



**Term Contract for Provision of Sampling and Analyzing of Samples
for Various Sewage Treatment Facilities in Urban Area, Lantau and
Outlying Islands to the Drainage Service Department**

Provision of Routine Marine Water Quality Monitoring Services

Report for the Month of Jan 2021

Contract No. : DE/2020/02

Applicant : SEWAGE TREATMENT DIVISION 2
ELECTRICAL AND MECHANICAL BRANCH
DRAINAGE SERVICES DEPARTMENT

Address : STONECUTTERS ISLAND SEWAGE TREATMENT WORKS.,
NGONG SHUNG ROAD, NGONG SHUEN CHAU,
KOWLOON, HONG KONG


Application Number : LA002945(9)

Report Number : AA0006036(4)

Report Issued Date : 04 Feb 2021

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____


Lau Yan Kin
Senior Manager
Environmental Division

The conformity statement stated in Conclusion above is based on the decision rule agreed with applicant and listed in www.cmateesting.org/gac/statement-of-conformity.pdf
This document is issued subject to the latest CMA Testing General Terms and Conditions of Testing and Inspection Services, available on request or accessible at website www.cmateesting.org.
This document shall not be reproduced except in full or with written approval by CMA Testing. The observations and test results in this report are relevant only to the sample tested.

CMA Industrial Development Foundation Limited

Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.

Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmateesting.org Web Site: <http://www.cmateesting.org>



Report No.: AA0006036(4)

Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department

TABLE OF CONTENT

1. Introduction	2
2. Marine Water Quality Monitoring	3 – 5
3. Results and Observations	5
Appendix	
Appendix I – Location of Monitoring Stations	
Appendix II – Report for Laboratory Test(s)	



Report No.: AA0006036(4)
Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department

EXECUTIVE SUMMARY

1. This is the water quality monitoring report prepared by CMA Testing for Contract No. DE/2020/02 “Term Contract for Provision of Sampling and Analysing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department”. This report documented the results and findings of Operation Phase Environmental Monitoring works conducted for Routine Marine Water Quality Monitoring (rMWQM) of Project in Jan 2021.
2. In accordance with the Final EM&A Manual, environmental monitoring has been conducted in the reporting month with a Quarterly Basis for various parameters as summarized in **Table I**.

Table I Summary Table for Environmental Monitoring Works Conducted in the Reporting Month

Monitoring Parameters	Monitoring Date	Laboratory Testing Parameters
Marine Water Quality	15 Jan 2021	E.coli, Total Residual Chlorine (TRC), Chlorination by-products (CBPs) and Contaminants of Concern (COCs)



Report No.: AA0006036(4)

Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department

1. INTRODUCTION

- 1.1. CMA Testing was commissioned by Drainage Services Department (DSD) to undertake the operation phase environmental monitoring for Advance Disinfection Facilities (ADF) at Stonecutters Island Sewage Treatment Works (SCISTW) (thereafter called the “the Services”).
- 1.2. The operation phase monitoring, which include effluent quality monitoring, marine water quality monitoring and emergency discharge monitoring, is to monitor the effluent and marine water quality impact of ADF during its operation phase.
- 1.3. This is the water quality monitoring report prepared by CMA Testing that documented the results and findings of Operation Phase Water Quality Monitoring works conducted for Routine Marine Water Quality Monitoring (rMWQM) of Project on 15 Jan 2021.

Report No.: AA0006036(4)

Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department

2. MARINE WATER QUALITY MONITORING

Monitoring Requirements

- 2.1. Monitoring was taken at three water depths, namely, 1m below water surface, mid-depth and 1m above sea bed, except where the water depth is less than 6m, in which case the mid-depth station may be omitted. If the water depth be less than 3m, only the mid-depth station will be monitored.
- 2.2. Six samples (replicates) at each monitoring stations were collected by collecting the same amount of water sample at each depth.
- 2.3. One grab sample was collected at each water depth for E.coli analysis.

Monitoring Locations

- 2.4. Six monitoring stations were designated for the marine water quality monitoring programme. The locations are summarized in Table 2.1 and shown on **Figure 2**.

Table 2.1 Proposed Marine Water Quality Monitoring Stations

Station	Description	Coordinates	
		Easting	Northing
1	Edge of Mixing Zone (northwest of effluent diffuser)	829762.00	819604.47
2	Edge of ZID (northwest of effluent diffuser)	830117.99	819251.93
3	Edge of ZID (southeast of effluent diffuser)	830186.21	819184.37
4	Edge of Mixing Zone (southeast of effluent diffuser)	830525.00	818848.87
SM6	Control Station	826179.81	805902.89
SM12	Control Station	819524.19	808420.40

Monitoring Schedule

- 2.5. The marine water quality monitoring was conducted coincide with effluent quality monitoring on 15 Jan 2021.

Monitoring Equipment

- 2.6. The equipment used in the marine water quality monitoring in the reporting month is summarized in Table 2.2. Copies of calibration certificates are shown in **Appendix II-Report no. AA0006035(3)**.

