

# Air Quality

## HIVOL SAMPLER CALIBRATION DATA SHEET (TSP)

### Site Information

Location:	Representative ForTung Lo Hang	Site ID:	AM1	Date:	04-Sep-2023
Serial No.:	1105	Model:	TE-5170X	Operator:	Andy Li

### Ambient Condition

Actual Pressure during Calibration ( $P_a$ ) (mm Hg):	1002.1	Actual Temperature during Calibration ( $T_a$ ) (deg K):	299.0
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### Calibration Orifice

Model:	TE-5025A	Slope ( $m_c$ ):	2.10188
Serial No.:	4166	Intercept ( $b_c$ ):	-0.35800
Calibration Due Date:	19-Jun-24	Corr. Coeff:	0.99998

### Calibration Data

Plate or Test #	$\Delta H_2O$ (in)	Qa, X-Axis (m <sup>3</sup> /min)	I, CFM (chart)	IC, Y-Axis (corrected)
18	13.00	2.137	53.0	60.76
13	11.00	1.979	47.0	53.88
10	9.00	1.807	44.0	50.44
7	6.30	1.539	36.0	41.27
5	4.50	1.327	28.0	32.10

#### Sampler Calibration Relationship (Qa on x-axis, IC on y-axis)

$m = \underline{\hspace{2cm} 34.0375 \hspace{2cm}}$ 
                         
  $b = \underline{\hspace{2cm} -12.1429 \hspace{2cm}}$ 
                         
 Corr. Coeff =  $\underline{\hspace{2cm} 0.9950 \hspace{2cm}}$

#### Calculations

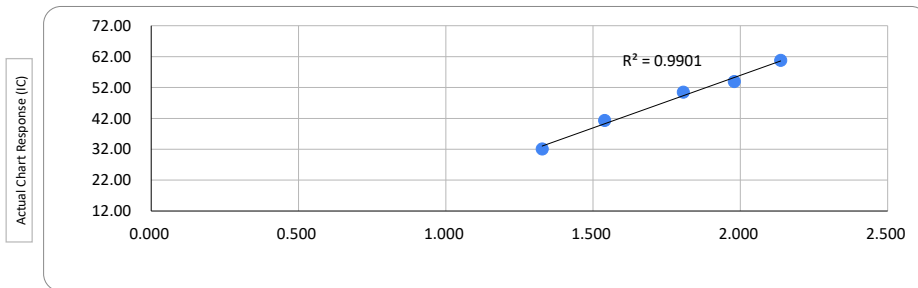
$$Q_a = 1/m_c \cdot [\text{Sqrt}(\Delta H_2O \cdot (P_a/P_{std}) \cdot (T_{std}/T_a)) - b_c]$$

$$IC = I \cdot (\text{Sqrt}(P_a/P_{std}) \cdot (T_{std}/T_a))$$

$Q_a$  = actual flow rate  
 $IC$  = corrected chart response  
 $I$  = actual chart response  
 $m_c$  = calibrator slope  
 $b_c$  = calibrator intercept

$m$  = sampler slope  
 $b$  = sampler intercept  
 $T_{std}$  = 298 deg K  
 $P_{std}$  = 760 mm Hg  
 $T_a$  = actual temperature during calibration (deg K)  
 $P_a$  = actual pressure during calibration (mm Hg)

Flow Rate Chart



Standard Flow Rate (m<sup>3</sup>/min)

Checked by: Tandy Tse Senior Consultant, Environmental

Date: 04-Sep-2023

## HIVOL SAMPLER CALIBRATION DATA SHEET (TSP)

### Site Information

Location:	Representative ForTung Lo Hang	Site ID:	AM1	Date:	04-Nov-2023
Serial No.:	1105	Model:	TE-5170X	Operator:	Andy Li

### Ambient Condition

Actual Pressure during Calibration (P <sub>a</sub> ) (mm Hg):	1013.9	Actual Temperature during Calibration (T <sub>a</sub> ) (deg K):	299.0
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### Calibration Orifice

Model:	TE-5025A	Slope (m <sub>c</sub> ):	2.10188
Serial No.:	4166	Intercept (b <sub>c</sub> ):	-0.35800
Calibration Due Date:	19-Jun-24	Corr. Coeff:	0.99998

### Calibration Data

Plate or Test #	ΔH <sub>2</sub> O (in)	Qa, X-Axis (m <sup>3</sup> /min)	I, CFM (chart)	IC, Y-Axis (corrected)
18	13.40	2.179	57.0	65.73
13	9.60	1.870	50.0	57.65
10	7.00	1.622	46.0	53.04
7	4.00	1.268	40.0	46.12
5	2.00	0.946	34.0	39.21

#### Sampler Calibration Relationship (Qa on x-axis, IC on y-axis)

m = 21.0403                      b = 19.1736                      Corr. Coeff = 0.9983

