



SUB-CONTRACTING REPORT

CONTACT : MR MAGNUM FAN
CLIENT : ENVIROTECH SERVICES CO.
ADDRESS : RM 712, 7/F, MY LOFT 9 HOI WING ROAD,
TUEN MUN, N.T. HK

WORK ORDER : HK2419606

SUB-BATCH : 1
DATE RECEIVED : 20-MAY-2024
DATE OF ISSUE : 24-MAY-2024
NO. OF SAMPLES : 1
CLIENT ORDER : ---

PROJECT : ---

General Comments

- Sample Information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
- Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.
- Calibration was subcontracted to Envirotech Services Company.
- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung

Managing Director

This report supersedes any previous report(s) with the same work order number.

All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**

11/F Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax +852 2610 2021 www.alsglobal.com

WORK ORDER : HK2419606
SUB-BATCH : 1
CLIENT : ENVIROTECH SERVICES CO.
PROJECT :



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2419606-001	Sibata LD 3B (436560)	Equipments	11-May-2024	S/N: 436560

----- END OF REPORT -----



Envirotech Services Co.

Rm. 712, 7/F
My Loft,
9 Hoi Wing Road,
Tuen Mun, H.K.
Tel : 2660 8450
Fax : 2660 8553
E-mail: envirotech@navigator.com

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust Monitor
Manufacturer: Sibata LD-3B
Serial No.: 436560
Equipment Ref.: N/A
ALS Job Order: HK2418944

Standard Equipment

Standard Equipment: High Volume Sampler (TSP)
Location: Envirotech Room (Calibration Room)
Equipment Ref.: HVS 8162
Last Calibration Date: 25-Mar-2024

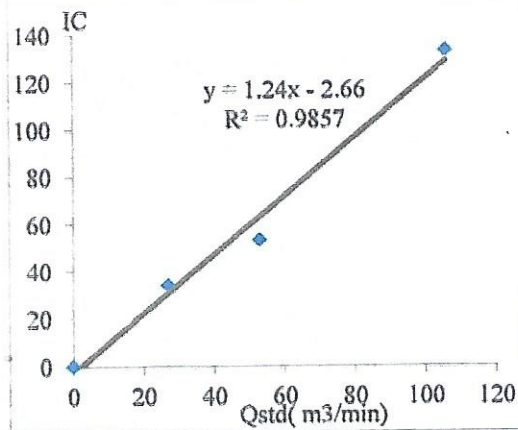
Equipment Verification Results:

Verification Date: 11-May-2024

Hour	Time	Mean Temp °C	Mean Pressure (hpa)	Concentration in $\mu\text{g}/\text{m}^3$ (Standard Equipment) (Y-Axis)	Concentration in $\mu\text{g}/\text{m}^3$ (Calibrated Equipment) (X-Axis)
1hr 00mins	0830-0930	26.8	1015	34	27
2hr 00mins	0935-1135	28.5	1015	53	53
3hr 00mins	1310-1610	29.5	1016	133	106

Linear Regression of Y or X

Slope (K-factor): $1.2400(\mu\text{g}/\text{m}^3)/\text{CPM}$
Correlation Coefficient (R): 0.9928
Date of Issue: 19-May-2024



Remarks:

1. Strong Correlation (>0.8)
2. Factor $1.2400(\mu\text{g}/\text{m}^3)/\text{CPM}$ should be applied for TSP monitoring

*If $R < 0.5$, repair or verification is required for the equipment

Operator: P.F.Yeung Signature Tai Date: 19 May 2024

QC Reviewer: K.F.Ho Signature Ho Date: 19 May 2024

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Rm. 712, My Loft, Tuen Mun

HVS ID: 8162

Name and Model : TISCH HVS Model TE-5170

Date of Calibration:

25-Mar-24

Next Calibration Date:

24-May-24

Operator:

P.F. Yeung

CONDITIONS

Sea Level Pressure (hpa)

1016

Corrected Pressure (mm Hg)

762.1

Temperature (°C)

24.5

Temperature (K)

297.5

CALIBRATION ORIFICE

Make:

TISCH

Qstd Slope

2.07544

Model:

TE-5025A

Qstd Intercept

-0.03205

Serial#:

2454

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.7	6.8	13.5	1.790	60	60.15	Slope= 30.471 Intercept= 5.514 Corr. Coeff.= 0.9994
13	5.5	5.6	11.1	1.625	55	55.13	
10	4.3	4.5	8.8	1.448	49	49.12	
7	2.5	2.7	5.2	1.117	40	40.10	
5	1.5	1.7	3.2	0.879	32	32.08	

Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

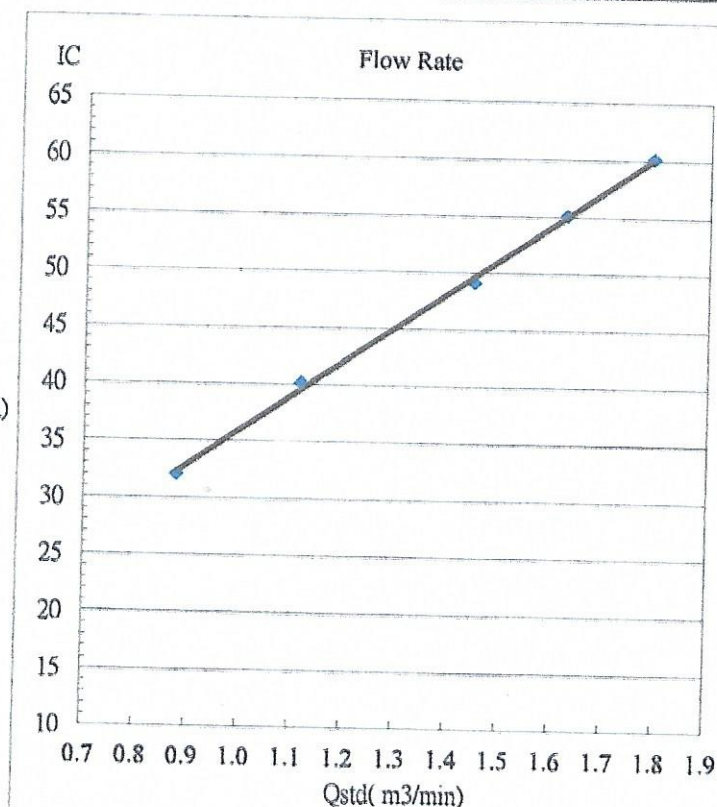
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





Certificate of Calibration

Calibration Certification Information

Cal. Date: December 15, 2023 Rootsmeter S/N: 438320 Ta: 295 °K
Operator: Jim Tisch Pa: 748.5 mm Hg
Calibration Model #: TE-5025A Calibrator S/N: **2454**

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4250	3.2	2.00
2	3	4	1	1.0090	6.4	4.00
3	5	6	1	0.9040	7.9	5.00
4	7	8	1	0.8610	8.8	5.50
5	9	10	1	0.7110	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)
0.9907	0.6952	1.4106	0.9957	0.6988	0.8878
0.9864	0.9776	1.9949	0.9914	0.9826	1.2556
0.9844	1.0890	2.2304	0.9894	1.0945	1.4037
0.9832	1.1420	2.3393	0.9882	1.1478	1.4723
0.9779	1.3754	2.8213	0.9829	1.3824	1.7756
QSTD	m=	2.07544	QA	m=	1.29961
	b=	-0.03205		b=	-0.02017
	r=	0.99999		r=	0.99999

Calculations

Vstd=	$\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	Va=	$\Delta Vol((Pa-\Delta P)/Pa)$
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



SUB-CONTRACTING REPORT

CONTACT : MR MAGNUM FAN
CLIENT : ENVIROTECH SERVICES CO.
ADDRESS : RM 712, 7/F, MY LOFT 9 HOI WING ROAD,
TUEN MUN, N.T. HK
PROJECT : ----

WORK ORDER : HK2423104
SUB-BATCH : 1
DATE RECEIVED : 8-JUN-2024
DATE OF ISSUE : 17-JUN-2024
NO. OF SAMPLES : 1
CLIENT ORDER : ----

General Comments

- Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
- Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified. The result(s) is/are related only to the item(s) tested.
- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition.
- Calibration was subcontracted to Envirotech Services Company.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories

Position

Richard Fung

Managing Director

This report supersedes any previous report(s) with the same work order number.

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WORK ORDER : HK2423104
SUB-BATCH : 1
CLIENT : ENVIROTECH SERVICES CO.
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2423104-001	Sibata LD-3B (476664)	Equipments	01-Jun-2024	S/N: 476664

***** END OF REPORT *****



Envirotech Services Co.

Rm. 712, 7/F
My Loft,
9 Hoi Wing Road,
Tuen Mun, H.K.
Tel : 2660 8450
Fax : 2660 8553
E-mail: envirotech@netvigator.com

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust Monitor
Manufacturer: Sibata LD-3B
Serial No.: 476664
Equipment Ref.: N/A
ALS Job Order: HK2421761

Standard Equipment

Standard Equipment: High Volume Sampler (TSP)
Location: Envirotech Room (Calibration Room)
Equipment Ref.: HVS 8162
Last Calibration Date: 1-Jun-2024

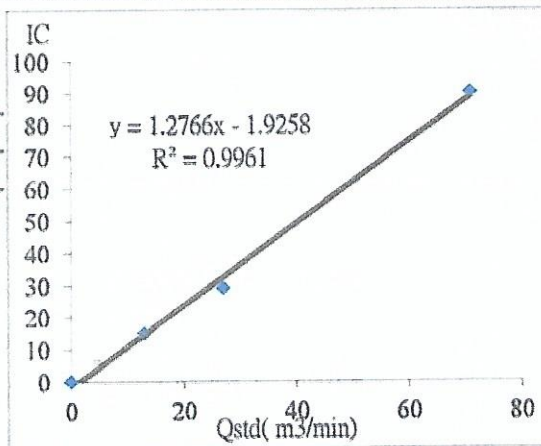
Equipment Verification Results:

Verification Date: 1-Jun-2024

Hour	Time	Mean Temp °C	Mean Pressure (hpa)	Concentration in $\mu\text{g}/\text{m}^3$ (Standard Equipment) (Y-Axis)	Concentration in $\mu\text{g}/\text{m}^3$ (Calibrated Equipment) (X-Axis)
1hr 00mins	0910-1010	27.2	1008	13	15
2hr 00mins	1015-1215	27.3	1008	27	30
3hr 00mins	1315-1615	27.4	1008	71	73

Linear Regression of Y or X

Slope (K-factor): $1.2766(\mu\text{g}/\text{m}^3)/\text{CPM}$
Correlation Coefficient (R): 0.9980
Date of Issue: 7-Jun-2024



Remarks:

1. Strong Correlation (>0.8)
2. Factor $1.2766(\mu\text{g}/\text{m}^3)/\text{CPM}$ should be applied for TSP monitoring

*If $R < 0.5$, repair or verification is required for the equipment

Operator: P.F.Yeung Signature Kai Date: 07 June 2024

QC Reviewer: K.F.Ho Signature at Date: 07 June 2024

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Rm. 712, My Loft, Tuen Mun	Date of Calibration: 1-Jun-24
HVS ID: 8162	Next Calibration Date: 31-Aug-24
Name and Model : TISCH HVS Model TE-5170	Operator: K.F.Ho

CONDITIONS

Sea Level Pressure (hpa) 1008.2	Corrected Pressure (mm Hg) 756.2
Temperature (°C) 27.2	Temperature (K) 300.2

CALIBRATION ORIFICE

Make: TISCH	Qstd Slope 2.07544
Model: TE-5025A	Qstd Intercept -0.03205
Serial#: 2454	

CALIBRATION

Plate No.	H2O(L) (in)	H2O(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.5	6.5	13.0	1.742	62	61.63	Slope= 48.07 Intercept= -22.843 Corr. Coeff.= 0.9974
13	5.4	5.4	10.8	1.590	54	53.68	
10	4.2	4.2	8.4	1.318	40	39.76	
7	2.7	2.7	5.4	1.128	30	29.82	
5	1.7	1.7	3.4	0.899	22	21.87	

Calculations:

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

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$$1/m(I[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

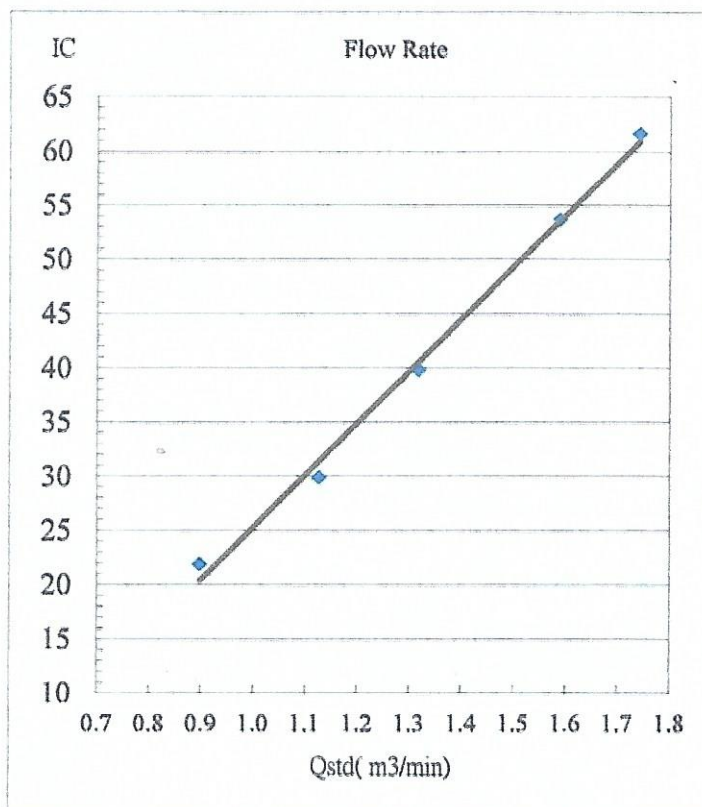
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





Certificate of Calibration

Calibration Certification Information

Cal. Date: December 15, 2023	Rootsmeter S/N: 438320	Ta: 295 °K
Operator: Jim Tisch		Pa: 748.5 mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 2454	

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4250	3.2	2.00
2	3	4	1	1.0090	6.4	4.00
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QSTD	m=	2.07544	QA	m=	1.29961
	b=	-0.03205		b=	-0.02017
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Calculations

Vstd= $\Delta Vol((Pa-\Delta P)/Pstd)(Tstd/Ta)$	Va= $\Delta Vol((Pa-\Delta P)/Pa)$
Qstd= $Vstd/\Delta Time$	Qa= $Va/\Delta Time$
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Qstd= $1/m \left(\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa= $1/m \left(\left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} \right) - b \right)$

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Tstd: 298.15 °K
Pstd: 760 mm Hg

Key

ΔH: calibrator manometer reading (in H2O)
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