Table 2.2 Marine Water Quality Monitoring Equipment

Equipment	Model and Make	Qty
Water Sampler	Kahlsico Water Sampler	1
Water Depth Detector	Garmin Striker 4 or equivalent	1
Positioning System	Global Positioning System (GPS)	1
Chlorine Meter	HACH Pocket Colorimeter II or equivalent	1
Turbidimeter	HACH 2100Q or equivalent	1
Multi-parameter Water Quality System	YSI Professional Plus (Pro Plus) or equivalent	1

Report No.: AA0006036(4)

Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department

Monitoring Parameters and Frequency

- 2.7. Marine Water sampling on E.coli, Total Residual Chlorine (TRC), Chlorination By-Products (CBPs) and the Contaminants of Concern (COCs) shall be performed quarterly throughout the contract period.
- 2.8. The list of parameters to be analysed as well as the corresponding analytical methods and detection limit are listed in Table 2.3

Table 2.3 Analytical Methods for Laboratory Analysis for Marine Water Samples

Parameters		Analytical Method	Limit of Reporting (µg/L)
TRC and Potential CBPs			
Total Residual Chlorine		APHA 23ed 4500 Cl G	10
Bromoform	Tri-halomethanes (THMs)	USEPA 8260B	0.1
Bromodichloromethane			0.1
Chloroform			0.1
Dibromochloromethane			5
Bromoacetic acid	Haloacetic Acids (HAAs)	In house method TG-ENV-WW-79 (by GC-ECD)	2
Chloroacetic acid			2
Dibromoacetic acid			2
Dichloroacetic acid			2
Trichloroacetic acid			2
Bacteria			
E.coli		Environmental Monitoring Laboratory Test Method Manual TM09/EC/10/098 Issue 3, Environmental Protection Department, HK.	1 cfu/100ml
Contaminants of Concern (COCs)			
Methylene chloride	Halogenated Aliphatics	ISO 17943:2016 & USEPA 8206B	20
Carbon tetrachloride			0.5
1,1-dichloroethane			0.5
1,2-dichloroethane			0.5
1,1-dichloroethylene			0.5
1,2-dichloropropane			0.5
Tetrachloroethylene			0.5
1,1,1-trichloroethane	Halogenated Aliphatics		0.5
1,1,2-trichloroethane			0.5
Trichloroethylene			0.5
2-chlorophenol	Phenols & Haloethers	In house method TG-ENV-WW-80, 84 & 86 (by GC-MSD)	0.5
2,4-dichlorophenol			0.5
p-chloro-m-cresol			0.5

Report No.: AA0006036(4)

Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department

Pentachlorophenol			0.5
2,4,6-trichlorophenol			0.5
Bis(2-chloroethoxy) methane			0.5
Chlorobenzene	Chlorinated Hydrocarbons & Organochlorine Pesticides	In house method TG-ENV-WW-78 (by Headspace GC/MSD) &	0.5
1,4-dichlorobenzene			0.5
Hexachlorobenzene			0.01
Hexachlorocyclopentadiene			2.5
Hexachloroethane			0.5
1,2,4-trichlorobenzene		In house method TG-ENV-WW-86 (by GC-MSD)	0.5
Alpha-BHC			0.01
Beta-BHC			0.01
Gamma-BHC			0.01

3. RESULTS AND OBSERVATIONS

Weather and Sea Condition

- 3.1. The weather condition was Fine while the sea condition was moderate during the sampling period 15 Jan 2021 in the reporting month.

