Air Quality Monitoring Equipment

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no. : 940891CA202730(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.	: 761105
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-065-5 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^3)	Total count for 1 hour	CPM (Count per minute)
0.0915	3647	60.78
0.0469	3027	50.45
0.1172	3861	64.35

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m^3) = K x [UUT reading (CPM)], where K = 0.001456
3. Correlation coefficient (r) : 0.9928

Checked by : Date : 15-12-2020 Certified by : Date : 15-12-2020

Leung Kwok Tai (Assistant Manager)

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

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no. : 940891CA202730(6)

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.	: 882149
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-065-5 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^3)	Total count for 1 hour	CPM (Count per minute)
0.0915	3526	58.77
0.0469	2720	45.33
0.1172	3776	62.93

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m^3) = K x [UUT reading (CPM)], where K = 0.001530
3. Correlation coefficient (r) : 0.9901

Checked by : Cammy Date : 15-12-2020 Certified by : C T Leung Date : 15-12-2020

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

Leung Kwok Tai (Assistant Manager)

** End of Report **

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : MaWTF, Ma Wan
Location ID: A1 Site Boundary

Date of Calibration: 23-Oct-20
Next Calibration Date: 22-Jan-21
Technician: Felix

CONDITIONS

Sea Level Pressure (hPa):	1011.40	Corrected Pressure (mm Hg):	759
Temperature (℃):	24	Temperature (K):	297

CALIBRATION ORIFICE

Make:	Tisch	Qstd Slope:	2.11508
Model:	TE-5025A	Qstd Intercept:	-0.02962
Calibration Date:	11/9/2020	Expiry Date:	11/9/2021

CALIBRATIONS

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m^3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION	
18	5.40	-6.00	11.400	1.613	61.00	61.10	Slope =	32.5454
13	4.30	-4.70	9.000	1.435	54.00	54.09	Intercept =	8.0074
10	3.30	-3.70	7.000	1.267	49.00	49.08	Corr. coeff.:	0.9991
7	2.00	-2.50	4.500	1.019	41.00	41.07		
5	1.10	-1.60	2.700	0.792	34.00	34.05		

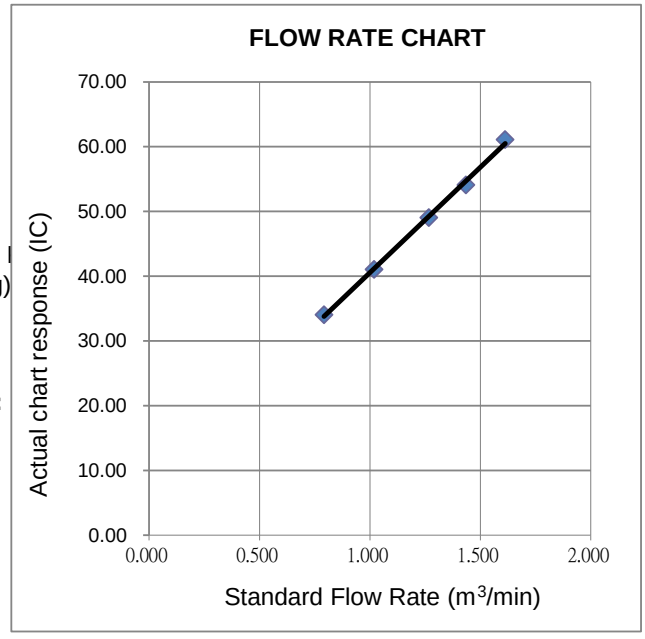
Calculations:

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



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MateriaLab

Report no. : 921436CA195379

HKAS HOKLAS 015 CAL

CALIBRATION CERTIFICATE OF SINGLE-PAN BALANCE

Client Supplied Information

Client : Fugro Technical Services Ltd.

Address : 5 Lok Yi Street, 17 M.S. Castle Peak Road, Tai Lam, Tuen Mun, N.T.

