



**Met One  
Instruments**

1600 Washington Blvd  
Grants Pass, OR 97526  
(541) 471-7111  
(541) 471-7116 (Fax)  
Service@metone.com

# Calibration Certificate

The calibration results on this report certify that this instrument complies with the product specifications at the time of calibration. Calibration was performed according to accepted industry methods using equipment, procedures, and standards that are traceable to NIST and ASTM and JIS.

Recommended calibration interval is 12 months from the first day of use.

Instrument Model# Aerocet 831

Instrument Serial# W14016

Date of Calibration 4/19/2018

Sensor # 16206

Darleen Best *AT*

AT

Calibration Technician

Quality Check

Temperature 23 °C

Relative Humidity 31 %

Test Procedure: **Aerocet 831-6100**

PSL Size (µm)	Test Results	Test Spec.	Lot# NIST	Expiration
0.3	Pass	± 10%	183039	03/31/2020
0.5	Pass	± 10%	180556	02/28/2020
1.0	Pass	± 10%	169240	5/31/2019
2.5	Pass	± 10%	181944	3/31/2020
4.0	Pass	± 10%	REF	NA
5.0	Pass	± 10%	REF	NA
7.0	Pass	± 10%	REF	NA
10.0	Pass	± 10%	REF	NA

Standards	Model	SN	Cal Due
Particle Counter	GT-526	M1762	7/31/2018
Flowmeter	DCL-M	103751	1/29/2019
DMM	289	27720071	6/15/2018
RH/TEMP SENSOR	083E-1-6	R20313	9/18/2018

*This calibration certificate shall not be reproduced except in full, without the written approval of Met One Instruments Inc.*




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Recommended calibration interval is 12 months from the first day of use.

Instrument Model# Aerocet 831 Instrument Serial# W15448  
 Date of Calibration 6/14/2018 Sensor # 16438  
Darleen Best Calibration Technician  Quality Check

Temperature 23.5 °C Relative Humidity 38 %

Test Procedure: Aerocet 831-6100

PSL Size (µm)	Test Results	Test Spec.	Lot# NIST	Expiration
0.3	Pass	± 10%	183039	03/31/2020
0.5	Pass	± 10%	180556	02/28/2020
1.0	Pass	± 10%	169240	5/31/2019
2.5	Pass	± 10%	REF	NA
4.0	Pass	± 10%	REF	NA
5.0	Pass	± 10%	REF	NA
7.0	Pass	± 10%	REF	NA
10.0	Pass	± 10%	REF	NA

Standards	Model	SN	Cal Due
Particle Counter	GT-526	M1762	7/31/2018
Flowmeter	DCL-M	103751	1/29/2019
DMM	289	27720071	6/15/2018
RH/TEMP SENSOR	083E-1-6	R20313	9/18/2018

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# Calibration Certificate

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Recommended calibration interval is 12 months from the first day of use.

Instrument Model# Aerocet 831

Instrument Serial# W15449

Date of Calibration 10/4/2018

Sensor # 16439

Darleen Best *AT7*  
 Calibration Technician

AT25  
 Quality Check

Temperature 23 °C

Relative Humidity 36.5 %

Test Procedure: **Aerocet 831-6100**

PSL Size (µm)	Test Results	Test Spec.	Lot# NIST	Expiration
0.3	Pass	± 10%	183039	03/31/2020
0.5	Pass	± 10%	180556	02/28/2020
1.0	Pass	± 10%	169240	5/31/2019
2.5	Pass	± 10%	REF	NA
4.0	Pass	± 10%	REF	NA
5.0	Pass	± 10%	REF	NA
7.0	Pass	± 10%	REF	NA
10.0	Pass	± 10%	REF	NA

Standards	Model	SN	Cal Due
Particle Counter	GT-526	M1760	10/9/2018
Flowmeter	DCL-M	103751	1/29/2019
DMM	289	27720071	6/29/2019
RH/TEMP SENSOR	083E-1-6	R20313	9/18/2019

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# Calibration Certificate

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Recommended calibration interval is 12 months from the first day of use.

