

## **E. Calibration Certificates**



**Appendix E**  
**Calibration Record**  
**(Air Quality Monitoring)**

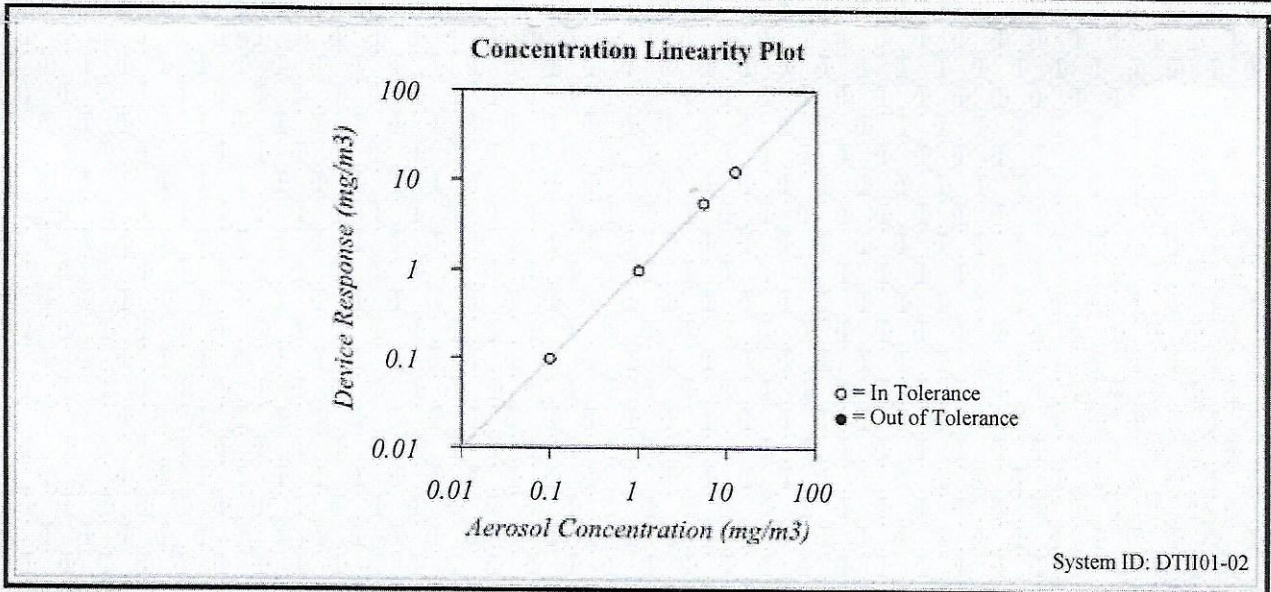


# CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA  
 Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 <http://www.tsi.com>

Environment Conditions			Model	<b>AM510</b>
Temperature	75.79 (24.3)	°F (°C)		
Relative Humidity	17.0	%RH	Serial Number	<b>10406054</b>
Barometric Pressure	29.01 (982.4)	inHg (hPa)		

<input checked="" type="checkbox"/> As Left	<input checked="" type="checkbox"/> In Tolerance
<input type="checkbox"/> As Found	<input type="checkbox"/> Out of Tolerance



CONCENTRATION				Unit: mg/m <sup>3</sup>			
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	5.480	5.445	4.932~6.028	3	1.000	0.973	0.700~1.300
2	0.099	0.097	0.084~0.114	4	12.447	12.322	11.202~13.692

*TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 4:1*

<u>Measurement Variable</u>	<u>System ID</u>	<u>Last Cal.</u>	<u>Cal. Due</u>
Temp/Humidity	E005656	03-07-17	03-31-18
DC Voltage	E003314	05-03-17	05-31-18
Photometer	E003319	07-27-17	01-31-18
Pressure	E003511	10-02-17	10-31-18

<u>Measurement Variable</u>	<u>System ID</u>	<u>Last Cal.</u>	<u>Cal. Due</u>
Temp/Humidity	E005657	03-06-17	03-31-18
DC Voltage	E003315	05-03-17	05-31-18
Microbalance	M001324	11-02-16	11-30-18
Flowmeter	E002471	04-20-17	04-30-18

