b>	
	<b>r=</b>	<b>0.99989</b>		<b>r=</b>	<b>0.99989</b>	

Calculations			
Vstd=	$\Delta Vol \left( \frac{Pa - \Delta P}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)$	Va=	$\Delta Vol \left( \frac{Pa - \Delta P}{Pa} \right)$
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:	rootsmeter 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: 27-Jul-20
Location : AMS2			Next Calibration Date: 26-Oct-20
Brand:	Tisch		Technician: Sam Fong
Model:	TE-5170	S/N: HVS-01	

CONDITIONS			
Sea Level Pressure (hPa):	1006.4	Corrected Pressure (mm Hg):	755
Temperature (°C):	30.5	Temperature (K):	304

CALIBRATION ORIFICE			
Make:	Tisch	Qstd Slope:	2.08799
Model:	TE-5025A	Qstd Intercept:	-0.03545
Calibration Date:	21-Oct-19	Expiry Date:	21-Oct-20
S/N:	2456		

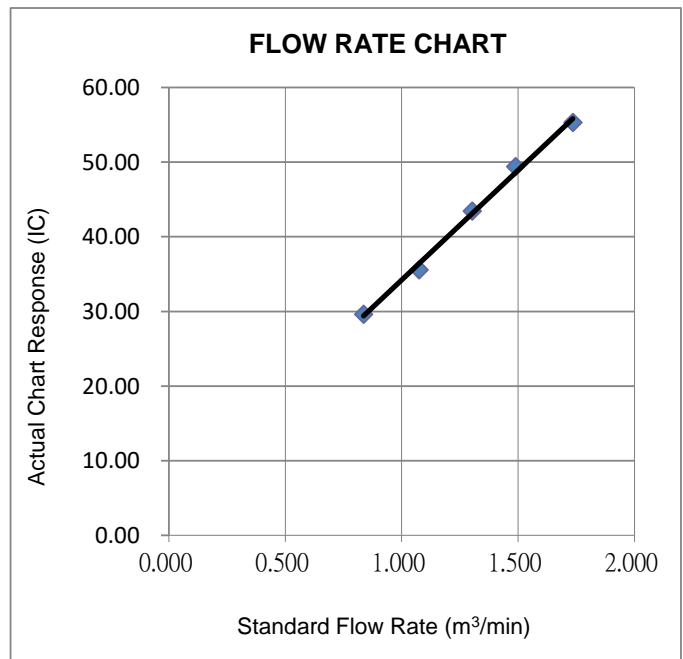
CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m <sup>3</sup> /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.80	-6.40	13.200	1.735	56.00	55.30	Slope = 29.3988 Intercept = 4.7982 Corr. coeff.: 0.9980
13	4.50	-5.20	9.700	1.490	50.00	49.38	
10	3.40	-4.00	7.400	1.304	44.00	43.45	
7	1.20	-3.80	5.000	1.075	36.00	35.55	
5	0.80	-2.20	3.000	0.836	30.00	29.63	

**Calculations:**

$Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)}] - b$   
 $IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$   
 Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)  
 T<sub>std</sub> = 298 deg K  
 P<sub>std</sub> = 760 mm Hg

**For subsequent calculation of sampler flow:**

$1/m((I)[\sqrt{298/T_{av}}](P_{av}/760)] - b$   
 m = sampler slope  
 b = sampler intercept  
 I = chart response  
 T<sub>av</sub> = daily average temperature  
 P<sub>av</sub> = daily average pressure



**Wan Ka Ho**  
 Project Consultant

Report Date: 28/7/2020

**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 27-Jul-20	
Location : AMS3C				Next Calibration Date: 26-Oct-20	
Brand:	Tisch		Technician: Sam Fong		
Model:	TE-5170	S/N:	HVS-02		

CONDITIONS					
Sea Level Pressure (hPa):	1006.4	Corrected Pressure (mm Hg):	755		
Temperature (°C):	30.5	Temperature (K):	304		