Instrument Model# Aerocet 831 Instrument Serial# W16848

Date of Calibration 8/3/2018 Sensor # 16574

Darleen Best AT7

**AT<sub>25</sub>**

Calibration Technician

Quality Check

Temperature 23.5 °C

Relative Humidity 41 %

Test Procedure: **Aerocet 831-6100**

PSL Size (µm)	Test Results	Test Spec.	Lot# NIST	Expiration
0.3	Pass	± 10%	183039	03/31/2020
0.5	Pass	± 10%	180556	02/28/2020
1.0	Pass	± 10%	169240	5/31/2019
2.5	Pass	± 10%	REF	NA
4.0	Pass	± 10%	REF	NA
5.0	Pass	± 10%	REF	NA
7.0	Pass	± 10%	REF	NA
10.0	Pass	± 10%	REF	NA

Standards	Model	SN	Cal Due
Particle Counter	GT-526	M1760	10/9/2018
Flowmeter	DCL-M	103751	1/29/2019
DMM	289	32270055	9/21/2018
RH/TEMP SENSOR	083E-1-6	R20313	9/18/2018

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Met One Instruments, Inc.  
 1600 NW Washington Blvd, Grants Pass, OR  
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# Certificate of Calibration

BT-645  
 Particulate Monitor

*Recommended calibration interval is 24 months from first day of use.*

<b>Unit Info</b>	Model:	<u>BT-645</u>	81865-1	Firmware Rev:	<u>1.1.0</u>
	Serial Number:	<u>X19295</u>			<u>1.0.1</u>
	Calibrated By:	<u>R. von Krohn</u>		Cal. Date:	<u>7/27/2018</u>
	Quality Inspector:			Date:	<u>7-27-2018</u>
	Calibration Hz/μg/m <sup>3</sup> :	<u>5.9</u>			

<b>Final Test</b>			
Flow (2.0 L/M):	Pass	Ambient T (C)	<u>24.8</u>
		RH, %	<u>39</u>
Serial Communication:	Pass		
BT-645 Conc.:	<u>400.12</u>	Standard Conc:	<u>399.67</u>

**Calibration Standards**

Standards	Manufacturer	Model	SN	Cal Due
DMM Multimeter	Fluke	189 Multimeter	94060816	8/28/2018
RH & TEMPERATURE	Met One Instruments	083E-1-35	R17149	July 28, 2018
BAROMETRIC PRESSURE	Met One Instruments	092	P22757	April 2, 2019
Primary Flow Meter	BIOS	DC-Lite	R537	May 29, 2019
LD-3B	SIBATA	LD-3B	6X7759	Nov 17, 2018

*The standards used for this calibration have accuracy equal to or greater than the instrument tested. These standards are on record and traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated, all instruments are calibrated to meet the manufacturer's published specifications. The Calibration system complies with MIL-STD-45662A.*




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# Certificate of Calibration

**BT-645**  
*Particulate Monitor*

*Recommended calibration interval is 24 months from first day of use.*

<b>Unit Info</b>	Model:	<u>BT-645</u>	81865-1	Firmware Rev:	<u>1.1.0</u>
	Serial Number:	<u>X19296</u>			<u>1.0.1</u>
	Calibrated By:	<u>R. von Krohn</u>		Cal. Date:	<u>7/27/2018</u>
	Quality Inspector:			Date:	<u>7-27-2018</u>
	Calibration Hz/ $\mu\text{g}/\text{m}^3$ :	<u>6.1</u>			

<b>Final Test</b>			
Flow (2.0 L/M):	Pass	Ambient T (C)	<u>24.8</u>
		RH, %	<u>39</u>
Serial Communication:	Pass		
BT-645 Conc.:	<u>416.59</u>	Standard Conc:	<u>412.22</u>

**Calibration Standards**

Standards	Manufacturer	Model	SN	Cal Due
DMM Multimeter	Fluke	189 Multimeter	94060816	8/28/2018
RH & TEMPERATURE	Met One Instruments	083E-1-35	R17149	July 28, 2018
BAROMETRIC PRESSURE	Met One Instruments	092	P22757	April 2, 2019
Primary Flow Meter	BIOS	DC-Lite	R537	May 29, 2019
LD-3B	SIBATA	LD-3B	6X7759	Nov 17, 2018

*The standards used for this calibration have accuracy equal to or greater than the instrument tested. These standards are on record and traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated, all instruments are calibrated to meet the manufacturer's published specifications. The Calibration system complies with MIL-STD-45662A.*





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# Certificate of Calibration

*BT-645*  
*Particulate Monitor*

*Recommended calibration interval is 24 months from first day of use.*

<b>Unit Info</b>	Model:	<u>BT-645</u>	81865-1	Firmware Rev:	<u>1.1.0</u>
	Serial Number:	<u>X19297</u>			<u>1.0.1</u>
	Calibrated By:	<u>R. von Krohn</u>		Cal. Date:	<u>7/27/2018</u>
	Quality Inspector:	<u><i>[Signature]</i></u>		Date:	<u>7-27-2018</u>
	Calibration Hz/ $\mu\text{g}/\text{m}^3$ :	<u>5.8</u>			