Bailey Passero

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Calibrated

November 28, 2017

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Date



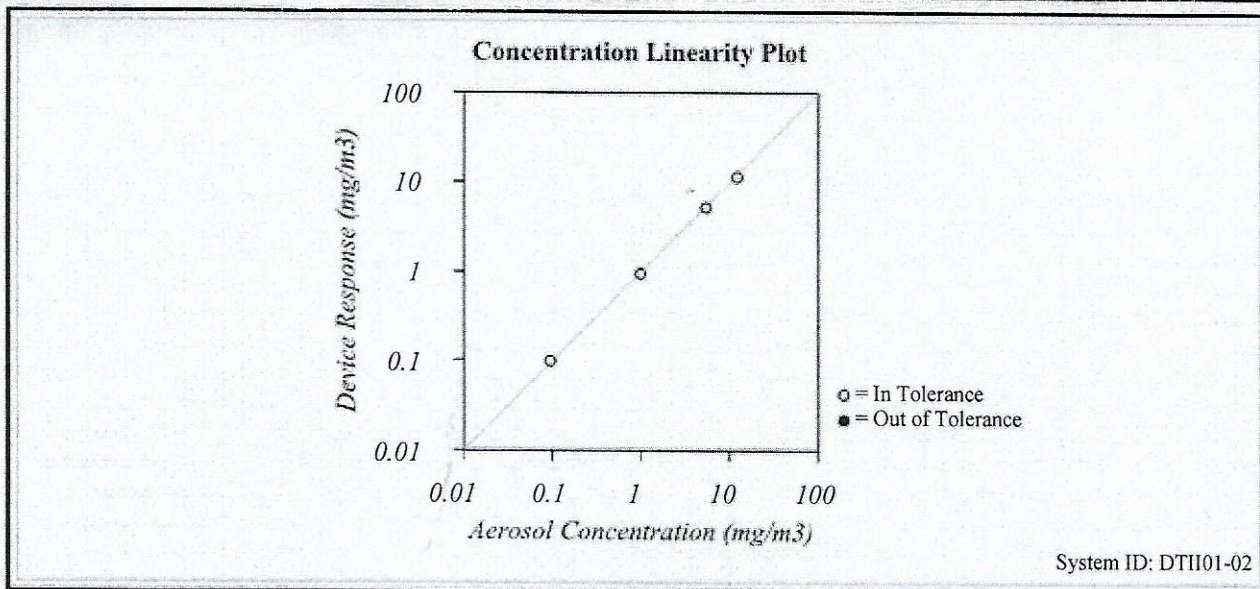
# CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA  
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 <http://www.tsi.com>

Environment Conditions		
Temperature	75.71 (24.3)	°F (°C)
Relative Humidity	21.4	%RH
Barometric Pressure	28.98 (981.4)	inHg (hPa)

Model	AM510
Serial Number	11603043

<input type="checkbox"/> As Left	<input checked="" type="checkbox"/> In Tolerance
<input checked="" type="checkbox"/> As Found	<input type="checkbox"/> Out of Tolerance



CONCENTRATION				Unit: mg/m <sup>3</sup>			
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	5.447	5.159	4.902~5.992	3	0.977	0.937	0.684~1.270
2	0.096	0.098	0.082~0.110	4	12.238	11.550	11.014~13.462

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 4:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Temp/Humidity	E005656	03-07-17	03-31-18	Temp/Humidity	E005657	03-06-17	03-31-18
DC Voltage	E003314	05-03-17	05-31-18	DC Voltage	E003315	05-03-17	05-31-18
Photometer	E003319	07-27-17	01-31-18	Microbalance	M001324	11-02-16	11-30-18
Pressure	E003511	10-02-17	10-31-18	Flowmeter	E002471	04-20-17	04-30-18

*Barley Parsons*  
Verified

November 28, 2017  
Date

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR1  
 Calibrated by : T.K.Wong  
 Date : 05/03/2018

Sampler

Model : GMWS-2310 ACCU-VOL  
 Serial Number : S/N 1806

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
 Service Date : 20 March 2017  
 Slope (m) : 2.08464  
 Intercept (b) : -0.036840  
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013  
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1015  
 Ta(K) : 295

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1   18 holes	12.6	3.571	1.731	54	54.33
2   13 holes	9.1	3.035	1.474	47	47.29
3   10 holes	6.0	2.464	1.200	42	42.25
4   7 holes	3.7	1.935	0.946	34	34.21
5   5 holes	2.6	1.622	0.796	29	29.18

Sampler Calibration Relationship

Slope(m):26.256      Intercept(b):9.177      Correlation Coefficient(r):0.9953

Checked by: Magnum Fan

Date: 10/03/2018

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR2A  
 Calibrated by : T.K.Wong  
 Date : 05/03/2018

Sampler

Model : GMWS-2310 ACCU-VOL  
 Serial Number : S/N 1061

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
 Service Date : 20 March 2017  
 Slope (m) : 2.08464  
 Intercept (b) : -0.036840  
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013  
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1015  
 Ta(K) : 295

