



Calibration Certificate

Certificate No. 311868

Page 1 of 3 Pages

Customer : Enovative Environmental Service Limited

Address : Room 23, 6/F, Block C, Goldfield Industrial Centre, 1 Siu Wo Road, Shatin, N.T.

Order No. : Q34412

Date of receipt : 14-Dec-23

Item Tested

Description : Sound Level Meter

Manufacturer : RION

Model : NL-52

I.D. : --

Serial No. : 01143484

Test Conditions

Date of Test : 9-Jan-24

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

Supply Voltage : --

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

Test Specifications

Calibration check.

The UUT has an indication that it conforms to IEC 61672-1:2002 Class 1

Ref. Document/Procedure: Z01, IEC 61672-1:2013.

Test Results

All results were within the IEC 61672 Class 1, manufacturer's specification or Tolerance.

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>
S240	Sound Level Calibrator	303941	NIM-PRC & SCL-HKSAR
S017	Multi-Function Generator	C211339	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 :

Elva Chong

Approved by :

Kin Wong

Date: 9-Jan-24

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

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Results :

Acoustical signal test

1. Indication at the Calibration Check Frequency (1kHz)

UUT Setting		Applied Value (dB)	UUT Reading (dB)
Weight.	Response		After Adjust.*
A	F	94.0	94.0
	S		94.0
C	F		94.0
Z			94.0

*Adjustment using the customer's sound calibrator was performed immediately before test.

Tolerance : ± 1.0 dB

Uncertainty : ± 0.1 dB

2. Self-generated noise (Microphone Installed, most sensitive range) : 16.5 dBA (Mfr's Spec. ≤ 17 dBA)

Electrical signal tests

3. Frequency weightings (A ,F)

Frequency	Attenuation (dB)	IEC 61672-1 Class 1 Spec.
31.5 Hz	-39.7	- 39.4 dB, ± 1.5 dB
63 Hz	-26.2	- 26.2 dB, ± 1.0 dB
125 Hz	-16.1	- 16.1 dB, ± 1.0 dB
250 Hz	-8.6	- 8.6 dB, ± 1.0 dB
500 Hz	-3.2	- 3.2 dB, ± 1.0 dB
1 kHz	0.0 (Ref)	0 dB, ± 0.7 dB
2 kHz	+1.0	+ 1.2 dB, ± 1.0 dB
4 kHz	+0.7	+ 1.0 dB, ± 1.0 dB
8 kHz	-1.2	- 1.1 dB, + 1.5 dB ~ -2.5 dB
16 kHz	-8.6	- 6.6 dB, + 2.5 dB ~ - 16.0 dB

Uncertainty : ± 0.1 dB



Calibration Certificate

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4. Frequency & Time weightings

4.1 Frequency Weighting (1kHz)

UUT Setting		Anticipated Value (dB)	UUT Reading (dB)	IEC 61672-1 Class 1 Spec.
Time Weight.	Freq. Weight.			
F	A	94.0	94.0 (Ref.)	--
	C		94.0	± 0.2 dB
	Z		94.0	

Uncertainty : ± 0.1 dB

4.2 Time Weighting (1kHz)

UUT Setting		Anticipated Value (dB)	UUT Reading (dB)	IEC 61672-1 Class 1 Spec.
Time Weight.	Freq. Weight.			
F	A	94.0	94.0 (Ref.)	--
S			94.0	± 0.1 dB
eq			94.0	

Uncertainty : ± 0.1 dB

5. Level Linearity on the Reference Level Range (8 kHz, A, F)

Anticipated Value (dB)	UUT Reading (dB)	IEC 61672-1 Class 1 Spec.
124.0	123.9	± 0.8 dB
114.0	113.9	
104.0	104.0	
94.0	94.0 (Ref.)	
84.0	84.0	
74.0	74.0	
64.0	64.0	
54.0	54.0	
44.0	44.1	

Uncertainty : ± 0.1 dB

6. Level Linearity including the level range control (1 kHz, A, F)

N.A. (UUT is single range)

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure: 1 008 hPa.

4. Microphone model: UC-59, S/N: 07032.

5. Preamplifier model: NH-25, S/N: 43399.

----- END -----



Calibration Certificate

Certificate No. 311870

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Customer : Enovative Environmental Service Limited

Address : Room 23, 6/F, Block C, Goldfield Industrial Centre, 1 Siu Wo Road, Shatin, N.T.

