High-Volume TSP Sampler
5-Point Calibration Record

Location : AM1(ICC)
Calibrated by : K.T.Ho
Date : 05/03/2025

Sampler
Model : TE-5170
Serial Number : S/N 0767

Calibration Orifice and Standard Calibration Relationship
Serial Number : 2454
Next Calibration Date : 02 December 2025
Slope (m) : 2.08315
Intercept (b) : -0.04938
Correlation Coefficient(r) : 0.99985

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

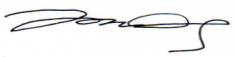
Calibration Condition
Pa (hpa) : 1013
Ta(K) : 295

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.2	3.364	1.639	58	58.30
2	13 holes	8.2	2.878	1.405	50	50.26
3	10 holes	6.2	2.503	1.225	42	42.22
4	7 holes	4.4	2.109	1.036	34	34.18
5	5 holes	2.6	1.621	0.802	22	22.11

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship

Slope(m):43.298 Intercept(b):-11.470 Correlation Coefficient(r): 0.9972

Checked by: 
Magnum Fan

Date: 08/03/2025

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	AM1(ICC)
Calibrated by	:	K.T.Ho
Date	:	04/05/2025

Sampler

Model	:	TE-5170
Serial Number	:	S/N 0767

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Next Calibration Date	:	02 December 2025
Slope (m)	:	2.08315
Intercept (b)	:	-0.04938
Correlation Coefficient(r)	:	0.99985

Standard Condition

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

Calibration Condition

Pa (hpa)	:	1010
Ta(K)	:	301

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	10.2	3.173	1.547	58	57.63
2	13 holes	7.5	2.721	1.330	50	49.68
3	10 holes	5.6	2.351	1.152	42	41.73
4	7 holes	3.8	1.937	0.954	34	33.78
5	5 holes	2.6	1.602	0.793	24	23.85

Notes:Z=SQRT{dH(Pa/Pstd)(Tstd/Ta)}, X=Z/m-b ,Y(Corrected Flow)=IC*{SQRT(Pa/Pstd)(Tstd/Ta)}

Sampler Calibration Relationship

Slope(m):44.098 Intercept(b):-9.6053 Correlation Coefficient(r): 0.9959

Checked by: Magnum Fan Date: 06/05/2025

TISCH Environmental

RECALIBRATION DUE DATE:
December 2, 2025

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	December 2, 2024	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 757.4	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	1.4200	3.2	2.00
2	3	4	1	1.0170	6.4	4.00
3	5	6	1	0.9090	7.9	5.00
4	7	8	1	0.8700	8.8	5.50
5	9	10	1	0.7140	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)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0093	0.7108	1.4238	0.9958	0.7013	0.8796
1.0051	0.9883	2.0136	0.9916	0.9750	1.2439
1.0031	1.1035	2.2512	0.9896	1.0886	1.3907
1.0018	1.1515	2.3611	0.9884	1.1361	1.4586
0.9965	1.3956	2.8476	0.9831	1.3769	1.7592
QSTD	**m=**	**2.08315**	**QA**	**m=**	**1.30443**
	b=	**-0.04938**		**b=**	**-0.03050**
	r=	**0.99985**		**r=**	**0.99985**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/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= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

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

Tisch Environmental, Inc.
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Village of Cleves, OH 45002

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TOLL FREE: (877)263-7610
FAX: (513)467-9009

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR MAGNUM FAN	WORK ORDER	: **HK2502565**
CLIENT	: **ENVIROTECH SERVICES CO.**		
ADDRESS	: RM 712, 7/F, MY LOFT 9 HOI WING ROAD, TUEN MUN, N.T. HK	SUB-BATCH	: 1
		DATE RECEIVED	: 15-JAN-2025
		DATE OF ISSUE	: 21-JAN-2025
PROJECT	: ----	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.