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1   18 holes	12.3	3.528	1.710	58	58.35
2   13 holes	8.9	3.001	1.457	48	48.29
3   10 holes	7.1	2.681	1.304	42	42.25
4   7 holes	3.9	1.987	0.971	33	33.20
5   5 holes	2.4	1.559	0.765	26	26.16

Sampler Calibration Relationship

Slope(m):33.258      Intercept(b):0.363      Correlation Coefficient(r):0.9968

Checked by: Magnum Fan

Date: 10/03/2018

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR3  
Calibrated by : T.K.Wong  
Date : 05/03/2018

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 7577

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
Service Date : 20 March 2017  
Slope (m) : 2.08464  
Intercept (b) : -0.036840  
Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1015  
Ta(K) : 295

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1   18 holes	12.20	3.514	1.703	62	62.38
2   13 holes	9.30	3.068	1.489	53	53.32
3   10 holes	7.30	2.718	1.322	45	45.27
4   7 holes	4.60	2.158	1.053	36	36.22
5   5 holes	2.70	1.653	0.811	28	28.17

Sampler Calibration Relationship

Slope(m): 38.271      Intercept(b): -3.745      Correlation Coefficient(r): 0.9971

Checked by: Magnum Fan

Date: 10/03/2018

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR4  
Calibrated by : T.K.Wong  
Date : 05/03/2018

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 1273

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
Service Date : 20 March 2017  
Slope (m) : 2.08464  
Intercept (b) : -0.036840  
Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1015  
Ta(K) : 295

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1   18 holes	13.1	3.641	1.764	56	56.34
2   13 holes	9.6	3.117	1.513	49	49.30
3   10 holes	7.4	2.737	1.331	44	44.27
4   7 holes	4.6	2.158	1.053	36	36.22
5   5 holes	3.3	1.828	0.894	29	29.18

Sampler Calibration Relationship

Slope(m):30.503      Intercept(b):3.070      Correlation Coefficient(r):0.9965

Checked by: Magnum Fan

Date: 10/03/2018

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR1  
Calibrated by : T.K.Wong  
Date : 05/05/2018

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 1806

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
Service Date : 19 Mar 2018  
Slope (m) : 2.05242  
Intercept (b) : -0.01383  
Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010  
Ta(K) : 304

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1   18 holes	12.8	3.537	1.730	53	52.40
2   13 holes	9.3	3.015	1.476	47	46.46
3   10 holes	6.5	2.520	1.235	40	39.54
4   7 holes	4.1	2.002	0.982	34	33.61
5   5 holes	2.6	1.594	0.783	30	29.66

Sampler Calibration Relationship

Slope(m):24.475      Intercept(b):9.957      Correlation Coefficient(r):0.9986

Checked by: Magnum Fan

Date: 09/05/2018

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR2A  
Calibrated by : T.K.Wong  
Date : 05/05/2018

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 1061

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
Service Date : 19 Mar 2018  
Slope (m) : 2.05242  
Intercept (b) : -0.01383  
Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010  
Ta(K) : 304

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1   18 holes	12.4	3.481	1.703	54	53.39
2   13 holes	9.6	3.063	1.499	46	45.48
3   10 holes	7.3	2.671	1.308	40	39.54
4   7 holes	5.5	2.319	1.136	34	33.61
5   5 holes	3.3	1.796	0.882	25	24.72

Sampler Calibration Relationship

Slope(m): 34.529      Intercept(b): -5.737      Correlation Coefficient(r):  
0.9996

Checked by: Magnum Fan

Date: 09/05/2018

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR3  
Calibrated by : T.K.Wong  
Date : 05/05/2018

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 7577

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
Service Date : 19 Mar 2018  
Slope (m) : 2.05242  
Intercept (b) : -0.01383  
Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010  
Ta(K) : 304

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1   18 holes	12.80	3.537	1.730	60	59.32
2   13 holes	9.40	3.031	1.484	52	51.41
3   10 holes	7.90	2.779	1.361	48	47.45
4   7 holes	5.60	2.339	1.147	38	37.57
5   5 holes	3.10	1.741	0.855	29	28.67

Sampler Calibration Relationship

Slope(m): 35.903      Intercept(b): -2.334      Correlation Coefficient(r): 0.9973

Checked by: Magnum Fan

Date: 09/05/2018

High-Volume TSP Sampler  
5-Point Calibration Record

Location : ASR4  
Calibrated by : T.K.Wong  
Date : 05/05/2018

Sampler

Model : GMWS-2310 ACCU-VOL  
Serial Number : S/N 1273

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454  
Service Date : 19 Mar 2018  
Slope (m) : 2.05242  
Intercept (b) : -0.01383  
Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013  
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010  
Ta(K) : 304