<b>Final Test</b>			
Flow (2.0 L/M):	Pass	Ambient T (C)	<u>24.8</u>
		RH, %	<u>39</u>
Serial Communication:	Pass		
BT-645 Conc.:	<u>421.14</u>	Standard Conc.:	<u>413.04</u>

Standards	Manufacturer	Model	SN	Cal Due
DMM Multimeter	Fluke	189 Multimeter	94060816	8/28/2018
RH & TEMPERATURE	Met One Instruments	083E-1-35	R17149	July 28, 2018
BAROMETRIC PRESSURE	Met One Instruments	092	P22757	April 2, 2019
Primary Flow Meter	BIOS	DC-Lite	R537	May 29, 2019
LD-3B	SIBATA	LD-3B	6X7759	Nov 17, 2018

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# Certificate of Calibration

**BT-645**  
*Particulate Monitor*

*Recommended calibration interval is 24 months from first day of use.*

<b>Unit Info</b>	Model:	<u>BT-645</u>	81865-1	Firmware Rev:	<u>1.1.0</u>
	Serial Number:	<u>X19298</u>			<u>1.0.1</u>
	Calibrated By:	<u>R. von Krohn</u>		Cal. Date:	<u>7/27/2018</u>
	Quality Inspector:			Date:	<u>7-27-2018</u>
	Calibration Hz/ $\mu\text{g}/\text{m}^3$ :	<u>7.7</u>			

**Final Test**

Flow (2.0 L/M):	Pass	Ambient T (C)	<u>24.8</u>
		RH, %	<u>39</u>
Serial Communication:	Pass		
BT-645 Conc.:	<u>413.48</u>	Standard Conc:	<u>412.22</u>

**Calibration Standards**

Standards	Manufacturer	Model	SN	Cal Due
DMM Multimeter	Fluke	189 Multimeter	94060816	8/28/2018
RH & TEMPERATURE	Met One Instruments	083E-1-35	R17149	July 28, 2018
BAROMETRIC PRESSURE	Met One Instruments	092	P22757	April 2, 2019
Primary Flow Meter	BIOS	DC-Lite	R537	May 29, 2019
LD-3B	SIBATA	LD-3B	6X7759	Nov 17, 2018

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**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 13/5/2018  
 REPORT NO. : HK1810447

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : AEROSOL MASS MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : AEROCET - 831  
 SERIAL NO. : W14016  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 11/5/2018

**STANDARD EQUIPMENT**

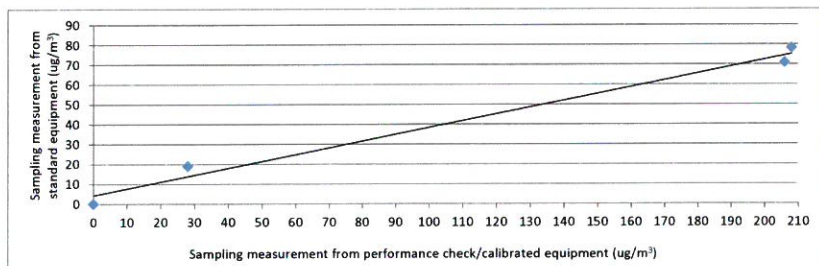
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 27/4/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	11/5/2018, 9:00:00 AM	24	1014	0	0
1	11/5/2018, 10:05:00 AM	24	1014	78	208
2	11/5/2018, 11:29:00 AM	24	1014	71	206
3	11/5/2018, 12:35:00 AM	24	1014	19	28

**Linear Regression of Y on X**

Slope (K- factor) : 0.3400  
 Correlation Coefficient : 0.9925  
 Validity of Performance Check / Calibration Record : 11/5/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.  
 2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.  
 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: MA Ching Him, Jackey Signature:  Date: 11/5/2018

Checked by: Wong Po Yan, Pauline Signature:  Date: 13/5/2018

**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 27/6/2018  
 REPORT NO. : HK1810626

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : AEROSOL MASS MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : AEROCET - 831  
 SERIAL NO. : W15448  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 26/6/2018