Marine Water Quality

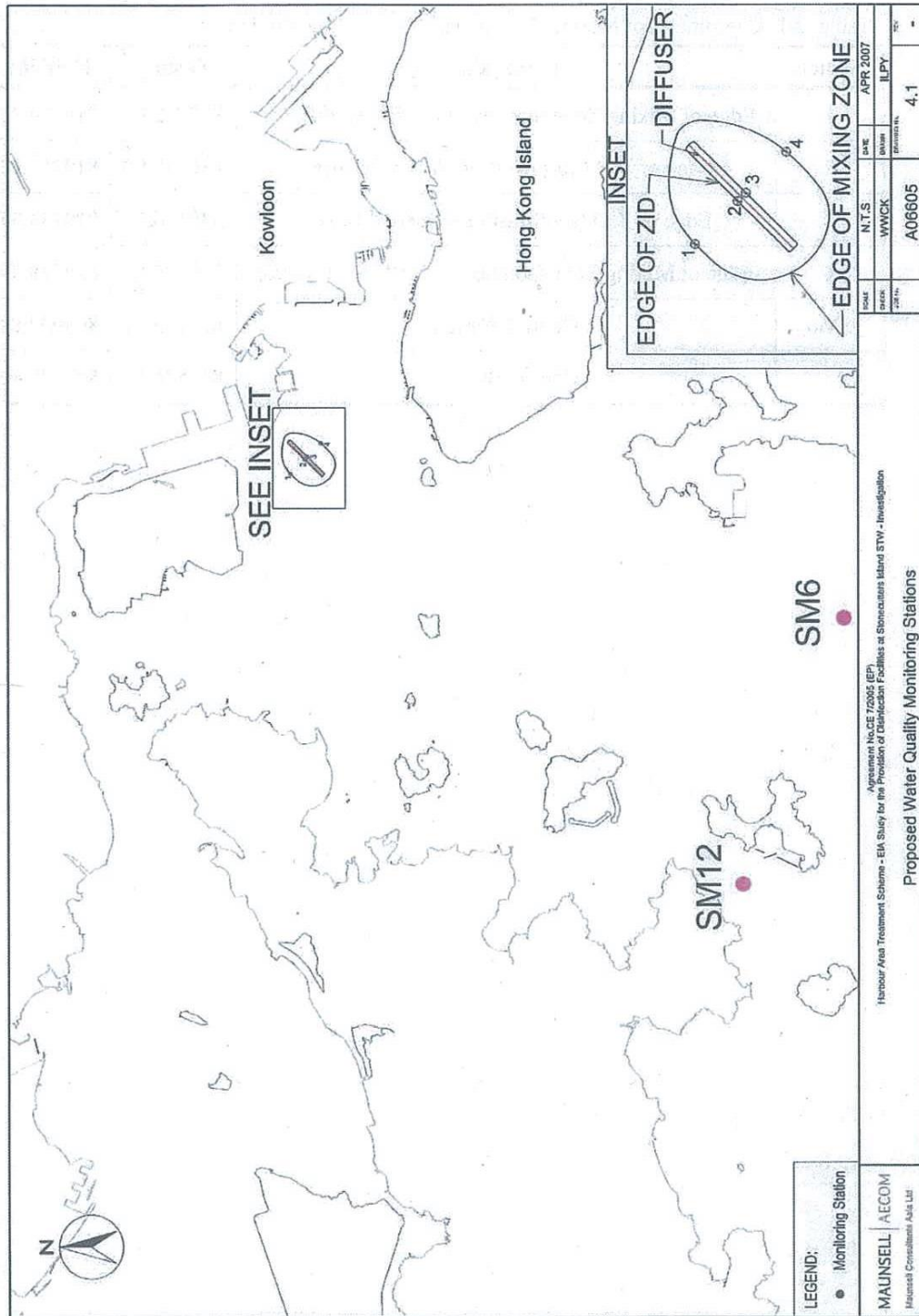
- 3.2. The in-situ measurement results including dissolved oxygen, turbidity, salinity, pH and temperature of the marine water monitoring. Also, the results of marine water quality monitoring conducted on 15 Jan 2021 and QC report are shown in **Appendix II – Report no. AA0006035(3)**.



Report No.: AA0006036(4)
Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment
Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department

Appendix I - Location of Monitoring Stations

Report No.: AA0006036(4)
 Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department





Report No.: AA0006036(4)
Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment
Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department

Appendix II - Report for Laboratory Test(s)


TEST REPORT

Report No. : AA0006035(3) Date: 04 Feb 2021
 Application No. : LA002945(9)
 Applicant : SEWAGE TREATMENT DIVISION 2
 ELECTRICAL AND MECHANICAL BRANCH
 DRAINAGE SERVICES DEPARTMENT
 STONECUTTERS ISLAND SEWAGE TREATMENT WORKS.,
 NGONG SHUNG ROAD, NGONG SHUEN CHAU,
 KOWLOON, HONG KONG

Contract No. : DE/2020/02
 Project Name : Term Contract for Provision of Sampling and Analyzing of Samples for Various Sewage Treatment Facilities in Urban Area, Lantau and Outlying Islands to the Drainage Services Department
 Sample Description : Eighteen (18) marine water samples sampled by the staff of CMA Industrial Development Foundation Limited. Samples were refrigerated during delivery.
 Sample ID : Refer to Sample ID on page 4 to 11.

Station	Description	Coordinates	
		Easting	Northing
1	Edge of Mixing Zone (northwest of effluent diffuser)	829762.00	819604.47
2	Edge of ZID (northwest of effluent diffuser)	830117.99	819251.93
3	Edge of ZID (southeast of effluent diffuser)	830186.21	819184.37
4	Edge of Mixing Zone (southeast of effluent diffuser)	830525.00	818848.87
SM6	Control Station	826179.81	805902.89
SM12	Control Station	819524.19	808420.40

For and on behalf of
 CMA Industrial Development Foundation Limited

Authorized Signature : 
 Lau Yan Kin
 Senior Manager
 Environmental Division

TEST REPORT

Report No. : AA0006035(3) Date: 04 Feb 2021

Application No. : LA002945(9)

Sampling Date : 15 Jan 2021.

Date Received : 15 Jan 2021.

Test Period : 15 Jan 2021 to 03 Feb 2021.