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 : HK2502565
SUB-BATCH : 1
CLIENT : ENVIROTECH SERVICES CO.
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2502565-001	Sibata LD-5R (831656)	Equipments	02-Jan-2025	S/N: 831656

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

Envirotech Services Co.
Rm. 712, 7/F
My Loft,
9 Hoi Wing Road,
Tuen Mun, H.K.
Tel : 2560 8450
Fax : 2560 6553
E-mail: envirotech@netvigator.com

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust Monitor
Manufacturer:	Sibata LD-5R
Serial No.:	831656
Equipment Ref.:	N/A
ALS Job Order:	HK2500343

Standard Equipment

Standard Equipment:	High Volume Sampler (TSP)
Location :	Envirotech Room (Calibration Room)
Equipment Ref.:	HVS 8162
Last Calibration Date:	1-Jan-2025

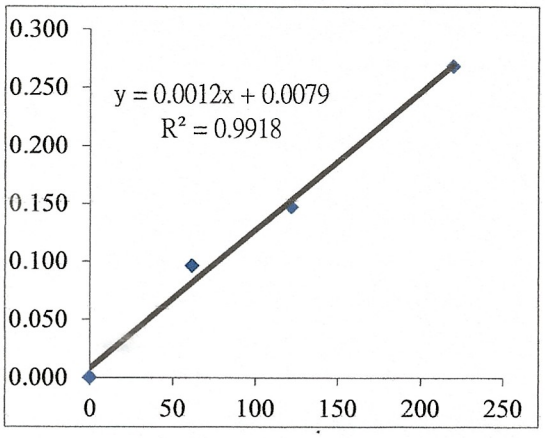
Equipment Verification Results:

Verification Date: 2-Jan-2025

Hour	Time	Mean Temp °C	Mean Pressure (hpa)	TSP Level in mg (Standard Equipment) (Y-Axis)	Total Count (Calibrated Equipment) (X-Axis)
1hr 00mins	0900-1000	16.1	1023	0.096	62
2hr 00mins	1005-1205	20.5	1022	0.147	122
3hr 00mins	1330-1630	21.0	1022	0.268	220

Linear Regression of Y or X

Slope (K-factor):	0.0012(mg)/Count
Correlation Coefficient (R):	0.9959
Date of Issue:	15-Jan-2025



Remarks:

1 . Strong Correlation (>0.8)

2. Factor 0.0012(mg)/Count should be applied for TSP monitoring

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

Operator: P.F.Yeung Signature Date: 15 Jan 2025

QC Reviewer: K.F.Ho Signature Date: 15 Jan 2025

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location :	Rm. 712, My Loft, Tuen Mun	Date of Calibration:	1-Jan-25
HVS ID:	8162	Next Calibration Date:	31-Mar-25
Name and Model :	TISCH HVS Model TE-5170	Operator:	K.F.Ho

CONDITIONS

Sea Level Pressure (hpa)	1023	Corrected Pressure (mm Hg)	767.3
Temperature (°C)	15.8	Temperature (K)	288.8

CALIBRATION ORIFICE

Make:	TISCH	Qstd Slope	2.08315
Model:	TE-5025A	Qstd Intercept	-0.04938
Serial#:	2454		

CALIBRATION

Plate No.	H2O(L) (in)	H20(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.4	6.4	12.8	1.777	62	63.30	Slope= 35.208
13	5.3	5.3	10.6	1.619	56	57.17	Intercept= -0.0015
10	4.2	4.2	8.4	1.444	48	49.00	Corr. Coeff.= 0.9959
7	2.7	2.7	5.4	1.163	41	41.86	
5	1.7	1.7	3.4	0.927	32	32.67	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