**STANDARD EQUIPMENT**

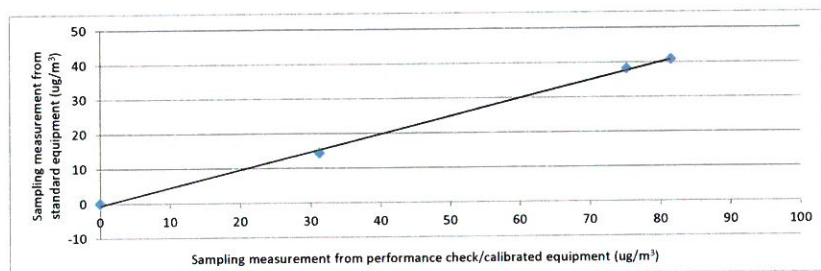
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 27/4/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	26/6/2018, 8:15:00 AM	29.2	1011	0	0
1	26/6/2018, 9:59:00 AM	29.2	1011	38	75
2	26/6/2018, 11:06:00 AM	29.2	1011	41	82
3	26/6/2018, 12:11:00 PM	29.2	1011	14	31

**Linear Regression of Y on X**

Slope (K- factor) : 0.5100  
 Correlation Coefficient : 0.9994  
 Validity of Performance Check / Calibration Record : 26/6/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.  
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 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature:  Date: 26/6/2018

Checked by: Wong Po Yan, Pauline Signature:  Date: 27/6/2018





**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 24/10/2018  
 REPORT NO. : HK1811054

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : AEROSOL MASS MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : AEROCET - 831  
 SERIAL NO. : W15449  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 23/10/2018

**STANDARD EQUIPMENT**

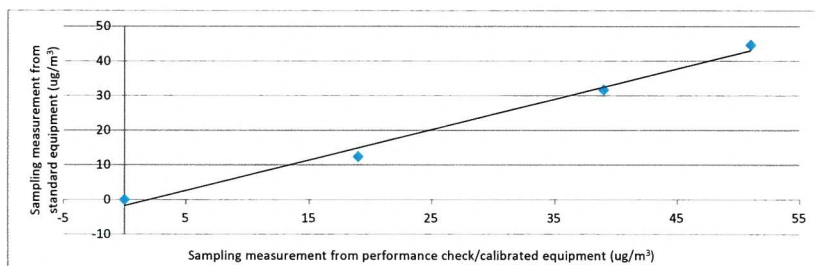
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 25/7/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	23/10/2018,9:05:00 AM	25.3	1017	0	0
1	23/10/2018,10:20:00 AM	25.3	1017	45	51
2	23/10/2018,11:22:00 AM	25.3	1017	32	39
3	23/10/2018,12:29:00 PM	25.3	1017	12	19

**Linear Regression of Y on X**

Slope (K- factor) : 0.8800  
 Correlation Coefficient : 0.9945  
 Validity of Performance Check / Calibration Record : 23/10/2019



- Notes :
1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
  2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
  3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature:  Date: 23/10/2018

Checked by: Wong Po Yan, Pauline Signature:  Date: 24/10/2018

**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 16/8/2018  
 REPORT NO. : HK1810819

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : AEROSOL MASS MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : AEROCET - 831  
 SERIAL NO. : W16848  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 15/8/2018

**STANDARD EQUIPMENT**

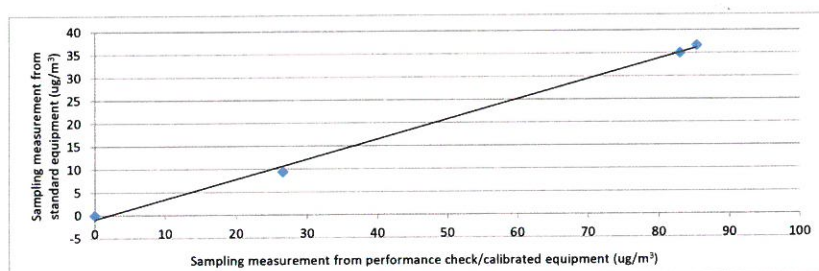
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 25/7/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	15/8/2018,9:05:00 AM	28.2	999	0	0
1	15/8/2018,10:20:00 AM	28.2	999	37	85
2	15/8/2018,11:22:00 AM	28.2	999	35	83
3	15/8/2018,12:29:00 PM	28.2	999	9	27

**Linear Regression of Y on X**

Slope (K- factor) : 0.4400  
 Correlation Coefficient : 0.9988  
 Validity of Performance Check / Calibration Record : 15/8/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.  
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 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature: *Natalie Lau* Date: 15/8/2018

Checked by: Wong Po Yan, Pauline Signature: *Pauline Wong* Date: 16/8/2018




**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 16/8/2018  
 REPORT NO. : HK1810826

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : PARTICULATE MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : BT 645  
 SERIAL NO. : X19295  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 16/8/2018