Test Requested :

1. Temperature (on-site measurement)
2. pH (on-site measurement)
3. Salinity (on-site measurement)
4. Dissolved Oxygen (DO) (mg/L) (on-site measurement)
5. Dissolved Oxygen (DOS) (% saturation) (on-site measurement)
6. Turbidity (on-site measurement)
7. Total Residual Chlorine (on-site measurement)
8. E. coli count
9. Bromoform
10. Bromodichloromethane
11. Chloroform
12. Dibromochloromethane
13. Bromoacetic acid
14. Chloroacetic acid
15. Dibromoacetic acid
16. Dichloroacetic acid
17. Trichloroacetic acid
18. Methylene chloride
19. Carbon tetrachloride
20. 1,1-dichloroethane
21. 1,2-dichloroethane
22. 1,1-dichloroethylene
23. 1,2-dichloropropane
24. Tetrachloroethylene
25. 1,1,1-trichloroethane
26. 1,1,2-trichloroethane
27. Trichloroethylene
28. 2-chlorophenol
29. 2,4-dichlorophenol
30. p-chloro-m-cresol
31. Pentachlorophenol
32. 2,4,6-trichlorophenol
33. Bis(2-chloroethoxy) methane
34. Chlorobenzene
35. 1,4-dichlorobenzene
36. Hexachlorobenzene
37. Hexachlorocyclopentadiene
38. Hexachloroethane
39. 1,2,4-trichlorobenzene
40. Alpha-BHC
41. Beta-BHC
42. Gamma-BHC



TEST REPORT

Report No. : AA0006035(3) Date: 04 Feb 2021

Application No. : LA002945(9)

Test Method : 1-5. In house method (by multimeter)
6. APHA 23ed 2130 B
7. APHA 23ed 4500 Cl G
8. Environmental Monitoring Laboratory Test Method Manual
TM09/EC/10/098 Issue 3, Environmental Protection
Department, HK.
9-12. USEPA 8260B
13-17. In house method TG-ENV-WW-79 (by GC-MSD)
18-27. ISO 17943:2016 & USEPA 8260B
28-33. In house method TG-ENV-WW-80, 84 & 86 (by GC-MSD)
34-42. In house method TG-ENV-WW-78 (by Headspace GC-MSD)
& In house method TG-ENV-WW-86 (by GC-MSD)

Test Result : Refer to results on page 4 to 11.



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

Marine Water Quality

Sampling Date 15-Jan-2021

Monitoring Location	Time	Water Depth (m)	Sampling Depth (m)	E.coli (CFU/100mL)	Temperature (°C)		Salinity (ppt)		pH		DO (mg/L)		DOS (%)		Turbidity (NTU)		TRC (mg/L)	
1	15:13 - 15:16	9.9	1.0	350	17.3	17.3	31.5	31.5	8.2	8.2	6.8	6.8	85.4	85.4	5.2	5.2	0.02	0.02
			5.0	310	17.3	17.3	31.9	31.9	8.3	8.3	6.6	6.6	83.1	83.1	4.7	4.7	0.03	0.03
			8.9	340	17.4	17.4	32.7	32.7	8.3	8.3	6.4	6.4	80.6	80.6	3.2	3.2	0.03	0.03
2	15:19 - 15:21	10.6	1.0	96	17.3	17.3	31.6	31.6	8.2	8.2	6.5	6.5	81.3	81.3	4.8	4.8	0.02	0.02
			5.3	130	17.3	17.3	32.5	32.5	8.2	8.2	6.4	6.4	80.4	80.4	3.5	3.5	0.01	0.01
			9.6	50	17.3	17.3	33.0	33.0	8.2	8.2	6.4	6.4	80.4	80.4	2.9	2.9	<0.01	<0.01
3	15:24 - 15:27	10.2	1.0	14	17.2	17.2	31.7	31.7	8.2	8.2	6.4	6.4	81.1	81.1	5.7	5.7	0.01	0.01
			5.1	38	17.3	17.3	32.0	32.0	8.3	8.3	6.4	6.4	81.1	81.1	4.5	4.5	0.02	0.02
			9.2	26	17.4	17.4	32.6	32.6	8.2	8.2	6.4	6.4	80.4	80.4	3.3	3.3	0.02	0.02
4	15:31 - 15:35	10.5	1.0	130	17.3	17.3	31.5	31.5	8.2	8.2	6.3	6.3	79.7	79.7	5.3	5.3	0.03	0.03
			5.3	160	17.4	17.4	32.7	32.7	8.2	8.2	6.3	6.3	79.6	79.6	3.9	3.9	0.02	0.02
			9.5	72	17.4	17.4	33.3	33.3	8.2	8.2	6.3	6.3	79.3	79.3	3.3	3.3	0.01	0.01
SM6	13:44 - 13:47	14.7	1.0	8	17.2	17.2	31.6	31.6	8.2	8.2	6.4	6.4	80.4	80.4	3.6	3.6	<0.01	<0.01
			7.4	8	17.4	17.4	32.7	32.7	8.2	8.2	6.2	6.2	78.6	78.6	4.3	4.3	0.01	0.01
			13.7	10	17.4	17.4	34.2	34.2	8.2	8.2	6.2	6.2	78.7	78.7	4.0	4.0	<0.01	<0.01
SM12	13:07 - 13:10	8.8	1.0	8	17.2	17.2	31.6	31.6	8.2	8.2	6.4	6.4	81.1	81.1	3.6	3.6	<0.01	<0.01
			4.4	12	17.3	17.3	32.5	32.5	8.2	8.2	6.4	6.4	80.1	80.1	4.0	4.0	0.01	0.01
			7.8	12	17.3	17.3	33.3	33.3	8.2	8.2	6.3	6.3	78.7	78.7	3.6	3.6	<0.01	<0.01