Manufacturer	: Sartorius	Capacity	: 150 (g)
Model no.	: LA130S-F	Discrimination	: 0.0001 (g)
Serial no.	: 90104309	Operating range	: 149.9999 (g)
Equipment ID.	: C-065-5	Type	: Without Built-in Mass

Location : General Chemical Laboratory of FTS

Next calibration due date : Full Check : 08-Apr-2021 Repeatability Check : 08-Oct-2019

Laboratory Information

Equipment ID. of weight set : R-030-29

Class of weight set : E2

Equipment ID. of psychrometer : R-067-67

Date of calibration : 09-Apr-2019

Temperature during test : 25 - 25 °C Relative humidity during test : 62 - 60 %

Method used : **In house method R-C-082**

Calibration results:

Departure from nominal value

Reading (g)	Correction (g)
5.0001	-0.0001
15.0000	0.0000
30.0001	-0.0001
45.0001	-0.0001
60.0003	-0.0003
75.0002	-0.0002
90.0003	-0.0003
105.0004	-0.0005
120.0003	-0.0004
135.0002	-0.0003
150.0002	-0.0003
--	--

Note:
When the sign of the correction is positive (+) the amount should be added to the balance reading to give the correct value and when negative (-) subtracted from it.

Repeatability of reading

Reading (g)	Standard deviation of reading (g)	Max. difference between successive reading (g)
5.0001	0.00010	0.0002
75.0002	0.00008	0.0002
150.0002	0.00007	0.0002

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MaterialLab

HOKLAS 015 CAL

Effect of off-centre loading

A mass of approximately 50 (g) was placed at various positions of the weighing pan.
The differences in balance readings are given in the table.

Centre	Front	Rear	Left	Right	Maximum difference (g)
0.0000	0.0002	-0.0001	-0.0002	0.0005	0.0007

Hysteresis

Load (g)	Hysteresis (g)
100.0001	less than 0.0002

Tare check

Tare load (g)	Balance reading with 99.9999 (g)	Error (g)
50.0000	100.0000	0.0001

Uncertainty of weighing (correction is applied) = ± 0.0004 g at 95% confidence level, with a coverage factor of **2.09**

The uncertainty of weighing is the tolerance band within which 95% balance readings will fall after appropriate correction is applied

Limit of performance for the balance (no correction is applied) = ± 0.0010 g

The limit of performance is the tolerance band within which 95% balance readings will fall.

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The reported hysteresis value is an average from three trials. In each trial, an extra mass was added to bring the balance reading close to full capacity after the specified load was placed on the pan. Hysteresis value is the difference of the readings of the specified load, before the extra mass was added and after it has been removed.
3. The uncertainty for departure from nominal value is ± **0.0004** g

Checked by : Hung Date : 18-4-2019 Approved Signatory : K T Leung Date : 18-4-2019

CA-R-124 (12/12/2008)

Leung Kwok Tai (Assistant Manager)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, N.T.
Hong Kong

Report No. : 921436CA202374

WORKSHEET FOR REPEATABILITY TEST OF BALANCE

Client Supplied Information

Client : Fugro Technical Services Limited

Calibration Item -	Description	: BALANCE
	Manufacturer	: Sartorius
	Model No.	: LA130S-F
	Serial No.	: 90104309
	Equipment ID.	: C-065-5
	Capacity	: 150 (g)
	Discrimination	: 0.0001 (g)
	Type	: [√] Top Loading [ ] Analytical

Laboratory Information

Calibrating Equipment -	Description	: Masses
	Equipment ID.	: R-030-29

Data of calibration : 25-Nov-2020 Ambient Temperature : 24 °C Relative Humidity : 57 %

Calibration Location : General Chemical Laboratory of FTS

Method Used : **CSIRO Publication "The Calibration of Balances" by David B. Prowse**

In-house testing procedure no. : **R-C-082**

1. Results of Previous Calibration (Last Full Check)

Report No. of last full check : 921436CA195379

Calibration date of last full check : 09-Apr-2019

Value of $\sigma 1$: 0.000103 (g)