**STANDARD EQUIPMENT**

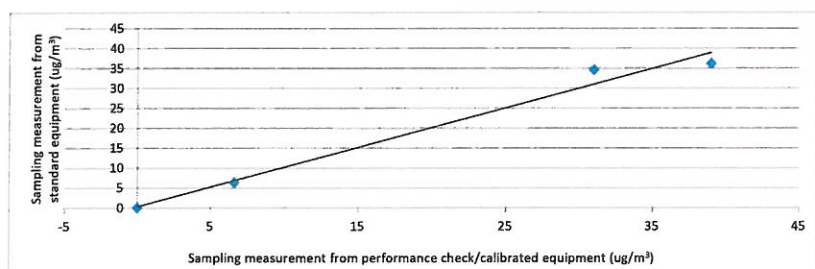
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 25/7/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	16/8/2018, 8:30:00 AM	27.8	1000	0	0
1	16/8/2018, 2:16:00 PM	27.8	1000	36	39
2	16/8/2018, 3:21:00 PM	27.8	1000	35	31
3	16/8/2018, 4:24:00 PM	27.8	1000	6	7

**Linear Regression of Y on X**

Slope (K- factor) : 1.0000  
 Correlation Coefficient : 0.9901  
 Validity of Performance Check / Calibration Record : 16/8/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.  
 2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.  
 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature:  Date: 16/8/2018

Checked by: Wong Po Yan, Pauline Signature:  Date: 16/8/2018


**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 16/8/2018  
 REPORT NO. : HK1810827

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : PARTICULATE MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : BT 645  
 SERIAL NO. : X19296  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 16/8/2018

**STANDARD EQUIPMENT**

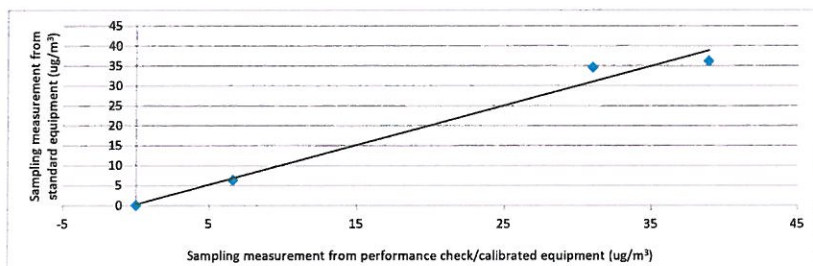
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 25/7/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	16/8/2018,8:30:00 AM	27.8	1000	0	0
1	16/8/2018,2:16:00 PM	27.8	1000	36	39
2	16/8/2018,3:21:00 PM	27.8	1000	35	31
3	16/8/2018,4:24:00 PM	27.8	1000	6	7

**Linear Regression of Y on X**

Slope (K- factor) : 1.0000  
 Correlation Coefficient : 0.9904  
 Validity of Performance Check / Calibration Record : 16/8/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.  
 2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.  
 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature:  Date: 16/8/2018

Checked by: Wong Po Yan, Pauline Signature:  Date: 16/8/2018




**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 22/8/2018  
 REPORT NO. : HK1810828

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : PARTICULATE MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : BT 645  
 SERIAL NO. : X19297  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 17/8/2018

**STANDARD EQUIPMENT**

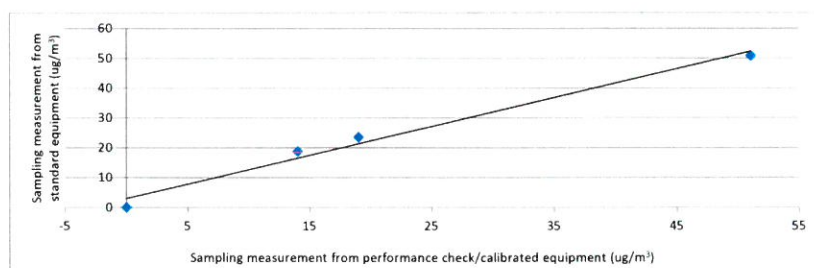
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 25/7/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	17/8/2018, 7:20:00 AM	28	1005	0	0
1	17/8/2018, 8:24:00 PM	28	1005	51	51
2	17/8/2018, 9:26:00 PM	28	1005	24	19
3	17/8/2018, 10:28:00 PM	28	1005	19	14

**Linear Regression of Y on X**

Slope (K- factor) : 1.0000  
 Correlation Coefficient : 0.9921  
 Validity of Performance Check / Calibration Record : 17/8/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.  
 2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.  
 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature:  Date: 17/8/2018

Checked by: Wong Po Yan, Pauline Signature:  Date: 22/8/2018


**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 22/8/2018  
 REPORT NO. : HK1810829

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : PARTICULATE MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : BT 645  
 SERIAL NO. : X19298  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 17/8/2018

**STANDARD EQUIPMENT**

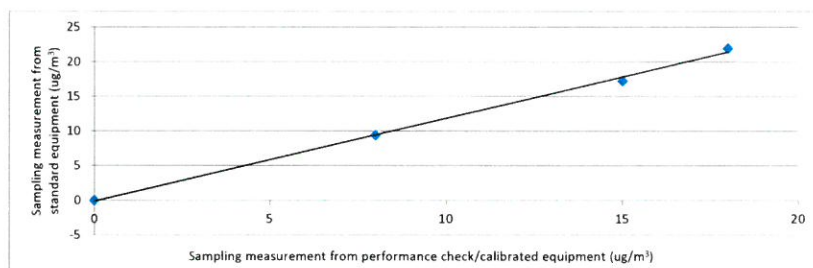
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 25/7/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	17/8/2018,4:50:00 PM	28	1005	0	0
1	17/8/2018,5:52:00 PM	28	1005	22	18
2	17/8/2018,6:58:00 PM	28	1005	17	15
3	17/8/2018,8:00:00 PM	28	1005	9	8

**Linear Regression of Y on X**

Slope (K- factor) : 1.2000  
 Correlation Coefficient : 0.9988  
 Validity of Performance Check / Calibration Record : 17/8/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.  
 2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.  
 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature: *Natalie Lau* Date: 17/8/2018

Checked by: Wong Po Yan, Pauline Signature: *Pauline Wong* Date: 22/8/2018





## CERTIFICATE OF CALIBRATION

Certificate No.: 18CA0322 01 Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type 1)	Microphone
Manufacturer:	Larson Davis	PCB
Type/Model No.:	LxT1	377B02
Serial/Equipment No.:	0003737	171529
Adaptors used:	-	-

### Item submitted by

Customer Name: Lam Geotechnics Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 22-Mar-2018

Date of test: 28-Mar-2018

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	08-Sep-2018	CIGISMEC
Signal generator	DS 360	61227	01-Apr-2018	CEPREI

### Ambient conditions

Temperature:  $21 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1005 \pm 5$  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 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsiveness 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:



Feng Jun Qi

Date: 06-Apr-2018

Company Chop:



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.: 18CA0322 01 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	2.1
	C	Pass	0.8	
	Lin	Pass	1.6	
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	2.2
	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	
	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
Linearity range for SPL	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100µs rectangular pulse	N/A	N/A	
R.M.S. accuracy	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  
28-Mar-2018

Checked by:

Lam Tze Wai  
06-Apr-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.





## CERTIFICATE OF CALIBRATION

Certificate No.: 18CA0322 02 Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type 1)	Microphone
Manufacturer:	Honglim Co., Ltd.	-
Type/Model No.:	HLES-01	CDM101
Serial/Equipment No.:	201692136	05866
Adaptors used:	-	-

### Item submitted by

Customer Name:	Lam Environmental Service Ltd.
Address of Customer:	-
Request No.:	-
Date of receipt:	22-Mar-2018

Date of test: 28-Mar-2018

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	08-Sep-2018	CIGISMEC
Signal generator	DS 360	33873	25-Apr-2018	CEPREI
Signal generator	DS 360	61227	01-Apr-2018	CEPREI

### Ambient conditions

Temperature:	21 ± 1 °C
Relative humidity:	50 ± 10 %
Air pressure:	1000 ± 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 ±20%.
- The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsiveness of the Sound Level Meter.

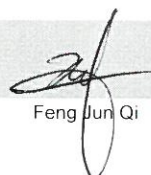
### Test results

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:



Feng Jun Qi

Date: 06-Apr-2018

Company Chop:



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.: 18CA0322 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	2.1
	C	Pass	0.8	
	Lin	N/A	N/A	
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	
	A	Pass	0.3	
	C	Pass	0.3	
Frequency weightings	Lin	N/A	N/A	
	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100µs rectangular pulse	N/A	N/A	
	R.M.S. accuracy	Crest factor of 3	Pass	
Time weighting I	Single burst 5 ms at 2000 Hz	N/A	N/A	
	Repeated at frequency of 100 Hz	N/A	N/A	
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	
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:

Date:

Fung Chi Yip  
28-Mar-2018

Checked by:

Date:

Lam Tze Wai  
06-Apr-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.





## CERTIFICATE OF CALIBRATION

Certificate No.: 18CA0309 02

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: Larson Davis  
Type/Model No.: CAL200  
Serial/Equipment No.: 13098  
Adaptors used: -

### Item submitted by

Customer: Lam Environmental Service Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 09-Mar-2018

Date of test: 12-Mar-2018

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	11-Apr-2018	SCL
Preamplifier	B&K 2673	2239857	05-May-2018	CEPREI
Measuring amplifier	B&K 2610	2346941	03-May-2018	CEPREI
Signal generator	DS 360	61227	01-Apr-2018	CEPREI
Digital multi-meter	34401A	US36087050	25-Apr-2018	CEPREI
Audio analyzer	8903B	GB41300350	21-Apr-2018	CEPREI
Universal counter	53132A	MY40003662	22-Apr-2018	CEPREI

### Ambient conditions

Temperature:  $21 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1000 \pm 5$  hPa

### Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

### Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

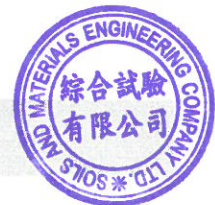
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

  
Feng Jun Qi

Date: 12-Mar-2018

Company Chop:



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

Certificate No.: 18CA1023 02

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: Larson Davis  
Type/Model No.: CAL200  
Serial/Equipment No.: 13437  
Adaptors used: -

### Item submitted by

Customer: Lam Geotechnics Ltd.  
Address of Customer: -  
Request No.: -  
Date of receipt: 23-Oct-2018

Date of test: 24-Oct-2018

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	20-Apr-2019	SCL
Preamplifier	B&K 2673	2239857	27-Apr-2019	CEPREI
Measuring amplifier	B&K 2610	2346941	08-May-2019	CEPREI
Signal generator	DS 360	33873	24-Apr-2019	CEPREI
Digital multi-meter	34401A	US36087050	23-Apr-2019	CEPREI
Audio analyzer	8903B	GB41300350	23-Apr-2019	CEPREI
Universal counter	53132A	MY40003662	24-Apr-2019	CEPREI

### Ambient conditions

Temperature:  $20 \pm 1$  °C  
Relative humidity:  $50 \pm 10$  %  
Air pressure:  $1005 \pm 5$  hPa

### Test specifications

- 1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- 2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- 3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

### Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

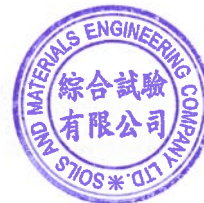
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

Feng Junqi

Date: 24-Oct-2018

Company Chop:



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.:

18CA1023 02

Page: 2 of 2

### 1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	(Output level in dB re 20 $\mu$ Pa)
			Estimated Expanded Uncertainty dB
1000	94.00	93.77	0.10

### 2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz **STF = 0.015 dB**

Estimated expanded uncertainty 0.005 dB

### 3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz **Actual Frequency = 1000.2 Hz**

Estimated expanded uncertainty 0.1 Hz Coverage factor  $k = 2.2$

### 4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz **TND = 0.5%**

Estimated expanded uncertainty 0.7 %

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.

Calibrated by:

Date:

Fung Chi Yip  
24-Oct-2018

- End -

Checked by:

Date:

Shek Kwong Tat  
24-Oct-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.





## 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 4226	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 ± 1 °C
Relative humidity:	50 ± 10 %
Air pressure:	1000 ± 5 hPa

### Test specifications

- 1, 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.
- 2, 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 ±20%.
- 3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure response of the Sound Level Meter.

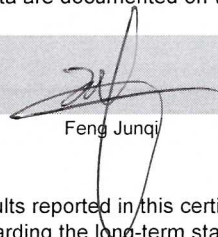
### Test results

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.

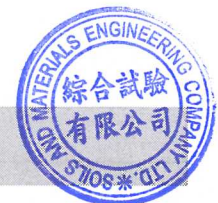
Approved Signatory:



Feng Junqi

Date: 15-Nov-2018

Company Chop:



**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	
Time weighting I	Crest factor of 3	Pass	0.3	
	Single burst 5 ms at 2000 Hz	Pass	0.3	
Time averaging	Repeated at frequency of 100 Hz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz	Pass	0.3	
Pulse range	1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz	Pass	0.3	
	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 Tat

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.



## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR CHAN KA CHUN	WORK ORDER:	HK1903608
CLIENT:	LAM ENVIRONMENTAL LTD		
ADDRESS:	11/F, CENTRE POINT, 181 - 185 GLOUCESTER ROAD WAN CHAI	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	23-Jan-2019
		DATE OF ISSUE:	31-Jan-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:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	XINRUI
Model No.:	--
Serial No.:	1309192
Equipment No.:	--
Date of Calibration:	25 January, 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.