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

Marine Water Quality

Sampling Date 15-Jan-2021

Monitoring Location	Time	Water Depth (m)	Sampling Depth (m)	Bromoform (µg/L)		Bromodichloromethane (µg/L)		Chloroform (µg/L)		Dibromochloromethane (µg/L)		Bromacetic acid (µg/L)		
				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2	
1	15:13 - 15:16	9.9	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2	
			5.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
			8.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
2	15:19 - 15:21	10.6	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2	
			5.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
			9.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
3	15:24 - 15:27	10.2	1.0	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2	
			5.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
			9.2	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
4	15:31 - 15:35	10.5	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2	
			5.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
			9.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
SM6	13:44 - 13:47	14.7	1.0	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2	
			7.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
			13.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
SM12	13:07 - 13:10	8.8	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2	
			4.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
			7.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2
			LRV	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<5	<5	<2	<2	



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

Marine Water Quality

Sampling Date 15-Jan-2021

Monitoring Location	Time	Water Depth (m)	Sampling Depth (m)	Chloroacetic acid (µg/L)	Dibromoacetic acid (µg/L)	Dichloroacetic acid (µg/L)	Trichloroacetic acid (µg/L)
1	15:13 - 15:16	9.9	1.0	<2	<2	<2	<2
			5.0	<2	<2	<2	<2
			8.9	<2	<2	<2	<2
2	15:19 - 15:21	10.6	1.0	<2	<2	<2	<2
			5.3	<2	<2	<2	<2
			9.6	<2	<2	<2	<2
3	15:24 - 15:27	10.2	1.0	<2	<2	<2	<2
			5.1	<2	<2	<2	<2
			9.2	<2	<2	<2	<2
4	15:31 - 15:35	10.5	1.0	<2	<2	<2	<2
			5.3	<2	<2	<2	<2
			9.5	<2	<2	<2	<2
SM6	13:44 - 13:47	14.7	1.0	<2	<2	<2	<2
			7.4	<2	<2	<2	<2
			13.7	<2	<2	<2	<2
SM12	13:07 - 13:10	8.8	1.0	<2	<2	<2	<2
			4.4	<2	<2	<2	<2
			7.8	<2	<2	<2	<2
			LRV	<2	<2	<2	<2



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

Marine Water Quality

Sampling Date 15-Jan-2021

Monitoring Location	Time	Water Depth (m)	Sampling Depth (m)	Methylene chloride (µg/L)		Carbon tetrachloride (µg/L)		1,1-dichloroethane (µg/L)		1,2-dichloroethane (µg/L)		1,1- dichloroethylene (µg/L)	
1	15:13 - 15:16	9.9	1.0	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			5.0	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			8.9	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2	15:19 - 15:21	10.6	1.0	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			5.3	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			9.6	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3	15:24 - 15:27	10.2	1.0	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			5.1	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			9.2	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4	15:31 - 15:35	10.5	1.0	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			5.3	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			9.5	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SM6	13:44 - 13:47	14.7	1.0	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			7.4	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			13.7	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SM12	13:07 - 13:10	8.8	1.0	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			4.4	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			7.8	<20	<20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
			LRV	<20		<0.5		<0.5		<0.5		<0.5	



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

Marine Water Quality

Sampling Date 15-Jan-2021

Monitoring Location	Time	Water Depth (m)	Sampling Depth (m)	1,2-dichloropropane (µg/L)	Tetrachloroethylene (µg/L)	1,1,1-trichloroethane (µg/L)	1,1,2-trichloroethane (µg/L)	Trichloroethylene (µg/L)
1	15:13 - 15:16	9.9	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			5.0	<0.5	<0.5	<0.5	<0.5	<0.5
			8.9	<0.5	<0.5	<0.5	<0.5	<0.5
2	15:19 - 15:21	10.6	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			5.3	<0.5	<0.5	<0.5	<0.5	<0.5
			9.6	<0.5	<0.5	<0.5	<0.5	<0.5
3	15:24 - 15:27	10.2	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			5.1	<0.5	<0.5	<0.5	<0.5	<0.5
			9.2	<0.5	<0.5	<0.5	<0.5	<0.5
4	15:31 - 15:35	10.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			5.3	<0.5	<0.5	<0.5	<0.5	<0.5
			9.5	<0.5	<0.5	<0.5	<0.5	<0.5
SM6	13:44 - 13:47	14.7	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			7.4	<0.5	<0.5	<0.5	<0.5	<0.5
			13.7	<0.5	<0.5	<0.5	<0.5	<0.5
SM12	13:07 - 13:10	8.8	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			4.4	<0.5	<0.5	<0.5	<0.5	<0.5
			7.8	<0.5	<0.5	<0.5	<0.5	<0.5
			LRV	<0.5	<0.5	<0.5	<0.5	<0.5