(σ_1 is the maximum standard deviation found on the repeatability tests in the last full check)

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2. Repeatability test

2.1 Repeatability of reading near to zero

M, near to zero = 5.0000 (g)

No.	Pan load	Reading (g)		Difference, mi -zi (g)	No.	Pan load	Reading (g)		Difference, mi -zi (g)
1	O	z_1=	0.0000	5.0001	6	O	z_6=	0.0000	5.0000
	M	m_1=	5.0001			M	m_6=	5.0000	
2	O	z_2=	0.0000	5.0001	7	O	z_7=	0.0000	5.0000
	M	m_2=	5.0001			M	m_7=	5.0000	
3	O	z_3=	0.0000	5.0000	8	O	z_8=	0.0000	5.0001
	M	m_3=	5.0000			M	m_8=	5.0001	
4	O	z_4=	0.0000	5.0001	9	O	z_9=	0.0000	5.0000
	M	m_4=	5.0001			M	m_9=	5.0000	
5	O	z_5=	0.0000	5.0001	10	O	z_{10}=	0.0000	5.0001
	M	m_5=	5.0001			M	m_{10}=	5.0001	

2.2 Repeatability of reading at half capacity

M, at half capacity = 75.0000 (g)

No.	Pan load	Reading (g)		Difference, mi -zi (g)	No.	Pan load	Reading (g)		Difference, mi -zi (g)
1	O	z_1=	0.0000	75.0005	6	O	z_6=	0.0000	75.0005
	M	m_1=	75.0005			M	m_6=	75.0005	
2	O	z_2=	0.0000	75.0005	7	O	z_7=	0.0000	75.0005
	M	m_2=	75.0005			M	m_7=	75.0005	
3	O	z_3=	0.0000	75.0004	8	O	z_8=	0.0000	75.0004
	M	m_3=	75.0004			M	m_8=	75.0004	
4	O	z_4=	0.0000	75.0005	9	O	z_9=	0.0000	75.0004
	M	m_4=	75.0005			M	m_9=	75.0004	
5	O	z_5=	0.0000	75.0005	10	O	z_{10}=	0.0000	75.0003
	M	m_5=	75.0005			M	m_{10}=	75.0003	

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Report No. : 921436CA202374

2. Repeatability test

2.3 Repeatability of reading at full capacity

M, at full capacity = 149.9999 (g)

No.	Pan load	Reading (g)		Difference, mi -zi (g)	No.	Pan load	Reading (g)		Difference, mi -zi (g)
1	O	z_1=	0.0000	150.0005	6	O	z_6=	0.0000	150.0006
	M	m_1=	150.0005			M	m_6=	150.0006	
2	O	z_2=	0.0000	150.0005	7	O	z_7=	0.0000	150.0006
	M	m_2=	150.0005			M	m_7=	150.0006	
3	O	z_3=	0.0000	150.0006	8	O	z_8=	0.0000	150.0005
	M	m_3=	150.0006			M	m_8=	150.0005	
4	O	z_4=	0.0000	150.0005	9	O	z_9=	0.0000	150.0005
	M	m_4=	150.0005			M	m_9=	150.0005	
5	O	z_5=	0.0000	150.0006	10	O	z_{10}=	0.0000	150.0006
	M	m_5=	150.0006			M	m_{10}=	150.0006	

3. Results of repeatability test

σ of readings near to zero : 0.000052 g σ_1 in last full check : 0.000103 g

σ of readings at half capacity : 0.000071 g

σ of readings at full capacity : 0.000053 g

Maximum value of σ is greater than σ_1 : [√] **No.**

[ ] **Yes** - carry out a full check

$\sigma = [\Sigma(r_i-r)^2/(n-1)]^{1/2}$,where i = 1,...,,10 ,r = mean value in the column "Difference".

or minimum $\sigma = dx/n^{1/2}$,where n=10 and dx is the discrimination of balance.

Note :

A full check should be carried out at least once every three years.

A full check must be carried out if the value of σ was increased in a repeatability test.

A repeatability test was carried out once every six months.

Pass	√
Fail	
N/A	

Remarks:

1. The equipment used in this calibration has traceable accuracy to National Primary Standards.
2. [√] Recommended next calibration date : 24-May-2021
3. [ ] The balance was recommended to carry out a full check.

[ ] Tick the appropriate.

Tested by: R. Anasco Date: 25-NOV-2020 Checked by : Date: 1- Dec-2020

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CALIBRATION REPORT OF WIND METER

Project: Contract No. SPW 07/2020		**Date of Calibration:**	**28-Mar-2021**
Location:	**Yuen Long Sewage Treatment Works**	**Next Calibration Date:**	**27-Sep-2021**
		Technician:	**Sam Fong**
Brand:	**Global Water**		
Model:	**GL500-7-2**	**Equipment ID: WS-02**	

Anemometer

Brand:	**Benetech**		
Model:	**GM816**	**Equipment ID:**	**08**

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)
1.2	1.0
1.5	1.4
2.8	3.0

Wind Direction Test:

	Marine Compass (o)
358	358
266	264
154	150
243	244

Report Date: **1/4/2021**

Wan Ka Ho
Project Consultant

Noise Monitoring Equipment

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no.: 203258CA201298(6)

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. :	1488302	03348	003036

Equipment ID : N/A

Next Calibration Date : 13-Jul-2021

Specification Limit : EN 61672-1: 2003 Class 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 : 14-Jul-2020

Calibration Location : Calibration Laboratory of FTS Ambient Temperature : 20±2 °C

Method Used : By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weigthing frequency response	4000Hz	0.9	2.6 to -0.6
	2000Hz	1.1	2.8 to -0.4
	1000Hz	0.0	1.1 to -1.1
	500Hz	-3.3	-1.8 to -4.6
	250Hz	-8.8	-7.2 to -10.0
	125Hz	-16.3	-14.6 to -17.6
	63Hz	-26.3	-24.7 to -27.7
	31.5Hz	-39.4	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.0	± 0.6
	104dB-114dB	0.0	± 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 complies 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 : William Date : 21-7-2020 Certified by : K.T. Leung Date : 21-7-2020

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

Leung Kwok Tai (Assistant Manager)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no.: 203258CA202302(2)

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. :	1488304	03876	002752

Equipment ID : N-62

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 Calibrator 4226 (Traditional free field setting)

Equipment ID. : R-108-1

Date of Calibration : 30-Oct-2020

Calibration Location : Calibration Laboratory of FTS

Method Used : By direct comparison

Ambient Temperature : 20±2 °C

Relative Humidity : <80% R.H.

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weigthing frequency response	4000Hz	1.5	2.6 to -0.6
	2000Hz	1.3	2.8 to -0.4
	1000Hz	-0.1	1.1 to -1.1
	500Hz	-3.5	-1.8 to -4.6
	250Hz	-8.9	-7.2 to -10.0
	125Hz	-16.4	-14.6 to -17.6
	63Hz	-26.4	-24.7 to -27.7
	31.5Hz	-39.4	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.0	± 0.6
	104dB-114dB	0.0	± 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 tranportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by : William Date : 4-11-2020 Certified by : K.T. Leung Date : 4-11-2020

Leung Kwok Tai (Assistant Manager)

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

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no.: 203258CA201871(1)

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.	:	5230736
Equipment ID	:	N-18
Next Calibration Date	:	07-Sep-2021
Specification Limit	:	EN 60942: 2003 Class 1

Laboratory Information

Details of Calibration Equipment

Description	:	Reference Sound level meter
Equipment ID.	:	R-119-1
Calibration Date		08-Sep-2020
Calibration Location	:	Calibration Laboratory of FTS
Method Used	:	By direct comparison

Ambient Temperature : 20±2 °C

Relative Humidity : : <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 : 11-9-2020 Certified by : K T Leung Date : 12-9-2020

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

Leung Kwok Tai (Assistant Manager)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no.: 203258CA201298(3)

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.	:	5230758
Equipment ID	:	N/A
Next Calibration Date	:	13-Jul-2021
Specification Limit	:	EN 60942: 2003 Type 1

Laboratory Information

Description	:	Reference Sound level meter
Equipment ID.	:	R-119-1
Date of Calibration	:	14-Jul-2020 Ambient Temperature : 20±2 °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	-0.3 dB	±0.4dB
114dB	-0.3 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 tranportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by : William Date : 21-7-2020 Certified by : K.T. Leung Date : 21-7-2020

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

Leung Kwok Tai (Assistant Manager)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 183057CA200894(3)

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 : K.T. Leung Date : 20-6-2020

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

Leung Kwok Tai (Assistant Manager)

** End of Report **

Water Quality Monitoring Equipment

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210283

Report on Calibration of YSI EXO-3 Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	Fugro Technical Services Limited (MCL)
Client's address	:	Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15, Kwai Fung Crescent, Kwai Chung, N.T.
Sample description	:	One YSI EXO-3 Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 19E100634
Test required	:	Calibration of the YSI EXO-3 Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA210283/1
Date sample received	:	05/02/2021
Date of calibration	:	11/02/2021
Next calibration date	:	10/05/2021
Test method used	:	In-house comparison method

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210283

Results :

A. pH calibration

pH reading at 20°C for Q.C. solution(6.86) and at 20°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.23	9.10	-0.13
6.88	6.83	-0.05

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	9.99	-0.01	± 0.5
20	19.98	-0.02	± 1.0
30	29.86	-0.14	± 1.5
40	40.25	+0.25	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By Titration	By D.O. meter
1	8.46	8.63
2	8.44	8.63
3	8.61	8.62
Average	8.50	8.63

Differences of D.O. Content between Wrinkler Titration and D.O. meter should be less than 0.2 mg/L

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 1/8/2021

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210283

Results :

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
20.1	20.01

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
4	4.41	+0.41	± 0.6
8	8.60	+0.60	± 0.8
40	41.01	+1.01	± 3.0
80	79.97	-0.03	± 4.0

F. Chlorophyll calibration

Chlorophyll reading at 24.6°C for Std. solution (62.5ug/L)		
Theoretical (ug/L) (Temp.-compensated)	Measured	Deviation
62.5	60.8	-1.7

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 1/3/2021

** End of Report **

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210140

Report on Calibration of YSI EXO-3 Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	Fugro Technical Services Limited (MCL)
Client's address	:	Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15, Kwai Fung Crescent, Kwai Chung, N.T.
Sample description	:	One YSI EXO-3 Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 19E100633
Test required	:	Calibration of the YSI EXO-3 Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA210140/1
Date sample received	:	12/01/2021
Date of calibration	:	18/01/2021
Next calibration date	:	17/04/2021
Test method used	:	In-house comparison method

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210140

Results :

A. pH calibration

pH reading at 20°C for Q.C. solution(6.86) and at 20°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.23	9.20	+0.03
6.88	6.82	-0.06

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.09	+0.09	± 0.5
20	20.19	+0.19	± 1.0
30	29.99	-0.01	± 1.5
40	40.27	+0.27	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By Titration	By D.O. meter
1	8.91	8.88
2	8.84	8.92
3	8.76	8.91
Average	8.84	8.90

Differences of D.O. Content between Wrinkler Titration and D.O. meter should be less than 0.2 mg/L

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 28/1/2021

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210140

Results :

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
19.8	19.91

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
4	4.13	+0.13	± 0.6
8	8.30	+0.30	± 0.8
40	39.75	-0.25	± 3.0
80	79.76	-0.24	± 4.0

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 28/11/2021

** End of Report **

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210725(1)

Report on Calibration of YSI EXO-3 Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	Fugro Technical Services Limited (MCL)
Client's address	:	Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15, Kwai Fung Crescent, Kwai Chung, N.T.
Sample description	:	One YSI EXO-3 Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 19E100633
Test required	:	Calibration of the YSI EXO-3 Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA210725/2
Date sample received	:	30/03/2021
Date of calibration	:	19/04/2021
Next calibration date	:	18/07/2021
Test method used	:	In-house comparison method

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210725(1)

Results :

A. pH calibration

pH reading at 24°C for Q.C. solution(6.86) and at 24°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.18	9.13	-0.05
6.86	6.83	-0.03

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.05	+0.05	± 0.5
20	20.02	+0.02	± 1.0
30	29.95	-0.05	± 1.5
40	40.10	+0.10	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By Titration	By D.O. meter
1	8.56	8.45
2	8.11	8.30
3	8.19	8.27
Average	8.29	8.34

Differences of D.O. Content between Wrinkler Titration and D.O. meter should be less than 0.2 mg/L

Certified by : _____
Approved Signatory : CHAN Hoi Yan, Winnie
Assistant Manager

Date : 7-5-2021

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA210725(1)

Results :

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
21.5	20.979

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
0	-	-	± 0.5
4	4.41	+0.41	± 0.6
8	8.09	+0.09	± 0.8
40	40.25	+0.25	± 3.0
80	80.34	+0.34	± 4.0

Certified by : _____
Approved Signatory : CHAN Hoi Yan, Winnie
Assistant Manager

Date : 7-7-2021

** End of Report **

Note : This report refers only to the sample(s) tested.

CALIBRATION CERTIFICATE

This document certifies that the instrument detailed below has been calibrated according to Valeport Limited's Standard Procedures, using equipment with calibrations traceable to UKAS or National Standards.

Calibration Certificate Number:	**61134**
Instrument Type:	MODEL 106
Instrument Serial Number:	67738
Calibrated By:	N.PADDON
Date:	11TH NOVEMBER 2019
Signed:	

Full details of the results from the calibration procedure applied to each fitted sensor are available, on request, via email. This summary certificate should be kept with the instrument.

Valeport Limited
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sales@valeport.co.uk
www.valeport.co.uk

VAT No: GB 165 8753 67
Registered in England No: 1950444

ISO 9001 ISO 14001 OHSAS 18001

SonTek
a xylem brand

9940 Summers Ridge Road
San Diego, CA 92121
Tel: (858) 546-8327
support@sontek.com

Certificate of Calibration

TEST REPORT

Serial Number	5906
System Type	M9
System Orientation	Down
Compass Type	Sontek
Compass Offset (degrees)	N/A
Communications Output	RS232
Recorder Size (GB)	14.9
Firmware Version	4.02
Date Tested	05/23/2017

POWER TEST

Command Mode (W):	0.17	Range : 0.00 – 0.30
Sleep Mode (W):	N/A	Range : N/A
Ping Mode - 18V (W):	2.67	Range : 1.50 – 3.50
Power Check		PASS

NOISE TEST

Beam 1 – 3.0 MHz (counts)	95
Beam 2 – 1.0 MHz (counts)	96
Beam 3 – 3.0 MHz (counts)	95
Beam 4 – 1.0 MHz (counts)	101
Beam 5 – 3.0 MHz (counts)	93
Beam 6 – 1.0 MHz (counts)	95
Beam 7 – 3.0 MHz (counts)	91
Beam 8 – 1.0 MHz (counts)	100
Beam Vertical – 500KHz (counts)	88
Noise Test	PASS

VERIFICATION

Velocity Check	PASS
Transmit Output	PASS
Sensitivity	PASS
Temperature Sensor	PASS
Compass Heading Check	PASS
Compass Level Check	PASS
Burn-in (24 hrs)	PASS
Load Default Parameters	DONE

OPTIONS

Bottom Track	Installed
SmartPulse HD ™	Enabled
Stationary	Disabled
GPS Compass Integration	Disabled
RiverSurveyor	Enabled
HydroSurveyor	Disabled

Verified by: **ainthasane**

This report was generated on 5/24/2017.