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1   18 holes	11.7	3.382	1.654	56	55.36
2   13 holes	9.4	3.031	1.484	50	49.43
3   10 holes	7.3	2.671	1.308	45	44.49
4   7 holes	4.6	2.120	1.040	35	34.60
5   5 holes	2.9	1.684	0.827	28	27.68

Sampler Calibration Relationship

Slope(m):33.524      Intercept(b):-0.0135      Correlation Coefficient(r):0.9995

Checked by: Magnum Fan

Date: 09/05/2018

**Appendix E**  
**Calibration Record**  
**(Noise Monitoring)**



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C173477

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1398)

Date of Receipt / 收件日期 : 21 June 2017

Description / 儀器名稱 : Precision Acoustic Calibrator

Manufacturer / 製造商 : LARSON DAVIS

Model No. / 型號 : CAL200

Serial No. / 編號 : 11333

Supplied By / 委託者 : Envirotech Services Co.

Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,  
New Territories, Hong Kong

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 28 June 2017

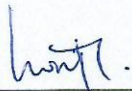
### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).


The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By  
測試

  
H T Wong  
Technical Officer

Certified By  
核證

  
K C Lee  
Engineer

Date of Issue  
簽發日期

30 June 2017

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited - Calibration & Testing Laboratory  
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室  
c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C173477

證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C163709
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

### 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

### 5.2 Frequency Accuracy

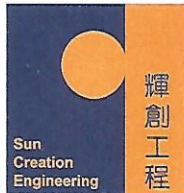
UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000	1 kHz ± 1 %	± 1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C173120

證書編號

ITEM TESTED / 送檢項目 ( Job No. / 序引編號 : IC17-1220 )

Date of Receipt / 收件日期 : 1 June 2017

Description / 儀器名稱 : Sound Level Meter

Manufacturer / 製造商 : Rion

Model No. / 型號 : NL-52

Serial No. / 編號 : 00643049

Supplied By / 委託者 : Envirotech Services Co.

Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,  
New Territories, Hong Kong

### TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C

Relative Humidity / 相對濕度 : (55 ± 20)%

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 8 June 2017

### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed manufacturer's specification.

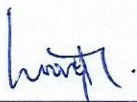
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA


Tested By

測試

  
H T Wong  
Technical Officer

Certified By

核證

  
K C Lee  
Engineer

Date of Issue

簽發日期

8 June 2017

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室所書面批准。

Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C173120

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration was performed before the test.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL280	40 MHz Arbitrary Waveform Generator	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	93.9	± 1.1

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	93.9 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

- 6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L <sub>A</sub>	A	Fast	94.00	1	93.9	Ref.
			Slow				

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

# Certificate of Calibration

## 校正證書

Certificate No. : C173120

證書編號

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L <sub>A</sub>	A	Fast	94.00	63 Hz	67.6	-26.2 ± 1.5
					125 Hz	77.7	-16.1 ± 1.5
					250 Hz	85.2	-8.6 ± 1.4
					500 Hz	90.6	-3.2 ± 1.4
					1 kHz	93.9	Ref.
					2 kHz	95.1	+1.2 ± 1.6
					4 kHz	94.9	+1.0 ± 1.6
					8 kHz	92.8	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.4	-4.3 (+3.0 ; -6.0)

#### 6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L <sub>C</sub>	C	Fast	94.00	63 Hz	93.0	-0.8 ± 1.5
					125 Hz	93.7	-0.2 ± 1.5
					250 Hz	93.9	0.0 ± 1.4
					500 Hz	93.9	0.0 ± 1.4
					1 kHz	93.9	Ref.
					2 kHz	93.7	-0.2 ± 1.6
					4 kHz	93.1	-0.8 ± 1.6
					8 kHz	90.9	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.5	-6.2 (+3.0 ; -6.0)

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 06829

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB : 63 Hz - 125 Hz	: ± 0.35 dB
250 Hz - 500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz - 4 kHz	: ± 0.35 dB
8 kHz	: ± 0.45 dB
12.5 kHz	: ± 0.70 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

**Appendix E**  
**Calibration Record**  
**(Water Quality Monitoring)**



專業化驗有限公司

QUALITY PRO TEST-CONSULT LIMITED

Unit 10, 14/F, Wah Wai Centre, 38-40 Au Pui Wan St., Fotan, Hong Kong

Email: info@qualityprotest.com; Website: www.qualityprotest.com

Tel: (852) 3956 8717; Fax: (852) 3956 3928

## REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Report No. : AH040199  
Date of Issue : 04 May 2018  
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### PART A – CUSTOMER INFORMATION