Mr Chan Siu Ming, Vico  
Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1903608  
SUB-BATCH: 0  
DATE OF ISSUE: 31-Jan-2019  
CLIENT: LAM ENVIRONMENTAL LTD

Equipment Type: Turbidimeter  
Brand Name: XINRUI  
Model No.: --  
Serial No.: 1309192  
Equipment No.: --  
Date of Calibration: 25 January, 2019

Date of Next Calibration: 25 April, 2019

## PARAMETERS:

Turbidity Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.01	--
40	39.06	-2.3
400	384.5	-3.9
800	868.3	+8.5
	Tolerance Limit (%)	±10.0

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>	MR CHAN KA CHUN	<b>WORK ORDER:</b>	HK1900006
<b>CLIENT:</b>	LAM ENVIRONMENTAL LTD		
<b>ADDRESS:</b>	11/F, CENTRE POINT, 181 - 185 GLOUCESTER ROAD WAN CHAI, HONG KONG	<b>SUB-BATCH:</b>	0
		<b>LABORATORY:</b>	HONG KONG
		<b>DATE RECEIVED:</b>	31- Dec- 2018
		<b>DATE OF ISSUE:</b>	10-Jan- 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.:	14M100277
Equipment No.:	--
Date of Calibration:	10 January, 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.

Mr Chan Siu Ming, Vico  
Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK1900006  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 10-Jan-2019  
**CLIENT:** LAM ENVIRONMENTAL LTD

**Equipment Type:** Multifunctional Meter  
**Brand Name:** YSI  
**Model No.:** Professional Plus  
**Serial No.:** 14M100277  
**Equipment No.:** --  
**Date of Calibration:** 10 January, 2019      **Date of Next Calibration:** 10 April, 2019

**PARAMETERS:**

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.67	2.47	- 0.20
6.20	6.28	+ 0.08
8.88	8.83	- 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	3.97	- 0.03
7.0	6.84	- 0.16
10.0	10.03	+ 0.03
	Tolerance Limit (pH unit)	± 0.20

**Salinity**

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.36	+ 3.6
20	18.90	- 5.5
30	27.77	- 7.4
	Tolerance Limit (%)	± 10.0

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

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Mr Chan Siu Ming, Vico  
Manager - Inorganic



# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



**WORK ORDER:** HK1900006  
**SUB-BATCH:** 0  
**DATE OF ISSUE:** 10-Jan-2019  
**CLIENT:** LAM ENVIRONMENTAL LTD

**Equipment Type:** Multifunctional Meter  
**Brand Name:** YSI  
**Model No.:** Professional Plus  
**Serial No.:** 14M100277  
**Equipment No.:** --  
**Date of Calibration:** 10 January, 2019

**Date of Next Calibration:** 10 April, 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	11.3	+ 0.8
21.0	19.8	- 1.2
40.5	39.4	- 1.1
	Tolerance Limit (°C)	± 2.0

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'.

Mr Chan Siu Ming, Vico  
Manager - Inorganic



## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR CHAN KA CHUN	WORK ORDER:	HK1901812
CLIENT:	LAM ENVIRONMENTAL LTD		
ADDRESS:	11/F, CENTRE POINT, 181 - 185 GLOUCESTER ROAD WAN CHAI	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	10-Jan-2019
		DATE OF ISSUE:	18-Jan-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:	18 January, 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.

Mr Chan Siu Ming, Vico  
Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1901812  
 SUB-BATCH: 0  
 DATE OF ISSUE: 18-Jan-2019  
 CLIENT: LAM ENVIRONMENTAL LTD

Equipment Type: Multifunctional Meter  
 Brand Name: YSI  
 Model No.: Professional Plus  
 Serial No.: 17F100236  
 Equipment No.: --  
 Date of Calibration: 18 January, 2019

Date of Next Calibration: 18 April, 2019

**PARAMETERS:**

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.65	2.45	-0.20
6.02	5.92	-0.10
8.88	8.94	+0.06
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	4.03	+0.03
7.0	7.08	+0.08
10.0	10.16	+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	10.20	+2.0
20	19.68	-1.6
30	29.74	-0.9
Tolerance Limit (%)		±10.0

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



WORK ORDER: HK1901812  
SUB-BATCH: 0  
DATE OF ISSUE: 18-Jan-2019  
CLIENT: LAM ENVIRONMENTAL LTD

Equipment Type: Multifunctional Meter  
Brand Name: YSI  
Model No.: Professional Plus  
Serial No.: 17F100236  
Equipment No.: --  
Date of Calibration: 18 January, 2019

Date of Next Calibration: 18 April, 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)
10.0	9.5	-0.5
22.0	21.3	-0.7
41.5	42.3	+0.8
	Tolerance Limit (°C)	±2.0

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'.

Mr Chan Siu Ming, Vico  
Manager - Inorganic