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

Marine Water Quality

Sampling Date 15-Jan-2021

Monitoring Location	Time	Water Depth (m)	Sampling Depth (m)	2-chlorophenol (µg/L)	2,4-dichlorophenol (µg/L)	p-chloro-m-cresol (µg/L)	Pentachlorophenol (µg/L)	2,4,6-trichlorophenol (µg/L)
1	15:13 - 15:16	9.9	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			5.0	<0.5	<0.5	<0.5	<0.5	<0.5
			8.9	<0.5	<0.5	<0.5	<0.5	<0.5
2	15:19 - 15:21	10.6	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			5.3	<0.5	<0.5	<0.5	<0.5	<0.5
			9.6	<0.5	<0.5	<0.5	<0.5	<0.5
3	15:24 - 15:27	10.2	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			5.1	<0.5	<0.5	<0.5	<0.5	<0.5
			9.2	<0.5	<0.5	<0.5	<0.5	<0.5
4	15:31 - 15:35	10.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			5.3	<0.5	<0.5	<0.5	<0.5	<0.5
			9.5	<0.5	<0.5	<0.5	<0.5	<0.5
SM6	13:44 - 13:47	14.7	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			7.4	<0.5	<0.5	<0.5	<0.5	<0.5
			13.7	<0.5	<0.5	<0.5	<0.5	<0.5
SM12	13:07 - 13:10	8.8	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
			4.4	<0.5	<0.5	<0.5	<0.5	<0.5
			7.8	<0.5	<0.5	<0.5	<0.5	<0.5
			LRV	<0.5	<0.5	<0.5	<0.5	<0.5



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

Marine Water Quality

Sampling Date 15-Jan-2021

Monitoring Location	Time	Water Depth (m)	Sampling Depth (m)	Bis(2-chloroethoxy) methane (µg/L)		Chlorobenzene (µg/L)		1,4-dichlorobenzene (µg/L)		Hexachlorobenzene (µg/L)		Hexachlorocyclopentadiene (µg/L)	
1	15:13 - 15:16	9.9	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			8.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
2	15:19 - 15:21	10.6	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			5.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			9.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
3	15:24 - 15:27	10.2	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			5.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			9.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
4	15:31 - 15:35	10.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			5.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			9.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
SM6	13:44 - 13:47	14.7	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			7.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			13.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
SM12	13:07 - 13:10	8.8	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			4.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			7.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<2.5	<2.5
			LRV	<0.5		<0.5		<0.5		<0.01		<2.5	



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

Marine Water Quality

Sampling Date 15-Jan-2021

Monitoring Location	Time	Water Depth (m)	Sampling Depth (m)	Hexachloroethane (µg/L)		1,2,4-trichlorobenzene (µg/L)		Alpha-BHC (µg/L)		Beta-BHC (µg/L)		Gamma-BHC (µg/L)	
1	15:13 - 15:16	9.9	1.0	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			5.0	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			8.9	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2	15:19 - 15:21	10.6	1.0	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			5.3	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			9.6	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
3	15:24 - 15:27	10.2	1.0	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			5.1	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			9.2	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
4	15:31 - 15:35	10.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			5.3	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			9.5	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SM6	13:44 - 13:47	14.7	1.0	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			7.4	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			13.7	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SM12	13:07 - 13:10	8.8	1.0	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			4.4	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			7.8	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
			LRV	<0.5	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

QC Report

Parameter	Method Blank	Acceptance Criteria	QC Recovery	Acceptance Criteria	Spike Recovery	Acceptance Criteria	Duplicate (RPD)	Acceptance Criteria
	(mg/L)	(mg/L)	(%)	(%)	(%)	(%)	(%)	(%)
Total Residual Chlorine	<0.01	<0.01	110	85-115	105	85-115	<1	≤20
Parameter	Method Blank	Acceptance Criteria	QC Recoery	Acceptance Criteria	Spike Recovery	Acceptance Criteria	Duplicate (RPD)	Acceptance Criteria
	(µg/L)	(µg/L)	(%)	(%)	(%)	(%)	(%)	(%)
Bromoform	<0.02	<0.02	92	80-120	86	70-130	10	≤20
Bromodichloromethane	<0.02	<0.02	107	80-120	79	70-130	7	≤20
Chloroform	<0.02	<0.02	89	80-120	113	70-130	6	≤20
Dibromochloromethane	<1	<1	106	80-120	108	70-130	9	≤20
Bromoacetic acid	<0.4	<0.4	93	80-120	97	70-130	7	≤20
Chloroacetic acid	<0.4	<0.4	98	80-120	78	70-130	11	≤20
Dibromoacetic acid	<0.4	<0.4	91	80-120	87	70-130	15	≤20
Dichloroacetic acid	<0.4	<0.4	113	80-120	105	70-130	8	≤20
Trichloroacetic acid	<0.4	<0.4	116	80-120	109	70-130	8	≤20



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002407(2)