Order No. : Q34412

Date of receipt : 14-Dec-23

Item Tested

Description : Sound Calibrator

Manufacturer : RION

Model : NC-74

I.D. : --

Serial No. : 34678506

Test Conditions

Date of Test : 9-Jan-24

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

Supply Voltage : --

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

Test Specifications

Calibration check.

The UUT has an indication that it conforms to IEC 60942:2003 Class 1.

Ref. Document/Procedure : F21, Z02, IEC 60942:2003.

Test Results

All results were within the IEC 60942 Class 1 specification.

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

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S014	Spectrum Analyzer	303639	NIM-PRC & SCL-HKSAR
S240	Sound Level Calibrator	303941	NIM-PRC & SCL-HKSAR
S041	Universal Counter	300591	SCL-HKSAR
S206	Sound Level Meter	303634	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 :

Elva Chong

Approved by :

Kin Wong

Date: 9-Jan-24

This Certificate is issued by:

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

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Results :

1. Generated Sound Pressure Level

UUT Nominal Value (dB)	Measured Value (dB)	IEC 60942 Class 1 Spec.
94.0	93.9	± 0.4 dB

Uncertainty : ± 0.2 dB

2. Short-term Level Fluctuation : 0.0 dB

IEC 60942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.05 dB

3. Frequency

UUT Nominal Value (kHz)	Measured Value (kHz)	IEC 60942 Class 1 Spec.
1	1.001	± 1 %

Uncertainty : $\pm 3.6 \times 10^{-6}$

4. Total Distortion + Noise : < 1.2 %

IEC 60942 Class 1 Spec. : < 3.0 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 1 008 hPa.

----- END -----

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : AMS5(Ma Wan Chung Village)
Calibrated by : P.F.Yeung
Date : 15/03/2024

Sampler

Model : TE-5170
Serial Number : S/N3640

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
Next Calibration Date : 15 December 2024
Slope (m) : 2.07544
Intercept (b) : -0.03205
Correlation Coefficient(r) : 0.99999

Standard Condition

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

Calibration Condition

Pa (hpa) : 1015
Ta(K) : 297

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	11.6	3.422	1.664	54	54.26
2	13 holes	9.2	3.048	1.484	48	48.23
3	10 holes	6.8	2.620	1.278	42	42.20
4	7 holes	4.5	2.131	1.042	35	35.17
5	5 holes	3.0	1.740	0.854	25	25.12

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

Sampler Calibration Relationship

Slope(m): 35.548 Intercept(b): -2.690 Correlation Coefficient(r): 0.9930

Checked by: Magnum Fan

Date: 15/03/2023

ENVIROTECH SERVICES CO.

High-Volume TSP Sampler
5-Point Calibration Record

Location : AMS5(Ma Wan Chung Village)
Calibrated by : P.F.Yeung
Date : 23/05/2024

Sampler

Model : TE-5170
Serial Number : S/N3640

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
Next Calibration Date : 15 December 2024
Slope (m) : 2.07544
Intercept (b) : -0.03205
Correlation Coefficient(r) : 0.99999

Standard Condition

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

Calibration Condition

Pa (hpa) : 1019
Ta(K) : 300

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	12.2	3.475	1.690	55	54.72
2	13 holes	9.0	2.984	1.453	50	49.74
3	10 holes	7.0	2.632	1.284	45	44.77
4	7 holes	4.6	2.134	1.043	37	36.81
5	5 holes	2.8	1.665	0.818	30	29.84

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

Sampler Calibration Relationship

Slope(m): 29.111 Intercept(b): 6.567 Correlation Coefficient(r): 0.9964

Checked by: Magnum Fan

Date: 24/05/2024



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)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (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

EQUIPMENT CALIBRATION RECORD

Type :	Laser Dust Monitor
Manufacturer / Brand :	SIBATA
Model No.:	LD-5R
Equipment No.:	LD-5R-002
Serial No.:	861988
Sensitivity Adjustment Scale Setting :	621 CPM

Standard Equipment

Equipment :	MFC High Volume Air Sampler
Venue :	Tung Chung Pier
Model No.:	TE-5170 Total Suspended Particulate
Serial No.:	S/N3641
Previous Calibration Date:	24-Apr-2023

