

# Certificate of Calibration

Calibration Certification Information			
Cal. Date: January 11, 2019	Rootsmeter S/N: 438320	Ta: 293	°K
Operator: Jim Tisch		Pa: 760.7	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 0005		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4090	3.2	2.00
2	3	4	1	0.9980	6.4	4.00
3	5	6	1	0.8900	7.8	5.00
4	7	8	1	0.8450	8.7	5.50
5	9	10	1	0.6990	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)
1.0138	0.7195	1.4269	0.9958	0.7067	0.8777
1.0095	1.0115	2.0180	0.9916	0.9936	1.2412
1.0076	1.1321	2.2561	0.9897	1.1121	1.3877
1.0064	1.1910	2.3663	0.9886	1.1699	1.4555
1.0012	1.4323	2.8538	0.9834	1.4069	1.7553
<b>QSTD</b>	m=	<b>1.99861</b>	<b>QA</b>	m=	<b>1.25149</b>
	b=	<b>-0.00882</b>		b=	<b>-0.00543</b>
	r=	<b>0.99997</b>		r=	<b>0.99997</b>

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:	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



Lam Environmental Services Limited

### Calibration Data for High Volume Sampler (TSP Sampler)

Location : CMA3a  
 Equipment no. : HVS012  
 Calibration Date : 19-Jun-19  
 Calibration Due Date : 19-Aug-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

Ambient Condition			
Temperature, T <sub>a</sub>	303	Kelvin	Pressure, P <sub>a</sub>
			1009 mmHg

Orifice Transfer Standard Information					
Equipment No.	0005	Slope, m <sub>c</sub>	1.99861	Intercept, b <sub>c</sub>	-0.00882
Last Calibration Date	11-Jan-19	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$ = m <sub>c</sub> x Q <sub>std</sub> + b <sub>c</sub>			
Next Calibration Date	11-Jan-20				

Calibration of TSP						
Calibration Point	Manometer Reading			Q <sub>std</sub> (m <sup>3</sup> / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31) Y-axis
	(up)	(down)	(difference)			
1	1.1	1.1	2.2	0.7388	20	19.7922
2	2.1	2.1	4.2	1.0192	27	26.7194
3	3.4	3.4	6.8	1.2956	39	38.5947
4	4.5	4.5	9.0	1.4899	47	46.5116
5	5.3	5.3	10.6	1.6165	55	54.4285

By Linear Regression of Y on X

Slope, m = 39.3179      Intercept, b = -11.2301

Correlation Coefficient\* = 0.9907

Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient < 0.990, check and recalibration again.

\*\* Delete as appropriate.

Remarks : \_\_\_\_\_

Calibrated by : Henry Lau      Checked by : Dean Chan  
 Date : 19-Jun-19      Date : 19-Jun-19



Lam Environmental Services Limited

**Calibration Data for High Volume Sampler (TSP Sampler)**

Location : CMA4a  
 Equipment no. : HVS004

Calibration Date : 19-Jun-19  
 Calibration Due Date : 19-Aug-19

**CALIBRATION OF CONTINUOUS FLOW RECORDER**

Ambient Condition			
Temperature, T <sub>a</sub>	303	Kelvin	Pressure, P <sub>a</sub>
			1009 mmHg

Orifice Transfer Standard Information					
Equipment No.	0005	Slope, m <sub>c</sub>	1.99861	Intercept, b <sub>c</sub>	-0.00882
Last Calibration Date	11-Jan-19	$\left( H \times P_a / 1013.3 \times 298 / T_a \right)^{1/2}$ $= m_c \times Q_{std} + b_c$			
Next Calibration Date	11-Jan-20				

Calibration of TSP						
Calibration Point	Manometer Reading			Q <sub>std</sub> (m <sup>3</sup> / min.) X-axis	Continuous Flow Recorder, W (CFM)	IC (W(P <sub>a</sub> /1013.3x298/T <sub>a</sub> ) <sup>1/2</sup> /35.31) Y-axis
	(up)	(down)	(difference)			
1	1.4	1.4	2.8	0.8330	37	36.6155
2	2.3	2.3	4.6	1.0664	44	43.5428
3	3.6	3.6	7.2	1.3330	52	51.4596
4	4.6	4.6	9.2	1.5063	58	57.3973
5	6.0	6.0	12.0	1.7197	63	62.3453

By Linear Regression of Y on X

Slope, m = 29.5175      Intercept, b = 12.1454  
 Correlation Coefficient\* = 0.9989  
 Calibration Accepted = Yes/No\*\*

\* if Correlation Coefficient &lt; 0.990, check and recalibration again.