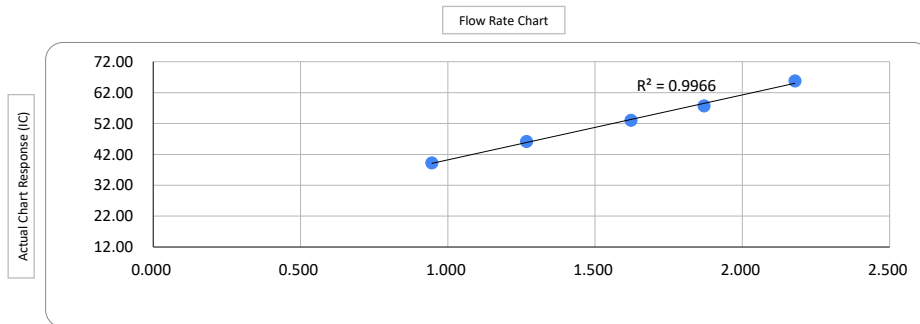
#### Calculations

$$Q_a = 1/m_c \cdot [\text{Sqrt}(\Delta H_2O \cdot (P_a/P_{Std}) \cdot (T_{Std}/T_a)) - b_c]$$

$$IC = I \cdot (\text{Sqrt}(P_a/P_{Std}) \cdot (T_{Std}/T_a))$$

Q<sub>a</sub> = actual flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m<sub>c</sub> = calibrator slope  
 b<sub>c</sub> = calibrator intercept

m = sampler slope  
 b = sampler intercept  
 T<sub>Std</sub> = 298 deg K  
 P<sub>Std</sub> = 760 mm Hg  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)



Standard Flow Rate (m<sup>3</sup>/min)

Checked by: Tandy Tse Senior Consultant, Environmental

Date: 04-Nov-2023

## HIVOL SAMPLER CALIBRATION DATA SHEET (TSP)

### Site Information

Location:	Representative For Heung Yuen Wai	Site ID:	AM2	Date:	04-Sep-2023
Serial No.:	1106	Model:	TE-5170X	Operator:	Andy Li

### Ambient Condition

Actual Pressure during Calibration (P <sub>a</sub> ) (mm Hg):	1002.1	Actual Temperature during Calibration (T <sub>a</sub> ) (deg K):	299.0
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### Calibration Orifice

Model:	TE-5025A	Slope (m <sub>c</sub> ):	2.10188
Serial No.:	4166	Intercept (b <sub>c</sub> ):	-0.35800
Calibration Due Date:	19-Jun-24	Corr. Coeff:	0.99998

### Calibration Data

Plate or Test #	ΔH <sub>2</sub> O (in)	Q <sub>a</sub> , X-Axis (m <sup>3</sup> /min)	I, CFM (chart)	IC, Y-Axis (corrected)
18	11.00	1.979	60.0	68.78
13	9.40	1.842	56.0	64.20
10	7.00	1.613	49.0	56.17
7	4.60	1.340	42.0	48.15
5	3.60	1.205	40.0	45.85

#### Sampler Calibration Relationship (Q<sub>a</sub> on x-axis, IC on y-axis)

m = 30.2611                      b = 8.3322                      Corr. Coeff = 0.9963

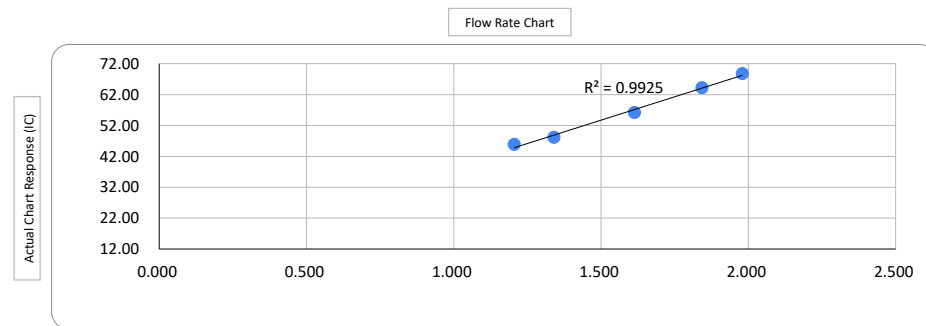
#### Calculations

$$Q_a = 1/m_c \cdot [\text{Sqrt}(\Delta H_2O \cdot (P_a/P_{std}) \cdot (T_{std}/T_a)) - b_c]$$

$$IC = I \cdot (\text{Sqrt}(P_a/P_{std}) \cdot (T_{std}/T_a))$$

Q<sub>a</sub> = actual flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m<sub>c</sub> = calibrator slope  
 b<sub>c</sub> = calibrator intercept

m = sampler slope  
 b = sampler intercept  
 T<sub>std</sub> = 298 deg K  
 P<sub>std</sub> = 760 mm Hg  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)



Standard Flow Rate (m<sup>3</sup>/min)

Checked by: Tandy Tse   
 Senior Consultant, Environmental

Date: 04-Sep-2023

## HIVOL SAMPLER CALIBRATION DATA SHEET (TSP)

### Site Information

Location:	Representative For Heung Yuen Wai	Site ID:	AM2	Date:	04-Nov-2023
Serial No.:	1106	Model:	TE-5170X	Operator:	Andy Li

### Ambient Condition

Actual Pressure during Calibration (P <sub>a</sub> ) (mm Hg):	1013.9	Actual Temperature during Calibration (T <sub>a</sub> ) (deg K):	299.0
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### Calibration Orifice

Model:	TE-5025A	Slope (m <sub>c</sub> ):	2.10188
Serial No.:	4166	Intercept (b <sub>c</sub> ):	-0.35800
Calibration Due Date:	19-Jun-24	Corr. Coeff:	0.99998

### Calibration Data

Plate or Test #	ΔH <sub>2</sub> O (in)	Qa, X-Axis (m <sup>3</sup> /min)	I, CFM (chart)	IC, Y-Axis (corrected)
18	12.00	2.071	55.0	63.42
13	9.40	1.852	49.0	56.50
10	6.40	1.558	43.0	49.58
7	4.40	1.321	40.0	46.12
5	2.40	1.020	33.0	38.05

#### Sampler Calibration Relationship (Qa on x-axis, IC on y-axis)

m = 23.1977                      b = 14.4432                      Corr. Coeff = 0.9950

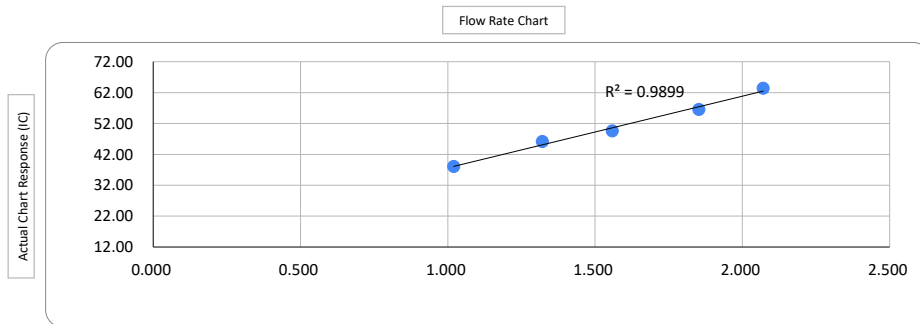
#### Calculations

$$Q_a = 1/m_c \cdot [\text{Sqrt}(\Delta H_2O \cdot (P_a/P_{Std}) \cdot (T_{Std}/T_a)) - b_c]$$

$$IC = I \cdot (\text{Sqrt}(P_a/P_{Std}) \cdot (T_{Std}/T_a))$$

Q<sub>a</sub> = actual flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m<sub>c</sub> = calibrator slope  
 b<sub>c</sub> = calibrator intercept

m = sampler slope  
 b = sampler intercept  
 T<sub>Std</sub> = 298 deg K  
 P<sub>Std</sub> = 760 mm Hg  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)



Standard Flow Rate (m<sup>3</sup>/min)

Checked by: Tandy Tse   
 Senior Consultant, Environmental

Date: 04-Nov-2023

## HIVOL SAMPLER CALIBRATION DATA SHEET (TSP)

### Site Information

Location:	Representative For Wo Keng Shan Tsuen	Site ID:	AM3	Date:	04-Sep-2023
Serial No.:	1856	Model:	TE-5170X	Operator:	Andy Li

### Ambient Condition

Actual Pressure during Calibration (P <sub>a</sub> ) (mm Hg):	1002.1	Actual Temperature during Calibration (T <sub>a</sub> ) (deg K):	299.0
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### Calibration Orifice

Model:	TE-5025A	Slope (m <sub>c</sub> ):	2.10188
Serial No.:	4166	Intercept (b <sub>c</sub> ):	-0.35800
Calibration Due Date:	19-Jun-24	Corr. Coeff:	0.99998

### Calibration Data

Plate or Test #	ΔH <sub>2</sub> O (in)	Qa, X-Axis (m <sup>3</sup> /min)	I, CFM (chart)	IC, Y-Axis (corrected)
18	13.50	2.174	55.0	63.05
13	11.40	2.012	51.0	58.46
10	9.10	1.816	48.0	55.03
7	6.00	1.506	41.0	47.00
5	4.00	1.261	38.0	43.56

#### Sampler Calibration Relationship (Qa on x-axis, IC on y-axis)

m = 21.5825                      b = 15.5690                      Corr. Coeff = 0.9953

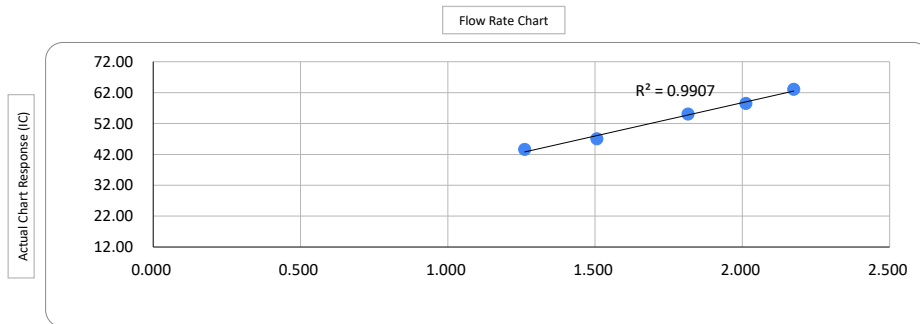
#### Calculations

$$Q_a = 1/m_c \cdot [\text{Sqrt}(\Delta H_2O \cdot (P_a/P_{Std}) \cdot (T_{Std}/T_a)) - b_c]$$

$$IC = I \cdot (\text{Sqrt}(P_a/P_{Std}) \cdot (T_{Std}/T_a))$$

Q<sub>a</sub> = actual flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m<sub>c</sub> = calibrator slope  
 b<sub>c</sub> = calibrator intercept

m = sampler slope  
 b = sampler intercept  
 T<sub>Std</sub> = 298 deg K  
 P<sub>Std</sub> = 760 mm Hg  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)



Standard Flow Rate (m<sup>3</sup>/min)

Checked by: Tandy Tse Senior Consultant, Environmental

Date: 04-Sep-2023

## HIVOL SAMPLER CALIBRATION DATA SHEET (TSP)

### Site Information

Location:	Representative For Wo Keng Shan Tsuen	Site ID:	AM3	Date:	04-Nov-2023
Serial No.:	1856	Model:	TE-5170X	Operator:	Andy Li

### Ambient Condition

Actual Pressure during Calibration (P <sub>a</sub> ) (mm Hg):	1013.9	Actual Temperature during Calibration (T <sub>a</sub> ) (deg K):	302.3
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### Calibration Orifice

Model:	TE-5025A	Slope (m <sub>c</sub> ):	2.10188
Serial No.:	4166	Intercept (b <sub>c</sub> ):	-0.35800
Calibration Due Date:	19-Jun-24	Corr. Coeff:	0.99998

### Calibration Data

Plate or Test #	ΔH <sub>2</sub> O (in)	Qa, X-Axis (m <sup>3</sup> /min)	I, CFM (chart)	IC, Y-Axis (corrected)
18	12.40	2.092	57.0	65.37
13	8.40	1.752	48.0	55.05
10	6.40	1.551	44.0	50.46
7	4.20	1.288	40.0	45.87
5	2.40	1.016	34.0	38.99

#### Sampler Calibration Relationship (Qa on x-axis, IC on y-axis)

m = 23.8033                      b = 14.4997                      Corr. Coeff = 0.9949

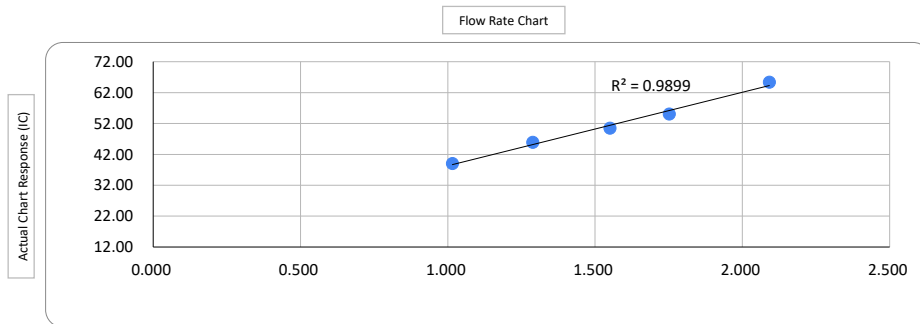
#### Calculations

$$Q_a = 1/m_c \cdot [\text{Sqrt}(\Delta H_2O \cdot (P_a/P_{Std}) \cdot (T_{Std}/T_a)) - b_c]$$

$$IC = I \cdot (\text{Sqrt}(P_a/P_{Std}) \cdot (T_{Std}/T_a))$$

Q<sub>a</sub> = actual flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m<sub>c</sub> = calibrator slope  
 b<sub>c</sub> = calibrator intercept

m = sampler slope  
 b = sampler intercept  
 T<sub>Std</sub> = 298 deg K  
 P<sub>Std</sub> = 760 mm Hg  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)



Standard Flow Rate (m<sup>3</sup>/min)

Checked by: Tandy Tse Senior Consultant, Environmental

Date: 04-Nov-2023





## Sibata LD-5R K-Factor Verification Test by Total Suspended Particulates HVS Test Report

Verification Test Date: 3-Dec-22 to 4-Dec-22  
 Next Verification Test Date: 2-Dec-23  
 Unit-under-Test- Model No.: Sibata LD-5R  
 Unit-under-Test Serial No.: 882106  
 Our Report Reference No.: RPT-22-HVS-0027  
 Calibration Location: AM2, Located near the Leachate Treatment Works within the NENT Landfill

Standard Equipment Information			
Verification Equipment Type	Tisch TSP HVS	Tisch HVS Calibrator	
Standard Equipment Model No.	TE-5170X	TE-5025A	
Equipment serial no.	MFC 1106	3465	
Last Calibration Date	1-Dec-22	28-Jun-22	
Next Calibration Date	31-Jan-23	27-Jun-23	

Verification Test No.	Date	Time			K-Factor K-Factor (K=C/R)	Counts/Minute (R) x-axis	Total Counts (TC)	TSP Sample ID No.	Dust Concentration (ug/m3), (C) y axis
		Start-time	End-time	Elapsed Time (in min)					
1	3/12/2022	194.73	198.08	201.00	0.00123	50	9983	R222043/1	61
2	3/12/2022	198.08	201.27	191.40	0.00092	37	7146	R222043/2	34
3	3/12/2022	201.27	204.35	184.80	0.00103	48	8870	R222043/3	49
4	4/12/2022	252.37	255.36	179.40	0.00108	62	11183	R222044/1	67
5	4/12/2022	255.38	258.38	180.00	0.00110	57	10260	R222044/2	62
6	4/12/2022	258.38	261.38	180.00	0.00108	65	11760	R222044/3	70
					0.00107				

K-Factor to be inputted in LD-5R (corrected 1 decimal point): 1.1

By Linear Regression of y on x:

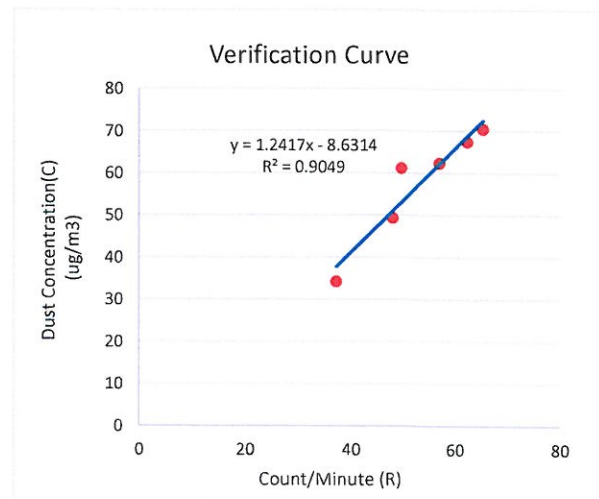
slope, mh= 1.2417

intercept, ch= -8.6314

\*Correlation Coefficient, R= 0.9513

Verification Test Result: Strong Correlation, Results were accepted.

\* If the Correlation Coefficient, R is <0.5. Checking and Re-verification are required.



Verified By: IA  
 Technical Manager

Date: 05-12-2022

## Sibata LD-5R K-Factor Verification Test by Total Suspended Particulates HVS Test Report

Verification Test Date: 3-Dec-22 to 4-Dec-22  
 Next Verification Test Date: 2-Dec-23  
 Unit-under-Test- Model No. Sibata LD-5R  
 Unit-under-Test Serial No. 942532  
 Our Report Reference No. RPT-22-HVS-0024  
 Calibration Location: AM2, Located near the Leachate Treatment Works within the NENT Landfill

Standard Equipment Information			
Verification Equipment Type	Tisch TSP HVS	Tisch HVS Calibrator	
Standard Equipment Model No.	TE-5170X	TE-5025A	
Equipment serial no.	MFC 1106	3465	
Last Calibration Date	1-Dec-22	28-Jun-22	
Next Calibration Date	31-Jan-23	27-Jun-23	

Verification Test No.	Date	Time			K-Factor K-Factor (K=C/R)	Counts/ Minute (R) x-axis	Total Counts (TC)	TSP Sample ID No.	Dust Concentration (ug/m3), (C) y axis
		Start-time	End-time	Elapsed Time (in min)					
1	3/12/2022	194.73	198.08	201.00	0.00111	55	11122	R222043/1	61
2	3/12/2022	198.08	201.27	191.40	0.00093	37	7082	R222043/2	34
3	3/12/2022	201.27	204.35	184.80	0.00110	45	8316	R222043/3	49
4	4/12/2022	252.37	255.36	179.40	0.00113	60	10704	R222044/1	67
5	4/12/2022	255.38	258.38	180.00	0.00120	52	9360	R222044/2	62
6	4/12/2022	258.38	261.38	180.00	0.00104	68	12180	R222044/3	70

0.00108

K-Factor to be inputted in LD-5R (corrected 1 decimal point): 1.1

By Linear Regression of y on x:

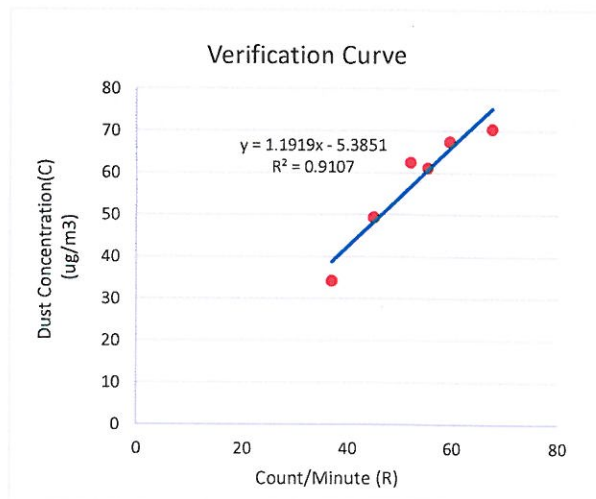
slope, mh= 1.1919

intercept, ch= -5.3851

\*Correlation Coefficient, R= 0.9543

Verification Test Result: Strong Correlation, Results were accepted.

\* If the Correlation Coefficient, R is <0.5. Checking and Re-verification are required.



Verified By: [Signature]  
Technical Manager

Date: 05-12-2022



**RECALIBRATION  
DUE DATE:  
June 19, 2024**

# Certificate of Calibration

Calibration Certification Information			
Cal. Date: June 19, 2023	Rootsmeter S/N: 438320	Ta: 294	°K
Operator: Jim Tisch		Pa: 754.9	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 4166		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4500	3.2	2.00
2	3	4	1	1.0260	6.4	4.00
3	5	6	1	0.9170	8.0	5.00
4	7	8	1	0.8770	8.8	5.50
5	9	10	1	0.7240	12.8	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)
1.0025	0.6914	1.4190	0.9958	0.6867	0.8826
0.9983	0.9730	2.0068	0.9915	0.9664	1.2481
0.9961	1.0863	2.2436	0.9894	1.0790	1.3955
0.9951	1.1346	2.3532	0.9883	1.1270	1.4636
0.9897	1.3670	2.8380	0.9830	1.3578	1.7651
<b>QSTD</b>	m=	<b>2.10188</b>	<b>QA</b>	m=	<b>1.31616</b>
	b=	<b>-0.03580</b>		b=	<b>-0.02227</b>
	r=	<b>0.99998</b>		r=	<b>0.99998</b>

Calculations			
Vstd=	$\Delta Vol \left( \frac{Pa - \Delta P}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)$	Va=	$\Delta Vol \left( \frac{Pa - \Delta P}{Pa} \right)$
Qstd=	Vstd / ΔTime	Qa=	Va / ΔTime
For subsequent flow rate calculations:			
Qstd=	$1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa=	$1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeter manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

# Noise

# Manufacturer Calibration Certificate

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The following instrument has been tested and calibrated to the manufacturer specifications.  
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **XL2 Audio and Acoustic Analyzer**
- Serial Number: **A2A-13663-F0**

- Certificate Issued: **15 February 2023**
- Certificate Number: **44972-A2A-13663-F0**
- Results: **PASSED**  
(for detailed report see next page)

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Tested by:

M. Frick

Signature:

Stamp:



NTi Audio AG  
Im alten Riet 102  
LI - 0494 Schaan  
www.nti-audio.com

Calibration of: XL2 Audio and Acoustic Analyzer  
 Serial Number: A2A-13663-F0  
 Date: 15 February 2023

• Detailed Calibration Test Results:

	reference	actual	unit	actual error	XL2 tolerance	calibration uncertainty <sup>2</sup>
RMS Level @ 1kHz, XLR Input	0.1	<b>0.100</b>	V	≤0.1%	±0.5%	±0.10%
	1	<b>0.999</b>	V	-0.1%	±0.5%	±0.09%
	10	<b>9.982</b>	V	-0.2%	±0.5%	±0.09%
Flatness, XLR Input <sup>1</sup>	20 Hz	<b>0.995</b>	V	-0.5%	±1.1%	±0.09%
	20 kHz	<b>1.003</b>	V	0.3%	±1.1%	±0.09%
Frequency	1000	<b>1000.00</b>	Hz	≤0.003%	±0.003%	±0.01%
Residual Noise	XLR	<b>&lt; 2 uV</b>			<2 uV	±0.50%
THD+N @ 0 dBu, 1 kHz, XLR Input		<b>-100.5</b>	dB		typ. -100 dB	±0.50%

- Test Conditions: Temperature: **24.9** °C  
 Relative Humidity: **19.8** %

• Calibration Equipment Used:

- Agilent Multimeter, Typ 34401A, Serial No. MY 5300 4607  
 Last calibration: 15.09.2022, Next calibration: 15.09.2023  
 Calibrated by ELCAL to the national standards maintained at Swiss Federal Office of Metrology. SCS 0002
- FX100 Audio Analyzer, Serial No. 10408  
 Last Calibration: 11.10.2022, Next Calibration: 11.10.2023  
 Manufacturer calibration based on Agilent 34410, Serial No. MY47014254,  
 Last Calibration: 26.05.2022, Next Calibration: 26.05.2023  
 which is calibrated by ELCAL to national standards maintained at Swiss Federal Office of Metrology. SCS 002

<sup>1</sup> The specified tolerance +/-0.1 dB @ 1V = +/- 1.1%

<sup>2</sup> The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.



# Certificate of Calibration

for

**Description:** *Sound Level Calibrator*  
**Manufacturer:** *RION*  
**Type No.:** *NC-75*  
**Serial No.:** *34724245*

**Submitted by:**

**Customer:** *Acuity Sustainability Consulting Limited*  
**Address:** *Unit E, 12/F, Ford Glory Plaza,  
Nos. 37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon,  
Hong Kong*

Upon receipt for calibration, the instrument was found to be:

- Within**
- Outside**

the allowable tolerance.

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

**Date of receipt:** 27 July 2023

**Date of calibration:** 3 August 2023

**Date of NEXT calibration:** 2 August 2024

**Calibrated by:** \_\_\_\_\_  
*Calibration Technician*

**Certified by:** \_\_\_\_\_  
*Mr. Ng Yan Wa  
Laboratory Manager*

**Date of issue:** 3 August 2023

Certificate No.: APJ23-049-CC003



**1. Calibration Precautions:**

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.

**2. Calibration Specifications:**

Calibration check

**3. Calibration Conditions:**

Air Temperature: 22.6°C  
Air Pressure: 1006 hPa  
Relative Humidity: 52.9 %

**4. Calibration Equipment:**

Test Equipment	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV220061	HOKLAS
Sound Level Meter	RION NA-28	30721812	AV220120	HOKLAS

**5. Calibration Results**

## 5.1 Sound Pressure Level

Nominal value dB	Accept lower level dB	Accept upper level dB	Measured value dB
94.0	93.6	94.4	94.0

Note:

The values given in this certification only related to the values measured at the time of the calibration.





AI

# Calibration Certificate

Certificate No. **300737**

Page 1 of 2 Pages

**Customer :** Acuity Sustainability Consulting Limited

**Address :** Unit E, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, H.K.

**Order No. :** Q30320

**Date of receipt :** 2-Feb-23

## Item Tested

**Description :** Hot Wire Anemometer

**Manufacturer :** RS PRO

**I.D. :** ASCL-EQ-111

**Model :** RS-90

**Serial No. :** 210722208

## Test Conditions

**Date of Test :** 13-Feb-23

**Supply Voltage :** --

**Ambient Temperature :**  $(23 \pm 3)^\circ\text{C}$

**Relative Humidity :**  $(50 \pm 25) \%$

## Test Specifications

Calibration check.

Ref. Document/Procedure : T03, Z04.

## Test Results

All results were within the manufacturer's specification.


The results are shown in the attached page(s).

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S155	Std. Anemometer	206240	NIM-PRC
S223C	Std. Thermometer	205617	NIM-PRC

The values given in this Calibration 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 environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. 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 International System of Units (SI), or by reference to a natural constant. The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
James Yau

**Approved by :**   
Steve Kwan

This Certificate is issued by:  
Hong Kong Calibration Ltd.

**Date:** 13-Feb-23

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.  
Tel: 2425 8801 Fax: 2425 8646



# Calibration Certificate

Certificate No. 300737

Page 2 of 2 Pages

Results :

## 1. Velocity

Applied Value (m/s)	UUT Reading (m/s)	Mfr's Spec.
0.00	0.00	± (3 % of reading + 0.3 m/s)
2.50	2.43	
5.00	5.04	
10.00	10.07	
15.00	15.65	
19.00	19.87	

## 2. Temperature

Applied Value (°C)	UUT Reading (°C)	Mfr's Spec.
23.12	23.0	± 2 °C

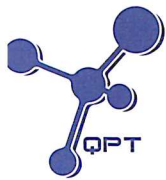
Remark : 1. UUT: Unit-Under-Test

2. Uncertainty : ± (0.9 % + 0.16 m/s) for Velocity, ± 0.1 °C for Temperature, for a confidence probability of not less than 95 %.

3. Atmospheric Pressure: 1 002 hPa

----- END -----

# Water Quality



專業化驗有限公司  
QUALITY PRO TEST-CONSULT LIMITED

Unit 10, 5/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

**Amendment Test Report No.** : R-BC090067  
**Amendment Test Report Date of Issue** : 20 September 2023  
**Superseded Test Report No.** : D-BC080079  
**Superseded Test Report Date of Issue** : 25 August 2023  
**Page No.** : 1 of 2

### PART A - CUSTOMER INFORMATION

Acuity Sustainability Consulting Limited  
Unit E, 12/F, Ford Glory Plaza 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong

### PART B - SAMPLE INFORMATION

Name of Equipment : HORIBA U-53  
Manufacturer : HORIBA  
Serial Number : PPHNOMXY  
Date of Received : 22 August 2023  
Date of Calibration : 22 August 2023  
Date of Next Calibration : 21 November 2023  
Request No. : D-BC080079

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

Test Parameter	Reference Method
pH value	APHA 21e 4500-H <sup>+</sup> B
Temperature	Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure
Salinity	APHA 21e 2520 B
Dissolved oxygen	APHA 23e 4500-O G (Membrane Electrode Method)
Turbidity	APHA 21e 2130 B (Nephelometric Method)

### PART D - CALIBRATION RESULT

#### (1) pH value

Target ( pH unit )	Display Reading ( pH unit )	Tolerance	Result
4.00	4.16	0.16	Satisfactory
7.42	7.56	0.14	Satisfactory
10.01	9.92	-0.09	Satisfactory

Tolerance of pH value should be less than  $\pm 0.2$  ( pH unit )

#### (2) Temperature

Reading of Ref. thermometer ( °C )	Display Reading ( °C )	Tolerance	Result
18	19.15	1.15	Satisfactory
28	27.79	-0.21	Satisfactory
37	36.58	-0.42	Satisfactory

Tolerance of Temperature should be less than  $\pm 2.0$  ( °C )

--- CONTINUED ON NEXT PAGE ---

AUTHORIZED  
SIGNATORY:

  
LEE Chun-ning  
Assistant Manager



## REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

**Amendment Test Report No.** : R-BC090067  
**Amendment Test Report Date of Issue** : 20 September 2023  
**Superseded Test Report No.** : D-BC080079  
**Superseded Test Report Date of Issue** : 25 August 2023  
**Page No.** : 2 of 2

### (3) Salinity

Expected Reading ( g/L )	Display Reading ( g/L )	Tolerance ( % )	Result
10	10.11	1.10	Satisfactory
20	21.27	6.35	Satisfactory
30	32.28	7.60	Satisfactory

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

### (4) Dissolved oxygen

Expected Reading ( mg/L )	Display Reading ( mg/L )	Tolerance	Result
7.50	7.88	0.38	Satisfactory
6.31	6.76	0.45	Satisfactory
1.11	1.29	0.18	Satisfactory
0.07	0.00	-0.07	Satisfactory

Tolerance of Dissolved oxygen should be less than  $\pm 0.5$  ( mg/L )

### (5) Turbidity

Expected Reading ( NTU )	Display Reading ( NTU )	Tolerance ( % )	Result
0	0.98	--	Satisfactory
10	10.7	7.00	Satisfactory
20	20.7	3.50	Satisfactory
100	107	7.00	Satisfactory
800	807	0.90	Satisfactory

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

### Remark(s)

- The "Date of Next Calibration" is recommended according to best practice principals as practiced by QPT or quoted from relevant international standards.
- The results relate only to the calibrated equipment as received
- The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
- "Displayed Reading" denotes the figure shown on item under calibration/ checking regardless of equipment precision or significant figures.
- 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.

--- END OF REPORT ---





# Calibration Certificate

Certificate No. **300745**

Page 1 of 2 Pages

**Customer :** Acuity Sustainability Consulting Limited

**Address :** Unit E, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, H.K.

**Order No. :** Q30320

**Date of receipt :** 2-Feb-23

## Item Tested

**Description :** Global Flow Probe

**Manufacturer :** Global Water

**Model :** FP111

**I.D. :** --

**Serial No. :** 22K100858

## Test Conditions

**Date of Test :** 27-Mar-23

**Ambient Temperature :** 20°C

**Supply Voltage :** --

**Relative Humidity :** 75%

## Test Specifications

Calibration check.

Ref. Document/Procedure : V12

## Test Results

All results were within the manufacturer's specification.

The results are shown in the attached page(s).

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S179	Std. Tape	301321	NIM-PRC
S136A	Stop Watch	201878	SCL-HKSAR

The values given in this Calibration 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 environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. 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 International System of Units (SI), or by reference to a natural constant. The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Kin Wong

**Approved by :**   
Alan Chu

**Date:** 27-Mar-23

This Certificate is issued by:  
Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.  
Tel: 2425 8801 Fax: 2425 8646



# Calibration Certificate

Certificate No. 300745

Page 2 of 2 Pages

Results :

Applied Value (m/s)	UUT Reading (m/s)	Mfr's Spec.
0.78	0.8	$\pm 0.1$ m/s

Remarks : 1. UUT : Unit-Under-Test

2. Uncertainty :  $\pm 1$  %, for a confidence probability of not less than 95%.

----- END -----

# Landfill Gas



# CERTIFICATION OF CALIBRATION



Date Of Calibration: 31-Aug-2023

Certificate Number: G505207\_1/33483

Issued by: QED Environmental Systems Ltd.

**Customer:** Onuee Electronics Ltd  
C3-E TCL Science Park No.1001 Zhong Shan Yuan Rd.  
Nanshan Shenzhen 518052 CHINA

**Description:** Gas Analyser

**Model:** GEM5000

**Serial Number:** G505207

## UKAS Accredited results:

Results after adjustment :

Methane (CH <sub>4</sub> )		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
5.0	5.0	0.072
15.0	15.1	0.13
60.0	59.7	0.42

Carbon Dioxide (CO <sub>2</sub> )		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
5.0	4.8	0.074
15.0	14.5	0.13
40.0	39.9	0.29

Oxygen (O <sub>2</sub> )		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
20.2	20.3	0.25

The inwards assessment was carried out 21-Aug-2023.  
The maximum adjustment is larger than the specification limit.  
Inwards assessment data is available if requested.

All concentrations are molar.

CH<sub>4</sub>, CO<sub>2</sub> readings recorded at : 33.2 °C ± 2.5 °C

O<sub>2</sub> readings recorded at : 24.4 °C ± 2.5 °C

Barometric Pressure : 0998 mbar ± 4 mbar

Method of Test : The analyser is calibrated in a temperature controlled chamber using a series of reference gases, in compliance with procedure LP004.

Instrument has passed calibration as the measurement result is within the specification limit. The specification limit takes into account the measurement uncertainty.

The results relate only to the item calibrated

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Calibration Instance:117 IGC Instance:117

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[www.qedenv.com](http://www.qedenv.com) +44 (0) 333 800 0088 [sales@qedenv.co.uk](mailto:sales@qedenv.co.uk)

QED Environmental Systems Ltd. Cyan Park - Unit 3, Jimmy Hill Way, Coventry, CV2 4QP, UNITED KINGDOM

Registered in England and Wales 1898734

# CERTIFICATION OF CALIBRATION



Date Of Calibration: 31-Aug-2023

Certificate Number: G505207\_1/33483

Issued by: QED Environmental Systems Ltd.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Calibrations marked 'Non-UKAS Accredited results' on this certificate have been included for completeness.

### Non-UKAS accredited results after adjustment:

Barometer (mbar)	
Reference	Instrument Reading
998	999

Additional Gas Cells		
Gas	Certified Gas (ppm)	Instrument Reading (ppm)
CO	501	507

Date of Issue : 07-Sep-2023

Approved by Signatory

Fani Zolota

Laboratory Inspection

End of Certificate

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Calibration Instance:117 IGC Instance:117

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