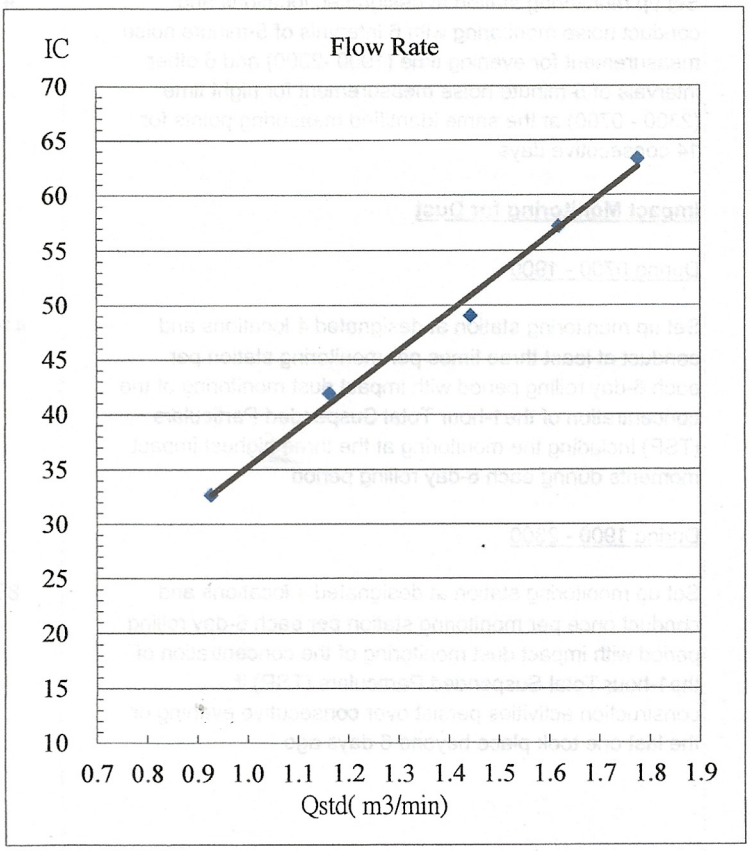
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
December 2, 2025

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	December 2, 2024	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 757.4	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	1.4200	3.2	2.00
2	3	4	1	1.0170	6.4	4.00
3	5	6	1	0.9090	7.9	5.00
4	7	8	1	0.8700	8.8	5.50
5	9	10	1	0.7140	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)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
1.0093	0.7108	1.4238	0.9958	0.7013	0.8796
1.0051	0.9883	2.0136	0.9916	0.9750	1.2439
1.0031	1.1035	2.2512	0.9896	1.0886	1.3907
1.0018	1.1515	2.3611	0.9884	1.1361	1.4586
0.9965	1.3956	2.8476	0.9831	1.3769	1.7592
QSTD	**m=**	**2.08315**	**QA**	**m=**	**1.30443**
	b=	**-0.04938**		**b=**	**-0.03050**
	r=	**0.99985**		**r=**	**0.99985**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/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= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

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

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FAX: (513)467-9009

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR MAGNUM FAN	WORK ORDER	: HK2500019
CLIENT	: ENVIROTECH SERVICES CO.		
ADDRESS	: RM 712, 7/F, MY LOFT 9 HOI WING ROAD, TUEN MUN, N.T. HK	SUB-BATCH	: 1
		DATE RECEIVED	: 16-DEC-2024
		DATE OF ISSUE	: 8-JAN-2025
PROJECT	: ----	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.

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

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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 : HK2500019
SUB-BATCH : 1
CLIENT : ENVIROTECH SERVICES CO.
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2500019-001	Sibata LD-3B (235780)	Equipments	07-Dec-2024	S/N: 235780

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

Envirotech Services Co.
Rm. 712, 7/F
My Loft,
9 Hoi Wing Road,
Tuen Mun, H.K.
Tel : 2560 8450
Fax : 2560 6553
E-mail: envirotech@netvigator.com

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust Monitor
Manufacturer:	Sibata LD-3B
Serial No.:	235780
Equipment Ref.:	N/A
ALS Job Order:	HK2451037

Standard Equipment

Standard Equipment:	High Volume Sampler (TSP)
Location :	Envirotech Room (Calibration Room)
Equipment Ref.:	HVS 8162
Last Calibration Date:	19-Oct-2024

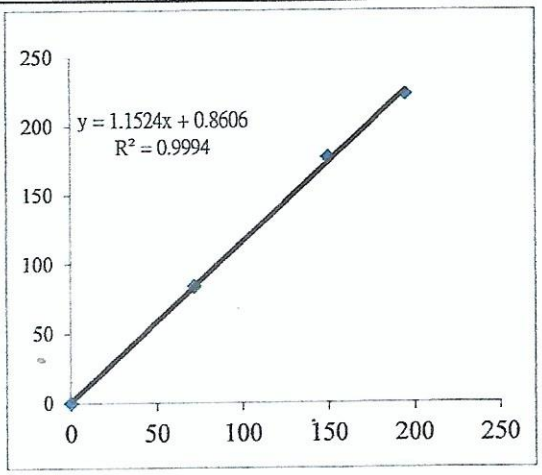
Equipment Verification Results:

Verification Date: 7-Dec-2024

Hour	Time	Mean Temp °C	Mean Pressure (hpa)	Concentration in µg/m³ (Standard Equipment) (Y-Axis)	Concentration in µg/m³ (Calibrated Equipment) (X-Axis)
1hr 00mins	0910-1010	19.5	1022	84	72
2hr 00mins	1300-1500	21.2	1019	177	150
3hr 00mins	1505-1805	21.5	1018	223	195

Linear Regression of Y or X

Slope (K-factor):	1.1524(µg/m³)/CPM
Correlation Coefficient (R):	0.9997
Date of Issue:	14-Dec-2024



Remarks:

1 . Strong Correlation (>0.8)

2. Factor 1.1524(µg/m³)/CPM should be applied for TSP monitoring

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

Operator: P.F.Yeung Signature Date: 14 Dec 2024

QC Reviewer: K.F.Ho Signature Date: 14 Dec 2024

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location :	Rm. 712, My Loft, Tuen Mun	Date of Calibration:	19-Oct-24
HVS ID:	8162	Next Calibration Date:	19-Dec-24
Name and Model :	TISCH HVS Model TE-5170	Operator:	K.F.Ho

CONDITIONS

Sea Level Pressure (hpa)	1015	Corrected Pressure (mm Hg)	761.3
Temperature (°C)	26.0	Temperature (K)	299

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O(L) (in)	H20(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.1	6.4	12.5	1.718	62	61.97	Slope= 45.67
13	4.9	5.2	10.1	1.546	56	55.97	Intercept= -15.103
10	3.6	3.8	7.4	1.325	48	47.97	Corr. Coeff.= 0.9947
7	2.4	2.7	5.1	1.103	34	33.98	
5	1.4	1.7	3.1	0.863	24	23.99	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

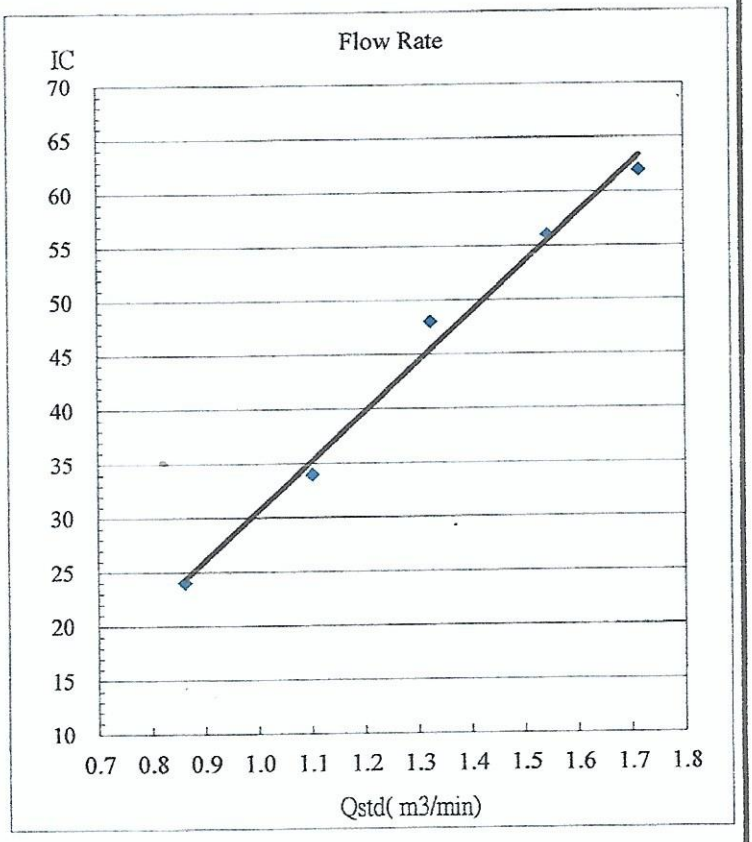
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
December 15, 2024

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)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (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=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/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= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

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

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ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR MAGNUM FAN	WORK ORDER	: HK2448121
CLIENT	: ENVIROTECH SERVICES CO.		
ADDRESS	: RM 712, 7/F, MY LOFT 9 HOI WING ROAD, TUEN MUN, N.T. HK	SUB-BATCH	: 1
		DATE RECEIVED	: 13-NOV-2024
		DATE OF ISSUE	: 20-NOV-2024
PROJECT	: ----	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.

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 : HK2448121
SUB-BATCH : 1
CLIENT : ENVIROTECH SERVICES CO.
PROJECT : ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2448121-001	Sibata LD-3B (245834)	Equipments	09-Nov-2024	S/N: 245834

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

Envirotech Services Co.
Rm. 712, 7/F
My Loft,
9 Hoi Wing Road,
Tuen Mun, H.K.
Tel : 2560 8450
Fax : 2560 8553
E-mail: envirotech@netvigator.com

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust Monitor
Manufacturer:	Sibata LD-3B
Serial No.:	245834
Equipment Ref.:	N/A
ALS Job Order:	HK2446853

Standard Equipment

Standard Equipment:	High Volume Sampler (TSP)
Location :	Envirotech Room (Calibration Room)
Equipment Ref.:	HVS 8162
Last Calibration Date:	19-Oct-2024

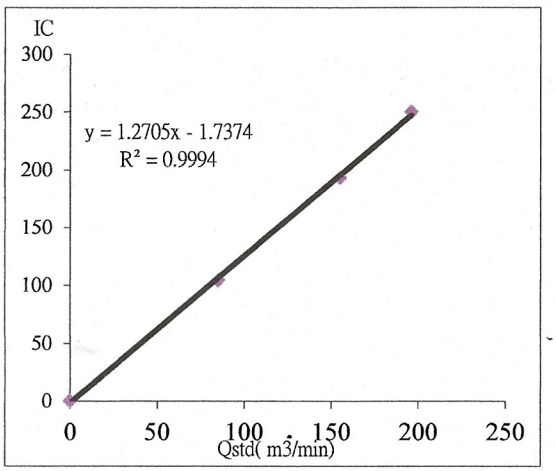
Equipment Verification Results:

Verification Date: 9-Nov-2024

Hour	Time	Mean Temp °C	Mean Pressure (hpa)	Concentration in µg/m³ (Standard Equipment) (Y-Axis)	Concentration in µg/m³ (Calibrated Equipment) (X-Axis)
1hr 00mins	0905-1005	24.9	1013	85	104
2hr 00mins	1015-1215	25.2	1014	155	193
3hr 00mins	1430-1730	25.6	1014	196	250

Linear Regression of Y or X

Slope (K-factor):	1.2705(µg/m³)/CPM
Correlation Coefficient (R):	0.9997
Date of Issue:	13-Nov-2024



Remarks:

1 . Strong Correlation (>0.8)

2. Factor 1.2705(µg/m³)/CPM should be applied for TSP monitoring

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

Operator: P.F.Yeung Signature Date: 11 Nov 2024

QC Reviewer: K.F.Ho Signature Date: 11 Nov 2024

TSP SAMPLER CALIBRATION CACULATION SPREADSHEET

Location :	Rm. 712, My Loft, Tuen Mun	Date of Calibration:	19-Oct-24
HVS ID:	8162	Next Calibration Date:	19-Dec-24
Name and Model :	TISCH HVS Model TE-5170	Operator:	K.F.Ho

CONDITIONS

Sea Level Pressure (hpa)	1015	Corrected Pressure (mm Hg)	761.3
Temperature (°C)	26.0	Temperature (K)	299

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O(L) (in)	H20(R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	6.1	6.4	12.5	1.718	62	61.97	Slope= 45.67
13	4.9	5.2	10.1	1.546	56	55.97	Intercept= -15.103
10	3.6	3.8	7.4	1.325	48	47.97	Corr. Coeff.= 0.9947
7	2.4	2.7	5.1	1.103	34	33.98	
5	1.4	1.7	3.1	0.863	24	23.99	

Calulations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[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)[Sqrt(298/Tav)(Pav/760)]-b)

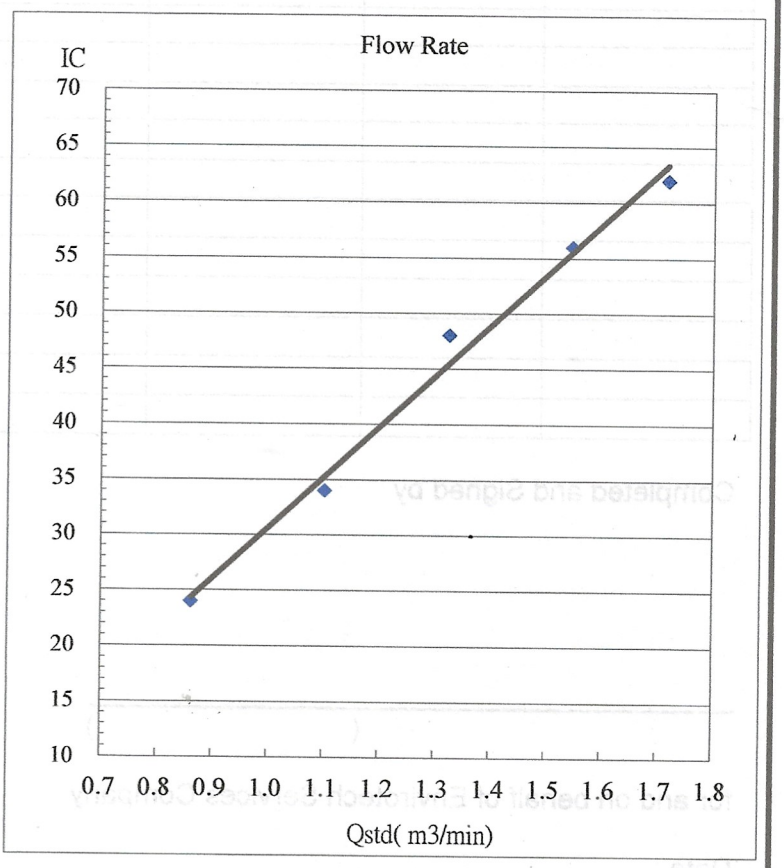
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
December 15, 2024

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)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (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=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/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= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

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

sch Environmental, Inc.
45 South Miami Avenue
llage of Cleves, OH 45002

www.tisch-env.com
TOLL FREE: (877)263-7610
FAX: (513)467-9009

Certificate of Calibration

for

Description:	***Sound Level Calibrator***
Manufacturer:	***Larson Davis***
Type No.:	***CAL200***
Serial No.:	***16172***

Submitted by:

Customer:	*Envirotech Services Co.*
Address:	*Rm.712, 7/F., My Loft, 9 Hoi Wing Road,*
	Tuen Mun, 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: 6 February 2025

Date of calibration: 7 February 2025

Date of NEXT calibration: 6 February 2026

Calibrated by: _____
Calibration Technician

Certified by: _____
Mr. Ng Yan Wa
Laboratory Manager

Date of issue: 7 February 2025

Room 422,Leader Industrial Centre,57-59 Au Pui Wan Street ,Fo Tan, Shatin,N.T.,Hong Kong
Tel: (852) 2668 3423 Fax:(852) 2668 6946
Homepage: http://www.aa-lab.com E-mail : inquiry@aa-lab.com

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:	24.3 °C
Air Pressure:	1006 hPa
Relative Humidity:	59.2 %

4. *Calibration Equipment:*

Test Equipment	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV240081	HOKLAS
Sound Level Meter	RION NA-28	30721812	AV240109	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	93.7
114.0	113.6	114.4	113.7

6. *Calibration Results Applied*

The results apply to the particular unit-under-test only. All calibration points are within manufacture's specification as IEC 60942 Class 1.

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

ACOUSTICS AND AIR TESTING LABORATORY CO. LTD. (A+A)*L

Room 422,Leader Industrial Centre,57-59 Au Pui Wan Street ,Fo Tan, Shatin,N.T.,Hong Kong
Tel: (852) 2668 3423 Fax:(852) 2668 6946
Homepage: http://www.aa-lab.com E-mail : inquiry@aa-lab.com

Certificate of Calibration

for

Description:	***Sound Level Meter***
Manufacturer:	***RION***
Type No.:	***NL-52 (Serial No.: 00643040)***
Microphone:	***PCB 377B02 (Serial No.: 172764)***
Preamplifier:	***NH-25 (Serial No.:21757)***

Submitted by:

Customer:	*Envirotech Services Co.*
Address:	*Rm.712, 7/F., My Loft, 9 Hoi Wing Road, Tuen Mun, Hong Kong*

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

☑ **Within (31.5Hz – 8kHz)**
☐ **Outside**

the allowable tolerance.

The test equipment used for calibration are traceable to National Standards via:
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

Date of receipt: 25 September 2024

Date of calibration: 27 September 2024

Date of NEXT calibration: 26 September 2025

Calibrated by: _____
Calibration Technician

Certified by: _____
Mr. Ng Yan Wa
Laboratory Manager

Date of issue: 27 September 2024

ACOUSTICS AND AIR TESTING LABORATORY CO. LTD. (A+A)*L

Certificate No.: APJ24-072-CC001

Room 422,Leader Industrial Centre,57-59 Au Pui Wan Street ,Fo Tan, Shatin,N.T.,Hong Kong
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Homepage: http://www.aa-lab.com E-mail : inquiry@aa-lab.com

1. *Calibration Precaution:*

- 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 Conditions:*

Air Temperature: 24.9 °C
Air Pressure: 1006 hPa
Relative Humidity: 54.5 %

3. *Calibration Equipment:*

	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV240081	HOKLAS

4. *Calibration Results*

Sound Pressure Level

Reference Sound Pressure Level

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	±0.4

Linearity

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	Ref
			104		104.0	±0.3
			114		114.0	±0.3

Time Weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	Ref
		Slow			94.0	±0.3

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Frequency Response

Linear Response

Setting of Unit-under-test (UUT)			Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dB SPL	Fast	94	31.5	93.8	±2.0
				63	93.9	±1.5
				125	93.9	±1.5
				250	93.9	±1.4
				500	93.9	±1.4
				1000	94.0	Ref
				2000	94.0	±1.6
				4000	94.5	±1.6
				8000	91.8	+2.1; -3.1

A-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dBA SPL	Fast	94	31.5	54.4	-39.4 ±2.0
				63	67.8	-26.2 ±1.5
				125	77.8	-16.1 ±1.5
				250	85.3	-8.6 ±1.4
				500	90.7	-3.2 ±1.4
				1000	94.0	Ref
				2000	95.2	+1.2 ±1.6
				4000	95.5	+1.0 ±1.6
				8000	90.8	-1.1+2.1; -3.1

C-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dBC SPL	Fast	94	31.5	90.8	-3.0 ±2.0
				63	93.1	-0.8 ±1.5
				125	93.7	-0.2 ±1.5
				250	93.9	-0.0 ±1.4
				500	93.9	-0.0 ±1.4
				1000	94.0	Ref
				2000	93.8	-0.2 ±1.6
				4000	93.7	-0.8 ±1.6
				8000	89.0	–3.0 +2.1: –3.1

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5. *Calibration Results Applied*

The results apply to the particular unit-under-test only. All calibration points are within manufacture's specification as IEC 61672 Class 1.

Uncertainties of Applied Value:

94 dB	31.5 Hz	± 0.15
	63 Hz	± 0.10
	125 Hz	± 0.10
	250 Hz	± 0.05
	500 Hz	± 0.10
	1000 Hz	± 0.05
	2000 Hz	± 0.05
	4000 Hz	± 0.05
	8000 Hz	± 0.10
104 dB	1000 Hz	± 0.05
114 dB	1000 Hz	± 0.05

The uncertainties are evaluated for a 95% confidence level.

Note:
The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allow 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 calibration. (A+A)*L shall not be liable for any loss or damage resulting from the use of the equipment.

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