CALIBRATION ORIFICE					
Make:	Tisch	Qstd Slope:	2.08799		
Model:	TE-5025A	Qstd Intercept:	-0.03545		
Calibration Date:	21-Oct-19	Expiry Date:	21-Oct-20		
S/N:	2456				

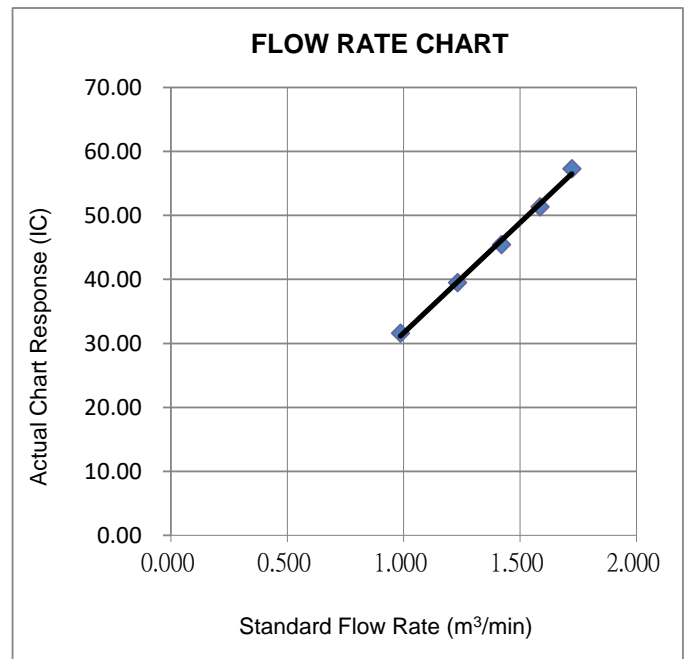
CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m <sup>3</sup> /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	7.20	-5.80	13.000	1.722	58.00	57.28	Slope = 34.4066 Intercept = -2.7672 Corr. coeff.: 0.9982
13	6.20	-4.80	11.000	1.586	52.00	51.35	
10	5.60	-3.20	8.800	1.420	46.00	45.43	
7	4.40	-2.20	6.600	1.232	40.00	39.50	
5	3.00	-1.20	4.200	0.986	32.00	31.60	

**Calculations:**

$Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)}] - b$   
 $IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$   
 Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)  
 T<sub>std</sub> = 298 deg K  
 P<sub>std</sub> = 760 mm Hg

**For subsequent calculation of sampler flow:**

$1/m((I)[\sqrt{298/T_{av}}](P_{av}/760)] - b$   
 m = sampler slope  
 b = sampler intercept  
 I = chart response  
 T<sub>av</sub> = daily average temperature  
 P<sub>av</sub> = daily average pressure



**Wan Ka Ho**  
 Project Consultant

Report Date: **28/7/2020**

**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

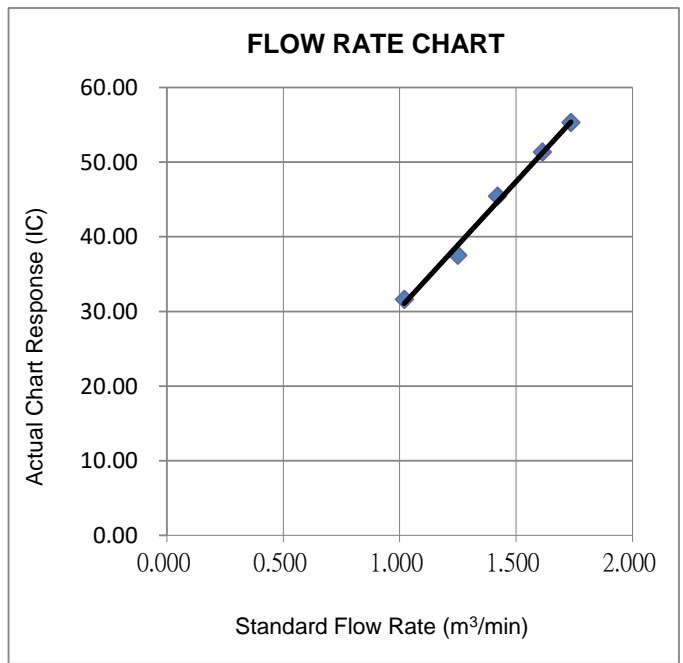
Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge				Date of Calibration: 27-Jul-20	
Location : AMS7B				Next Calibration Date: 26-Oct-20	
Brand:	Tisch		Technician: Sam Fong		
Model:	TE-5170	S/N:	HVS-03		