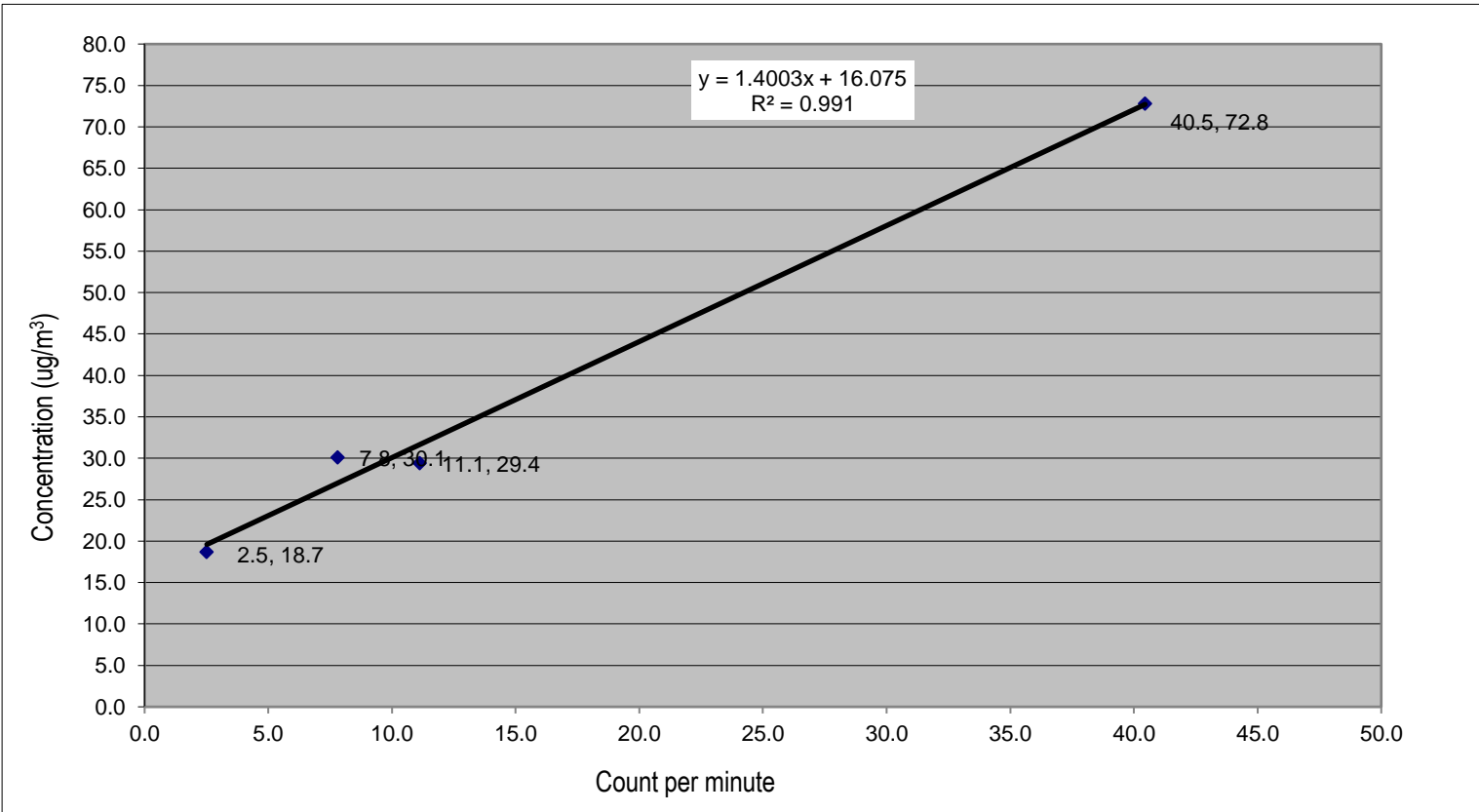
Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration) :	621 CPM
Sensitivity Adjustment Scale Setting (After Calibration) :	621 CPM

Date (dd-mmm-yy)	Time		Ambient Condition		Concentration (ug/m ³) Y-axis	Total Count	Count/Minute X-axis
			Temp (°C)	R.H. (%)			
10-May-23	9:25	11:25	31.4	68%	72.8	2427	40.5
16-May-23	9:00	11:00	25.2	87%	29.4	668	11.1
16-May-23	14:30	15:30	25.2	87%	30.1	469	7.8
16-May-23	15:35	16:35	25.2	87%	18.7	151	2.5