\*\* Delete as appropriate.

Remarks : \_\_\_\_\_

Calibrated by : Henry Lau  
 Date : 19-Jun-19

Checked by : Dean Chan  
 Date : 19-Jun-19



## CERTIFICATE OF CALIBRATION

Certificate No.: 18CA1114 02 Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type 1)	Microphone
Manufacturer:	B & K	B & K
Type/Model No.:	2236	4188
Serial/Equipment No.:	2100736	2288941
Adaptors used:	-	-

### Item submitted by

Customer Name: Lam Environmental Service Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 14-Nov-2018

Date of test: 15-Nov-2018

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4228	2288444	23-Aug-2019	CIGISMEC
Signal generator	DS 360	33873	24-Apr-2019	CEPREI
Signal generator	DS 360	61227	23-Apr-2019	CEPREI

### Ambient conditions

Temperature:  $20 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1000 \pm 5$  hPa

### Test specifications

- The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of  $\pm 20\%$ .
- The acoustic calibration was performed using an B&K 4228 sound calibrator and corrections was applied for the difference between the free-field and pressure response of the Sound Level Meter.

### Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:  Date: 15-Nov-2018 Company Chop:

Feng Jung



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



## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 18CA1114 02 Page 2 of 2

### 1. Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Expanded Uncertainty (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	
	C	Pass	1.0	2.1
	Lin	Pass	2.0	2.2
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
	Frequency weightings			
Time weightings	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
Peak response	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
R.M.S. accuracy	Single 100µs rectangular pulse	Pass	0.3	
	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

### 2. Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Expanded Uncertainty (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

### 3. Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by:

Fung Chi Yip  
Date: 15-Nov-2018

Checked by:

Shek Kwong Tot  
Date: 15-Nov-2018

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

# Calibration Certificate

Certificate Number 2018010851

**Customer:**

LAM Environmental Services Ltd  
11/F Centre Point  
181-185 Gloucester Road  
Wanchai, Hong Kong

**Model Number** CAL200  
**Serial Number** 13098  
**Test Results** Pass

**Initial Condition** Inoperable

**Description** Larson Davis CAL200 Acoustic Calibrator

**Procedure Number** D0001.8386  
**Technician** Scott Montgomery  
**Calibration Date** 29 Oct 2018  
**Calibration Due**  
**Temperature** 23 °C ± 0.3 °C  
**Humidity** 34 %RH ± 3 %RH  
**Static Pressure** 101.2 kPa ± 1 kPa

**Evaluation Method** The data is acquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

**Compliance Standards** Compliant to Manufacturer Specifications per D0001.8190 and the following standards:  
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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## Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	09/06/2018	09/06/2019	001021
Larson Davis Model 2900 Real Time Analyzer	04/10/2018	04/10/2019	001051
Microphone Calibration System	03/07/2018	03/07/2019	005446
1/2" Preamplifier	09/20/2018	09/20/2019	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/07/2018	08/07/2019	006507
1/2 inch Microphone - RI - 200V	05/10/2018	05/10/2019	006510
Pressure Transducer	07/18/2018	07/18/2019	007368

Larson Davis, a division of PCB Piezotronics, Inc  
1681 West 820 North  
Provo, UT 84601, United States  
716-684-0001



**LARSON DAVIS**  
A PCB PIEZOTRONICS DIV.





REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

WORK ORDER: 22777053-E29V4502  
DATE OF ISSUE: 18/06/2019  
CLIENT: LAM GEOTECHNICS LIMITED

Equipment Type:	Turbidimeter
Brand Name:	Xin Rui
Model No.:	WGZ-3B
Serial No.:	1807077
Equipment No.:	---
Date of Calibration:	01/06/2019
Date of next Calibration:	31/08/2019
Lab ID:	H190165-02

Parameters:

Turbidity

Method Ref: APHA 22<sup>nd</sup> ed. 2130B

Expected Reading (NTU)	Display Reading (NTU)	Tolerance
0	0.00	---
4	4.32	8.0%
10	9.99	-0.1%
40	43.32	8.3%
100	100.30	0.3%
400	435	8.6%
1000	1002	0.2%
	Tolerance Limit ( $\pm$ )	10%

Remark: "Displayed Reading" presents the figures shown on item under calibration/checking regardless of equipment precision or significant figures.





## REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

<b>CONTACT:</b>	CHAN KA CHUN	<b>WORK ORDER:</b>	HK1914664
<b>CLIENT:</b>	LAM ENVIRONMENTAL SERVICES LTD		
<b>ADDRESS:</b>	11/F CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	<b>SUB- BATCH:</b>	0
		<b>LABORATORY:</b>	HONG KONG
		<b>DATE RECEIVED:</b>	04-Apr-2019
		<b>DATE OF ISSUE:</b>	11-Apr-2019

### COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Dissolved Oxygen, pH Value, Salinity and Temperature
Equipment Type:	Multifunctional Meter
Brand Name:	YSI
Model No.:	Professional Plus
Serial No.:	14K100322
Equipment No.:	--
Date of Calibration:	10 April, 2019

### NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu  
Assistant Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION



**WORK ORDER:** HK1914664  
**SUB- BATCH:** 0  
**DATE OF ISSUE:** 11-Apr-2019  
**CLIENT:** LAM ENVIRONMENTAL SERVICES LTD

Equipment Type: Multifunctional Meter  
 Brand Name: YSI  
 Model No.: Professional Plus  
 Serial No.: 14K100322  
 Equipment No.: --  
 Date of Calibration: 10 April, 2019                      Date of Next Calibration: 10 July, 2019

**PARAMETERS:**

**Dissolved Oxygen**    Method Ref: APHA (21st edition), 4500- O: G

Expected Reading (mg/ L)	Displayed Reading (mg/ L)	Tolerance (mg/ L)
8.20	8.30	+0.10
6.04	5.98	-0.06
2.63	2.54	-0.09
	Tolerance Limit (mg/L)	±0.20

**pH Value**                      Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.87	-0.13
7.0	6.90	-0.10
10.0	9.84	-0.16
	Tolerance Limit (pH unit)	±0.20

**Salinity**                      Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.07	+0.7
20	20.20	+1.0
30	30.87	+2.9
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu  
 Assistant Manager - Inorganic

# REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION



**WORK ORDER:** HK1914664  
**SUB- BATCH:** 0  
**DATE OF ISSUE:** 11-Apr-2019  
**CLIENT:** LAM ENVIRONMENTAL SERVICES LTD

**Equipment Type:** Multifunctional Meter  
**Brand Name:** YSI  
**Model No.:** Professional Plus  
**Serial No.:** 14K100322  
**Equipment No.:** --  
**Date of Calibration:** 10 April, 2019                      **Date of Next Calibration:** 10 July, 2019

**PARAMETERS:**

**Temperature**

**Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
9.5	10.4	+0.9
22.0	22.3	+0.3
40.0	39.7	-0.3
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu  
Assistant Manager - Inorganic



## REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

**CONTACT:** CHAN KA CHUN  
**CLIENT:** LAM ENVIRONMENTAL SERVICES LTD

**WORK ORDER:** HK1930780

**ADDRESS:** 11/ F CENTRE POINT,  
181- 185 GLOUCESTER ROAD,  
WANCHAI, HONG KONG

**SUB- BATCH:** 0  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** 17- Jul- 2019  
**DATE OF ISSUE:** 24- Jul- 2019

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### COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Dissolved Oxygen, pH Value, Salinity and Temperature  
Equipment Type: Multifunctional Meter  
Brand Name: YSI  
Model No.: Professional Plus  
Serial No.: 14K100322  
Equipment No.: - -  
Date of Calibration: 23- Jul- 2019

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### NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

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Mr Chan Siu Ming, Vico  
Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION



**WORK ORDER:** HK1930780  
**SUB- BATCH:** 0  
**DATE OF ISSUE:** 24- Jul- 2019  
**CLIENT:** LAM ENVIRONMENTAL SERVICES LTD

**Equipment Type:** Multifunctional Meter  
**Brand Name:** YSI  
**Model No.:** Professional Plus  
**Serial No.:** 14K100322  
**Equipment No.:** --  
**Date of Calibration:** 23- Jul- 2019

**Date of Next Calibration:** 23- Oct- 2019

## PARAMETERS:

**Dissolved Oxygen** Method Ref: APHA (21st edition), 4500- O: G

Expected Reading (mg/ L)	Displayed Reading (mg/ L)	Tolerance (mg/ L)
7.23	7.16	- 0.07
5.75	5.59	- 0.16
3.70	3.60	- 0.10
	Tolerance Limit (mg/ L)	± 0.20

**pH Value**

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.04	+ 0.04
7.0	6.96	- 0.04
10.0	9.87	- 0.13
	Tolerance Limit (pH unit)	± 0.20

**Salinity**

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.96	- 0.4
20	20.18	+ 0.9
30	30.95	+ 3.2
	Tolerance Limit (%)	± 10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

A handwritten signature in black ink, appearing to read 'Chan Siu Ming'.

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Mr Chan Siu Ming, Vico  
Manager - Inorganic

# REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION



**WORK ORDER:** HK1930780  
**SUB- BATCH:** 0  
**DATE OF ISSUE:** 24- Jul- 2019  
**CLIENT:** LAM ENVIRONMENTAL SERVICES LTD

Equipment Type: Multifunctional Meter  
Brand Name: YSI  
Model No.: Professional Plus  
Serial No.: 14K100322  
Equipment No.: --  
Date of Calibration: 23- Jul- 2019

Date of Next Calibration: 23- Oct- 2019

## PARAMETERS:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical  
Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.5	11.1	+ 0.6
20.0	18.9	- 1.1
39.0	38.7	- 0.3
	Tolerance Limit (°C)	± 2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico  
Manager - Inorganic



## REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

<b>CONTACT:</b>	CHAN KA CHUN	<b>WORK ORDER:</b>	HK1916521
<b>CLIENT:</b>	LAM ENVIRONMENTAL SERVICES LTD		
<b>ADDRESS:</b>	11/F CENTRE POINT, 181-185 GLOUCESTER ROAD, WANCHAI, HONG KONG	<b>SUB- BATCH:</b>	0
		<b>LABORATORY:</b>	HONG KONG
		<b>DATE RECEIVED:</b>	17-Apr-2019
		<b>DATE OF ISSUE:</b>	25-Apr-2019

### COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Dissolved Oxygen, pH Value, Salinity and Temperature
Equipment Type:	Multifunctional Meter
Brand Name:	YSI
Model No.:	Professional Plus
Serial No.:	17F100236
Equipment No.:	--
Date of Calibration:	24-Apr-2019

### NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu  
Assistant Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION



**WORK ORDER:** HK1916521  
**SUB- BATCH:** 0  
**DATE OF ISSUE:** 25-Apr-2019  
**CLIENT:** LAM ENVIRONMENTAL SERVICES LTD

**Equipment Type:** Multifunctional Meter  
**Brand Name:** YSI  
**Model No.:** Professional Plus  
**Serial No.:** 17F100236  
**Equipment No.:** --  
**Date of Calibration:** 24-Apr-2019                      **Date of Next Calibration:** 24-Jul-2019

**PARAMETERS:**

**Dissolved Oxygen**    **Method Ref: APHA (21st edition), 4500- O: G**

Expected Reading (mg/ L)	Displayed Reading (mg/ L)	Tolerance (mg/ L)
8.15	8.07	-0.08
5.90	6.05	+0.15
2.64	2.69	+0.05
	Tolerance Limit (mg/L)	±0.20

**pH Value**                      **Method Ref: APHA (21st edition), 4500H:B**

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.00	+0.00
7.0	7.20	+0.20
10.0	10.05	+0.05
	Tolerance Limit (pH unit)	±0.20

**Salinity**                      **Method Ref: APHA (21st edition), 2520B**

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.86	-1.4
20	19.53	-2.3
30	29.81	-0.6
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu  
 Assistant Manager - Inorganic



# REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION



**WORK ORDER:** HK1916521  
**SUB- BATCH:** 0  
**DATE OF ISSUE:** 25-Apr-2019  
**CLIENT:** LAM ENVIRONMENTAL SERVICES LTD

Equipment Type: Multifunctional Meter  
Brand Name: YSI  
Model No.: Professional Plus  
Serial No.: 17F100236  
Equipment No.: --  
Date of Calibration: 24-Apr-2019                      Date of Next Calibration: 24-Jul-2019

**PARAMETERS:**

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
9.5	9.7	+0.2
22.0	22.1	+0.1
38.5	38.2	-0.3
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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