Enovative Environmental Service Ltd.  
Flat 2207, Yu Fun House,  
Yu Chui Court, Shatin,  
New Territories, Hong Kong  
Attn: Mr. Thomas WONG

### PART B – DESCRIPTION

Name of Equipment : YSI ProDSS (Multi-Parameters)  
Manufacturer : YSI (a xylem brand)  
Serial Number : 15M100005  
Date of Received : Apr 30, 2018  
Date of Calibration : Apr 30, 2018 to Apr 30, 2018  
Date of Next Calibration<sup>(a)</sup> : Jul 30, 2018

### PART C – REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

Parameter	Reference Method
pH at 25°C	APHA 21e 4500-H <sup>+</sup> B
Dissolved Oxygen	APHA 21e 4500-O G
Conductivity at 25°C	APHA 21e 2510 B
Salinity	APHA 21e 2520 B
Turbidity	APHA 21e 2130 B
Temperature	Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

### PART D – CALIBRATION RESULTS<sup>(b,c)</sup>

#### (1) pH at 25°C

Target (pH unit)	Displayed Reading <sup>(d)</sup> (pH Unit)	Tolerance <sup>(e)</sup> (pH Unit)	Results
4.00	4.07	0.07	Satisfactory
7.42	7.49	0.07	Satisfactory
10.01	10.08	0.07	Satisfactory

Tolerance of pH should be less than ±0.10 (pH unit)

#### (2) Temperature

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)	Results
13.0	13.1	0.1	Satisfactory
25.0	25.2	0.2	Satisfactory
38.0	37.9	-0.1	Satisfactory


Tolerance limit of temperature should be less than ±2.0 (°C)

~ CONTINUED ON NEXT PAGE ~

#### Remark(s): -

- <sup>(a)</sup> The "Date of Next Calibration" is recommended according to best practice principals as practiced by QPT or quoted from relevant international standards.  
<sup>(b)</sup> The results relate only to the calibrated equipment as received  
<sup>(c)</sup> The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.  
<sup>(d)</sup> "Displayed Reading" denotes the figure shown on item under calibration/ checking regardless of equipment precision or significant figures.  
<sup>(e)</sup> The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by QPT or quoted from relevant international standards.

APPROVED SIGNATORY:

  
LAM Ho-ye, Emma  
Assistant Laboratory Manager



專業化驗有限公司

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## REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

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### PART D – CALIBRATION RESULTS (Cont'd)

#### (3) Dissolved Oxygen

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)	Results
0.00	0.08	0.08	Satisfactory
2.56	2.63	0.07	Satisfactory
4.72	4.64	-0.08	Satisfactory
6.76	6.66	-0.10	Satisfactory

Tolerance limit of dissolved oxygen should be less than  $\pm 0.20$  (mg/L)

#### (4) Conductivity at 25°C

Conc. of KCl (M)	Expected Reading ( $\mu\text{S/cm}$ )	Displayed Reading ( $\mu\text{S/cm}$ )	Tolerance (%)	Results
0.001	146.9	151.6	3.2	Satisfactory
0.01	1412	1429	1.2	Satisfactory
0.1	12890	12834	-0.4	Satisfactory
0.5	58670	57932	-1.3	Satisfactory
1.0	111900	108516	-3.0	Satisfactory

Tolerance limit of conductivity should be less than  $\pm 10.0$  (%)

#### (5) Salinity

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)	Results
10	9.92	-0.8	Satisfactory
20	20.28	1.4	Satisfactory
30	30.61	2.0	Satisfactory

Tolerance limit of salinity should be less than  $\pm 10.0$  (%)

#### (6) Turbidity

Expected Reading (NTU)	Displayed Reading <sup>(f)</sup> (NTU)	Tolerance <sup>(g)</sup> (%)	Results
0	0.1	--	--
10	10.2	2.0	Satisfactory
20	19.7	-1.5	Satisfactory
100	107.2	7.2	Satisfactory
800	807.6	1.0	Satisfactory

Tolerance limit of turbidity should be less than  $\pm 10.0$  (%)

~ END OF REPORT ~

**Remark(s): -**

<sup>(f)</sup> "Displayed Reading" presents the figures shown on item under calibration/ checking regardless of equipment precision or significant figures.

<sup>(g)</sup> The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted from relevant international standards.