Be Linear Regression of Y or X
Slope (K-factor): 1.4003 Intercept,b: 16.0750
Correlation coefficient (R): 0.99550

Remark: Srong Correlation (R>0.8)



Recorded by: Irene Tsang

Signature: 

Date: 01-Jun-23

Checked by: Ruby Law

Signature: 

Date: 01-Jun-23



Enovative Environmental Service Limited

REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler and the filter paper is weighted by HOKLAS laboratory.

Instrument: Handheld TSP meter
Brand Name: TSI
Model No.: AM520
Serial No.: 5201735004
Date of Calibration: 20 October, 2023
Date of Next Calibration : 20 October, 2024

ISSUING ORGANISATION

Address

Enovative Environmental Service Limited
Flat 23, 6/F, Block C, Goldfield Industrial Centre
1 Sui Wo Road
Shatin, N.T.
Hong Kong

Phone: 852-2242 1020
Fax: 852-3691 9240
Email: info@eno.com.hk



Mr Wong Siu Ho, Thomas
Manager



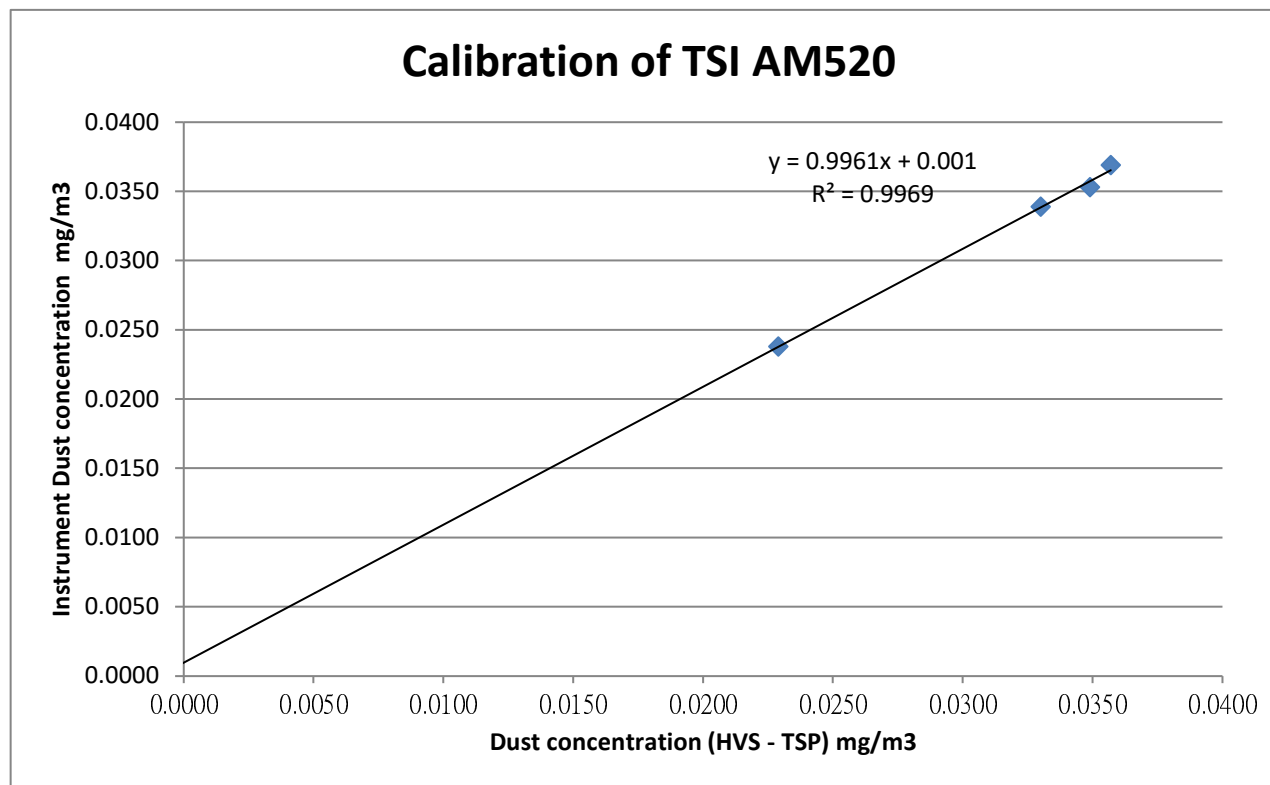
Enovative Environmental Service Limited

Brand Name: TSI
Model No.: AM520
Serial No.: 5201735004
HVS No.: A12-TSP-102
Date of Calibration: 20 October, 2023
Date of next Calibration: 20 October, 2024