CONDITIONS					
Sea Level Pressure (hPa):	1006.4	Corrected Pressure (mm Hg):	755		
Temperature (°C):	30.5	Temperature (K):	304		

CALIBRATION ORIFICE					
Make:	Tisch	Qstd Slope:	2.08799		
Model:	TE-5025A	Qstd Intercept:	-0.03545		
Calibration Date:	21-Oct-19	Expiry Date:	21-Oct-20		
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	7.00	-6.20	13.200	1.735	56.00	55.30	Slope = 34.0396 Intercept = -3.6848 Corr. coeff.: 0.9964
13	6.20	-5.20	11.400	1.614	52.00	51.35	
10	5.40	-3.40	8.800	1.420	46.00	45.43	
7	4.20	-2.60	6.800	1.250	38.00	37.53	
5	2.70	-1.80	4.500	1.020	32.00	31.60	

**Calculations:**  
 $Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)}] - b$   
 $IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$   
 Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)  
 T<sub>std</sub> = 298 deg K  
 P<sub>std</sub> = 760 mm Hg  
**For subsequent calculation of sampler flow:**  
 $1/m((I)[\sqrt{298/T_{av}}](P_{av}/760)] - b$   
 m = sampler slope  
 b = sampler intercept  
 I = chart response  
 T<sub>av</sub> = daily average temperature  
 P<sub>av</sub> = daily average pressure



**Wan Ka Ho**  
 Project Consultant

**Report Date:** 28/7/2020



## CALIBRATION REPORT OF WIND METER

<b>Project:</b> Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge	<b>Date of Calibration:</b> 2-Jul-2020
<b>Location:</b> AMS3C	<b>Next Calibration Date:</b> 1-Jan-2021
<b>Brand:</b> Global Water	<b>Technician:</b> Ting Chan
<b>Model:</b> GL500-7-2	<b>S/N:</b> 1847003409
<b>Anemometer</b>	
<b>Brand:</b> Benetech	<b>Equipment ID:</b> 08
<b>Model:</b> GM816	
<b>Procedures:</b>	
1. <b>Wind Still Test:</b>	The wind speed sensor was held by hand until stabilized.
2. <b>Wind Speed Test:</b>	The wind meter was calibrated in-situ and compared with the Anemometer.
3. <b>Wind Direction Test:</b>	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)
0.9	0.5
2.4	2.6
3.4	3.8

**Wind Direction Test:**

Global Water (o)	Marine Compass (o)
0	358
247	244
173	172
80	79

Wan Ka Ho  
Project Consultant

Report Date: 3/7/2020



Report No. : 183057CA200894(3)

Page 1 of 1

**CALIBRATION CERTIFICATE OF ANEMOMETER**

**Client Supplied Information**

Client : Fugro Technical Services Ltd.

Project : Calibration Services

**Details of Unit Under Test, UUT**

Description : Anemometer

Manufacturer : Benetech

Model No. : GM816

Serial No. : N/A

Equipment ID : WS-08

Next Calibration Date : 14-Jun-2021

**Laboratory Information**

Details of Reference Equipment –

Description : Reference Anemometer

Equipment ID : R-101-4

Date of Calibration : 15-Jun-2020 Ambient Temperature : 22 °C

Calibration Location : Calibration Laboratory of FTS

Method Used : R-C-279

**Calibration Results :**

Reference Reading (m/s)	UUT Reading (m/s)	Error (m/s)
2.02	2.0	0.0
4.15	4.1	-0.1
6.27	6.0	-0.3
8.43	8.0	-0.4
10.75	10.1	-0.7

**Remark :**

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The reported readings in this calibration are an average from 10 trials.

Checked by : William Date : 20-6-2020 Certified by : Kit Young Date : 20-6-2020

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

Leung Kwok Tai (Assistant Manager)

\*\* End of Report \*\*

Report no. : 940891CA200109(2)

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. : 761101  
Specification Limit : NA  
Next Calibration Date : 09-Oct-2020

**Laboratory Information**

Description : TSP high volume air sampler  
Serial No. : 4350  
Date of Calibration : 10-Oct-2019 Ambient Temperature : 28 °C  
Calibration Location : 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)
0.1047	2110	35.17
0.0623	1948	32.47
0.0587	1908	31.80

**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 = 0.002270
3. Correlation coefficient (r) : 0.9931

Checked by : C. Wong Date : 10-2-2020 Certified by : K. J. Leung Date : 10-2-2020

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

Leung Kwok Tai (Assistant Manager)

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

**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. : 761104

Specification Limit : NA

Next Calibration Date : 21-Oct-2020

**Laboratory Information**

Description : TSP high volume air sampler

Serial No. : 4350

Date of Calibration : 22-Oct-2019

Ambient Temperature : 25 °C

Calibration Location : 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)
0.1287	3564	59.40
0.0888	2877	47.95
0.1141	3267	54.45

**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 = 0.002049
3. Correlation coefficient (r) : 0.9971

Checked by : Crommy Date : 10-2-2020 Certified by : K. Kwok Tai Date : 10-2-2020

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

Leung Kwok Tai (Assistant Manager)

\*\* End of Report \*\*



Report no. : 940891CA200109

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. : 882147  
Specification Limit : NA  
Next Calibration Date : 09-Oct-2020

**Laboratory Information**

Description : TSP high volume air sampler  
Serial No. : 4350  
Date of Calibration : 10-Oct-2019 Ambient Temperature : 28 °C  
Calibration Location : 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)
0.1047	2477	41.28
0.0623	2121	35.35
0.0587	2073	34.55

**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 = 0.002030
3. Correlation coefficient (r) : 0.9993

Checked by : Cenny Date : 10-2-2020 Certified by : R.T. Young Date : 10-2-2020  
CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

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

# FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,  
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Tuen Mun, N.T.,  
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E-mail : matlab@fugro.com  
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# MaterialLab

Report no.: 183057CA196181

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

Model No.

Serial No.

Next Calibration Date : 01-Oct-2020

Specification Limit : EN 61672: 2003 Type 1

Meter	Microphone	Preamplifier
CEL-63X	CE-251	CEL-495
1488272	02552	003942

### Laboratory Information

Details of Reference Equipment -

Description : B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)

Equipment ID. : R-108-1

Date of Calibration : 02-Oct-2019 Ambient Temperature : 22 °C

Calibration Location : Calibration Laboratory of FTS

Method Used : By direct comparison

### Calibration Results :

Parameters	Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	2.0
	2000Hz	1.4
	1000Hz	0.0
	500Hz	-3.4
	250Hz	-8.8
	125Hz	-16.3
	63Hz	-26.3
	31.5Hz	-39.3
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 equipment does comply with EN 61672: 2003 Type 1 sound level meter for the above measurement.
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. Uncertainties 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 : 4-10-2019 Certified by : KL Leung Date : 6-10-2019  
CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

\*\* End of Report \*\*

Report no.: 183057CA196458

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									
Model No.	: <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">Meter</td> <td style="text-align: center;">Microphone</td> <td style="text-align: center;">Preampifier</td> </tr> <tr> <td style="text-align: center;">CEL-63X</td> <td style="text-align: center;">CE-251</td> <td style="text-align: center;">CEL-495</td> </tr> <tr> <td style="text-align: center;">2451048</td> <td style="text-align: center;">02789</td> <td style="text-align: center;">004065</td> </tr> </table>	Meter	Microphone	Preampifier	CEL-63X	CE-251	CEL-495	2451048	02789	004065
Meter	Microphone	Preampifier								
CEL-63X	CE-251	CEL-495								
2451048	02789	004065								
Serial No.	: <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">Meter</td> <td style="text-align: center;">Microphone</td> <td style="text-align: center;">Preampifier</td> </tr> <tr> <td style="text-align: center;">CEL-63X</td> <td style="text-align: center;">CE-251</td> <td style="text-align: center;">CEL-495</td> </tr> <tr> <td style="text-align: center;">2451048</td> <td style="text-align: center;">02789</td> <td style="text-align: center;">004065</td> </tr> </table>	Meter	Microphone	Preampifier	CEL-63X	CE-251	CEL-495	2451048	02789	004065
Meter	Microphone	Preampifier								
CEL-63X	CE-251	CEL-495								
2451048	02789	004065								
Equipment ID	: N/A									
Next Calibration Date	: 21-Nov-2020									
Specification Limit	: EN 61672: 2003 Type 1									

### Laboratory Information

Details of Reference Equipment -

Description	: B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)	
Equipment ID.	: R-108-1	
Date of Calibration	: 22-Nov-2019	Ambient Temperature : 22 °C
Calibration Location	: Calibration Laboratory of FTS	
Method Used	: By direct comparison	

### Calibration Results :

Parameters	Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	2.6 to -0.6
	2000Hz	2.8 to -0.4
	1000Hz	1.1 to -1.1
	500Hz	-1.8 to -4.6
	250Hz	-7.2 to -10.0
	125Hz	-14.6 to -17.6
	63Hz	-24.7 to -27.7
	31.5Hz	-37.4 to -41.4
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 equipment does comply with EN 61672: 2003 Type 1 sound level meter for the above measurement.

Checked by : William Date : 27-11-2019 Certified by : K. Kwok Tai Date : 28-11-2019  
 CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

\*\* End of Report \*\*



# FUGRO TECHNICAL SERVICES LIMITED

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# MaterialLab

Report no.: 183057CA196275

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## CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

### Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT

Description : Sound Calibrator  
Manufacturer : Casella (Model CEL-120/1)  
Serial No. : 2383852  
Equipment ID : N/A

Next Calibration Date : 15-Oct-2020

Specification Limit : EN 60942: 2003 Type 1

### Laboratory Information

Details of Reference Equipment -

Description : Reference Sound level meter  
Equipment ID. : R-119-1

Date of Calibration : 16-Oct-2019 Ambient Temperature : 22 °C

Calibration Location : Calibration Laboratory of FTS

Method Used : By direct comparison

### Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	0.0 dB	±0.4dB
114dB	0.0 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 equipment does comply with the specification limit.
4. 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 : 22-10-2019 Certified by : Leung Kwok Tai Date : 22-10-2019  
CA-R-297 (22/07/2009) Leung Kwok Tai (Assistant Manager)

\*\* End of Report \*\*

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## CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

### Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

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 : 12-Jan-2021  
 Specification Limit : EN 60942: 2003 Type 1

### Laboratory Information

Description : Reference Sound level meter  
 Equipment ID. : R-119-1  
 Date of Calibration : 13-Jan-2020      Ambient Temperature : 22 °C  
 Calibration Location : Calibration Laboratory of FTS  
 Method Used : By direct comparison

### Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.2 dB	±0.4dB
114dB	-0.1 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 equipment does comply with the specification limit.
4. 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 : 20-1-2020      Certified by : K. L. Young      Date : 21-1-2020  
 CA-R-297 (22/07/2009)      Leung Kwok Tai (Assistant Manager)

\*\* End of Report \*\*