QC Report

Parameter	Method Blank	Acceptance Criteria	QC Recovery	Acceptance Criteria	Spike Recovery	Acceptance Criteria	Duplicate (RPD)	Acceptance Criteria
	(µg/L)	(µg/L)	(%)	(%)	(%)	(%)	(%)	(%)
Methylene chloride	<4	<4	104	80-120	91	70-130	6	≤20
Carbon tetrachloride	<0.1	<0.1	112	80-120	85	70-130	9	≤20
1,1-dichloroethane	<0.1	<0.1	105	80-120	94	70-130	13	≤20
1,2-dichloroethane	<0.1	<0.1	110	80-120	103	70-130	7	≤20
1,1-dichloroethylene	<0.1	<0.1	94	80-120	81	70-130	9	≤20
1,2-dichloropropane	<0.1	<0.1	106	80-120	93	70-130	11	≤20
Tetrachloroethylene	<0.1	<0.1	83	80-120	97	70-130	5	≤20
1,1,1-trichloroethane	<0.1	<0.1	92	80-120	80	70-130	9	≤20
1,1,2-trichloroethane	<0.1	<0.1	96	80-120	108	70-130	8	≤20
Trichloroethylene	<0.1	<0.1	103	80-120	86	70-130	3	≤20
2-chlorophenol	<0.1	<0.1	85	80-120	104	70-130	12	≤20
2,4-dichlorophenol	<0.1	<0.1	91	80-120	94	70-130	15	≤20
p-chloro-m-cresol	<0.1	<0.1	87	80-120	98	70-130	10	≤20
Pentachlorophenol	<0.1	<0.1	104	80-120	112	70-130	17	≤20
2,4,6-trichlorophenol	<0.1	<0.1	110	80-120	89	70-130	6	≤20
Bis(2-chloroethoxy) methane	<0.1	<0.1	107	80-120	106	70-130	5	≤20
Chlorobenzene	<0.1	<0.1	93	80-120	108	70-130	5	≤20
1,4-dichlorobenzene	<0.1	<0.1	106	80-120	95	70-130	8	≤20
Hexachlorobenzene	<0.005	<0.005	84	80-120	89	70-130	7	≤20
Hexachlorocyclopentadiene	<0.5	<0.5	91	80-120	110	70-130	6	≤20
Hexachloroethane	<0.1	<0.1	98	80-120	116	70-130	7	≤20
1,2,4-trichlorobenzene	<0.1	<0.1	106	80-120	88	70-130	12	≤20
Alpha-BHC	<0.005	<0.005	115	80-120	92	70-130	15	≤20
Beta-BHC	<0.005	<0.005	87	80-120	96	70-130	8	≤20
Gamma-BHC	<0.005	<0.005	86	80-120	107	70-130	16	≤20

TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002945(9)

Calibration Certificate



Calibration Certificate

Certificate No.: CC0182011

1. Description

Calibration item :	a) pH at 25°C b) Temperature c) Dissolve Oxygen d) Conductivity at 25°C e) Salinity f) Oxidation-Reduction Potential (ORP)
Equipment description :	Multiparaters Instrument
Manufacturer :	YSI
Type / Model No. :	Professional Plus
Serial No. :	Meter: 17F104341
Assigned equipment no. :	N/A
Adjustment :	N/A
Remark :	Received with good condition

2. Customer information

Customer :	CMA Testing and Certification Laboratories
Address :	Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung Street, Fotan, Shatin, NT, Hong Kong
Date of receipt :	2 November 2020

3. Date of performance of the calibration

Date of calibration :	3 November 2020
Next Calibration date :	3 February 2021

Authorized Signatory

Warren Yeung



Company Chop:



Certificate issue date: 5 November 2020

1. The certificate shall not reproduced except in full without the written approval of CAL LAB LTD Page 1 of 3
 2. The Certificate is issued subject to the latest Term and Condition, available assessable at our web site cc0182011

Cal Lab Limited
 Address: Room 2103, Technology Plaza, 29-35 Sha Tsui Road, Tsuen Wan, NT, Hong Kong.
 Tel : (852)25680106 Fax(852)30116194 Email: info@callab.com.hk Website: callab.com.hk

TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002945(9)



4. Result of Calibration

a) Temperature

Reference reading (°C)	Display Reading (°C)	Error of indication (°C)
14.95	15.2	0.3
25.02	24.8	-0.2
34.99	34.7	-0.3

b) Dissolved Oxygen

Reference reading (mg/L)	Display Reading (mg/L)	Error of indication
0.00	0.00	0.00
4.03	3.92	-0.11
8.18	8.03	-0.15

c) Conductivity at 25°C

Reference reading (uS/cm)	Display Reading (uS/cm)	Error of indication (%)
147.4	153.8	4.3
1411	1455	3.1
12846	12677	-1.3
111310	108733	-2.3

d) Salinity

Reference reading (ppt)	Display Reading (ppt)	Error of indication (%)
10	9.95	-0.5
20	19.97	-0.2
30	29.88	-0.4

Oxidation-Reduction Potential (ORP)

Reference reading (mV)	Display Reading (mV)	Error of indication (mV)
+230	+235	+5

1. The certificate shall not reproduced except in full without the written approval of CAL LAB LTD
2. The Certificate is issued subject to the latest Term and Condition, available assessable at our web site

Page 2 of 3
cc0182011

Cal Lab Limited
Address: Room 2103, Technology Plaza, 29-35 Sha Tsui Road, Tsuen Wan, NT, Hong Kong.
Tel: (852)25680106 Fax:(852)30116194 Email: info@callab.com.hk Website:callab.com.hk

TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002945(9)



e) pH at 25°C

Reference reading	Display Reading	Error of indication
4.00	3.97	-0.03
6.86	6.92	0.06
9.18	9.25	0.07
10.01	10.02	0.01

5. Reference method for calibration

pH at 25°C	APHA 21e 4500-H B
Dissolved Oxygen	APHA 21e 4500-O G
Conductivity at 25°C	APHA 21e 2510 B
Temperature	JJG 130-2011
Salinity	APHA 21e 2520 B
Oxidation-Reduction Potential (ORP)	APHA 21e 2580 B

6. Environment condition of calibration

Temperature ; °C	18 – 25 °C
Relative humidity ; %RH	< 75 %RH

*** End of Certificate ***

1. The certificate shall not reproduced except in full without the written approval of CAL LAB LTD
2. The Certificate is issued subject to the latest Term and Condition, available assessable at our web site

Page 3 of 3
cc0182011

Cal Lab Limited
Address: Room 2103, Technology Plaza, 29-35 Sha Tsui Road, Tsuen Wan, NT, Hong Kong.
Tel: (852)25680106 Fax(852)30116194 Email: info@callab.com.hk Website: callab.com.hk

TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002945(9)



Calibration Certificate

Certificate No.: CC0192011

1. Description

Calibration item :	a) Turbidity
Equipment description :	Portable Turbidimeter
Manufacturer :	Hach
Type / Model No. :	2100Q
Serial No. :	17040C057757
Assigned equipment no. :	N/A
Adjustment :	N/A
Remark :	Received with good condition


2. Customer information

Customer :	CMA Testing and Certification Laboratories
Address :	Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung Street, Fotan, Shatin, NT, Hong Kong
Date of receipt :	2 November 2020

3. Date of performance of the calibration

Date of calibration :	3 November 2020
Date of next calibration :	3 February 2021

Authorized Signatory
Warren Yeung 

Company Chop: 
Certificate issue date: 5 November 2020

1. The certificate shall not reproduced except in full without the written approval of CAL LAB LTD Page 1 of 2
2. The Certificate is issued subject to the latest Term and Condition, available assessable at our web site cc0192011

Cal Lab Limited
Address: Room 2103, Technology Plaza, 29-35 Sha Tsui Road, Tsuen Wan, NT, Hong Kong
Tel : (852)25680106 Fax(852)30116194 Email: info@callab.com.hk Website: callab.com.hk

TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002945(9)



4. Result of Calibration

a) Turbidity

Reference reading (NTU)	Display Reading (NTU)	Error of indication (%)
Blank	0.00	N/A
10	9.95	-0.5
20	20.3	1.5
100	105	5.0
800	822	2.8

5. Reference method for calibration

Turbidity	APHA 21e 2130B
-----------	----------------

6. Environment condition of calibration

Temperature ; °C	18 – 25 °C
Relative humidity ; %RH	< 75 %RH

*** End of Certificate ***

1. The certificate shall not reproduced except in full without the written approval of CAL LAB LTD Page 2 of 2
 2. The Certificate is issued subject to the latest Term and Condition, available assessable at our web site cc0192011

Cal Lab Limited
 Address: Room 2103, Technology Plaza, 29-35 Sha Tsui Road, Tsuen Wan, NT, Hong Kong
 Tel: (852)25680106 Fax(852)30116194 Email: info@callab.com.hk Website: callab.com.hk

TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002945(9)




TEST REPORT

Report No. : AA0006350(3) Date : 08 Jan 2021
Application No. : LZ003543(4)
Applicant : CMA INDUSTRIAL DEVELOPMENT FOUNDATION LIMITED
ROOM 1302, YAN HING CENTRE,
9-13 WONG CHUK YEUNG STREET,
FO TAN, SHATIN,
N.T., HONG KONG.
Instrument : HACH Portable Colorimeter (DR300)
Serial No. : 19030A000277
Date Received : 04 Jan 2021.
Test Period : 04 Jan 2021 to 06 Jan 2021.
Date of next checking : 03 Apr 2021
Test Method : APHA 23e 4500Cl-G
Test Result : Refer to the results on page 2.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____


Tang Tsz Wang
Manager

Page 1 of 2

The conformity statement stated in Conclusion above is based on the decision rule agreed with applicant and listed in www.cmatesting.org/gsc/statement-of-conformity.pdf.
This document is issued subject to the latest CMA Testing General Terms and Conditions of Testing and Inspection Services, available on request or accessible at website www.cmatesting.org.
This document shall not be reproduced except in full without written approval by CMA Testing. The results apply to the sample as received unless otherwise specified. The observations and test results in this report are relevant only to the sample tested.

CMA Industrial Development Foundation Limited
Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.
Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatesting.org Web Site: <http://www.cmatesting.org>



TEST REPORT

Report No. : AA0006035(3)

Date: 04 Feb 2021

Application No. : LA002945(9)



TEST REPORT

Report No. : AA0006350(3)

Date : 08 Jan 2021

Application No. : LZ003543(4)

Test Result :

Test Item	Reference reading (mg/L)	Display Reading (mg/L)	Error of indication (%)
Chlorine	1.00	0.98	-2

***** End of Report *****

Page 2 of 2

CMA Industrial Development Foundation Limited
 Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.
 Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatesting.org Web Site: <http://www.cmatesting.org>

***** End of Report *****

Page 20 of 20