Calibration Record

HVS - TSP (mg/m3)	0.0229	0.0330	0.0357	0.0349
TSI AM520 (mg/m3)	0.0238	0.0339	0.0369	0.0353

K Factor :	0.9961
Correlation Coefficient :	0.9969



*** Filter paper being used in the calibration : 209591, 209592, 209593, 209594
Those filter papers are weighted by HOKLAS laboratory (ALS Technichem (HK) Pty Ltd.)



Thomas

Mr Wong Siu Ho, Thomas
Manager



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: WS CHAN
CLIENT: AECOM ASIA COMPANY LIMITED
ADDRESS: 1501-10, 15/F, TOWER 1,
GRAND CENTRAL PLAZA,
138 SHATIN RURAL COMMITTEE ROAD,
SHATIN, NEW TERRITORIES, HONG KONG

WORK ORDER: HK2408657
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 05-Mar-2024
DATE OF ISSUE: 11-Mar-2024

GENERAL COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

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

EQUIPMENT INFORMATION

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client.

Equipment Type: Multifunctional Meter

Service Nature: Performance Check

Scope: Conductivity, Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature

Brand Name/ Model No.: [YSI]/ [ProDSS]

Serial No./ Equipment No.: [22J104777/22H104506]/ [W.026.37]

Date of Calibration: 05-March-2024

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2408657
SUB-BATCH: 0
DATE OF ISSUE: 11-Mar-2024
CLIENT: AECOM ASIA COMPANY LIMITED

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [ProDSS]
Serial No./ Equipment No.: [22J104777/22H104506]/ [W.026.37]
Date of Calibration: 05-March-2024 Date of Next Calibration: 05-June-2024

PARAMETERS:

Conductivity

Method Ref: APHA (23rd edition), 2510B

Expected Reading (µS/cm)	Displayed Reading (µS/cm)	Tolerance (%)
146.9	158.6	+8.0
6667	6616	-0.8
12890	12929	+0.3
58670	57137	-2.6
	Tolerance Limit (%)	±10.0

Dissolved Oxygen

Method Ref: APHA (23rd edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.12	2.22	+0.10
4.25	4.34	+0.09
6.33	6.46	+0.13
	Tolerance Limit (mg/L)	±0.20

pH Value

Method Ref: APHA (23rd edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.00	+0.00
7.0	6.99	-0.01
10.0	10.03	+0.03
	Tolerance Limit (pH unit)	±0.20

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2408657
SUB-BATCH: 0
DATE OF ISSUE: 11-Mar-2024
CLIENT: AECOM ASIA COMPANY LIMITED

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [ProDSS]
Serial No./ Equipment No.: [22J104777/22H104506]/ [W.026.37]
Date of Calibration: 05-March-2024 Date of Next Calibration: 05-June-2024

PARAMETERS:

Turbidity

Method Ref: APHA (23rd edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.02	--
4	3.94	-1.5
10	9.80	-2.0
20	19.07	-4.7
50	48.66	-2.7
100	101.75	+1.8
Tolerance Limit (%)		±10.0

Salinity

Method Ref: APHA (23rd edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.21	+2.1
20	19.87	-0.6
30	30.04	+0.1
Tolerance Limit (%)		±10.0

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2408657
SUB-BATCH: 0
DATE OF ISSUE: 11-Mar-2024
CLIENT: AECOM ASIA COMPANY LIMITED

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [ProDSS]
Serial No./ Equipment No.: [22J104777/22H104506]/ [W.026.37]
Date of Calibration: 05-March-2024 Date of Next Calibration: 05-June-2024

PARAMETERS:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.0	9.8	-0.2
20.5	20.0	-0.5
38.0	37.6	-0.4
Tolerance Limit (°C)		±2.0

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics