



水務署
Water Supplies Department

總部 Headquarters

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24 December 2024

Distribution: To all Licensed Plumbers and Authorized Persons

Dear Sirs,

WSD Circular Letter No. 9/2024

**Revised Water Sampling Sequence
for Commissioning Fresh Water Plumbing System**

The Water Supplies Department (WSD) has revised the sequence of water sampling for commissioning of a fresh water plumbing system.

Updated Requirements

2. Considering that the entire plumbing system would be completely isolated during stagnation and bacteriological tests are in place to check for the adequacy of disinfection, the on-site free residual chlorine test would be conducted prior to the bacteriological tests (i.e. heterotrophic plate count and *E. coli* tests) for commissioning a fresh water plumbing system. This arrangement would serve the purpose of demonstrating an acceptable level of free residual chlorine after the preceding flushing has been attained and ensuring that subsequent results of the bacteriological tests would not be affected by the remaining trace of the sterilizing agent.

3. The revised water sampling sequence is shown in **Appendices I and II**.

Effective Date

4. The revised water sampling sequence will apply to the plumbing works covered by Form WWO 46 Part IV submitted on or after 31 December 2024.

Enquiry

5. Should you have any enquiry, please contact our Engineer/Technical Support(3) at telephone no. 2829 4726.

Yours faithfully,

(Original Signed)

(CHAN Chi Yuen, Stanley)
for Water Authority

Encl.
(with Chinese translation)

c.c.

Housing Department (Attn: SM/QM)

Buildings Department

Architectural Services Department

Fire Services Department

The Hong Kong Housing Society

The Hong Kong Institute of Architects

The Hong Kong Institution of Engineers

The Hong Kong Institute of Surveyors

The Chartered Institute of Plumbing and Heating Engineering – Hong Kong Branch

Hong Kong Plumbing and Sanitary Ware Trade Association Ltd.

Hong Kong Licensed Plumbing Professionals Association Ltd.

Hong Kong Water Works Professionals Association Ltd.

The Hong Kong Institution of Plumbing and Drainage Ltd.

Plumbing Technology Student Association

The Association of Registered Fire Service Installation Contractors of Hong Kong Limited

Real Estate Developers Association of Hong Kong

The Hong Kong Construction Association, Ltd.

Hong Kong Registered Contractors Association Company Ltd.

The Hong Kong Federation of Electrical & Mechanical Contractors Ltd.

Contractor's Authorised Signatory Association Ltd.

Registered Minor Works Contractor Signatory Association Ltd.

Hong Kong General Building Contractors Association Ltd.

Hong Kong Institute of Vocational Education

Hong Kong Institute of Construction, Construction Industry Council

Hong Kong Licensed Plumbers Union Limited

Hong Kong Metropolitan University Li Ka Shing School of Professional and Continuing Education

The Association of Electrical and Mechanical Engineering (Hong Kong) Ltd.

Pipeman Engineering (International) Limited

Hong Kong Institute of Water and Sanitation Safety

Hong Kong Plumbing General Union

Appendix 19

(B) Sampling Protocol for Commissioning Test of Fresh Water Plumbing System

1. General

1.1 This sampling protocol is applicable for collection of water samples at water sampling tap, connection point and water tank for commissioning of newly installed or replaced inside services for fresh water supply in occupied or unoccupied buildings.

1.2 Site supervisors/testing laboratories shall take necessary measures and maintain relevant records to ensure that the water samples are:

- a) taken by a competent person with proper training supported by relevant training records on the sampling procedures and handling of the water samples;
- b) representativeness of the water quality of the new plumbing system at the time of sampling; and
- c) free from contamination during the course of sampling, sample storage and transportation.

1.3 Sample Bottles

1.3.1 Sample for Metal Tests: Sample bottles shall be made of PE, PP, FEP, PE-HD or PTFE¹, with a capacity of 1 litre (L) each. Sample bottles and caps shall be: (i) thoroughly cleaned with a phosphate-free detergent solution; (ii) thoroughly rinsed with deionised water; (iii) soaked in dilute nitric acid (~10% volume dilution of concentrated HNO₃) or dilute hydrochloric acid (~25% volume dilution of concentrated HCl) for 24 hours; (iv) rinsed with deionised water several times, and (v) dried and kept tightly capped in storage.

1.3.2 Sample for Chemical and Physical Tests (*except free residual chlorine*): Sample bottles shall be made of plastics or glass except soda glass with a capacity of 500mL. The bottles shall be prepared in accordance with the ISO 5667-3.

1.3.3 Sample for Bacteriological Tests: Sample bottles shall be glass or plastics with a capacity of 250mL and the recommendations for sample bottles given in ISO 19458 shall be followed. The bottles shall be prepared in accordance with the ISO 19458. Sufficient amount of sodium thiosulfate (7.1 mg of sodium thiosulfate (pentahydrate) can neutralise 1 mg of residual chlorine) shall be added into the sample bottle to remove the residual disinfectant present in the water sample.

1.3.4 *Sample for Free Residual Chlorine Tests: Sample bottles shall be made of plastics or glass except soda glass with a capacity of at least 10mL. The*

¹ PE: polyethylene; PP polypropylene; FEP: perfluoro (ethylene-propylene) plastic; PE-HD: high density polyethylene; PTFE: polytetrafluoroethylene.

bottles shall be prepared in accordance with the ISO 5667-3.

- 1.4 Water samples shall not be taken at the following drinking water tap or sampling tap:
- a) Leaking tap;
 - b) Drinking water tap installed with an inline water filter or a point-of-use filter with no bypass switch;
 - c) Insufficient space below the tap to accommodate the sampling bottle; and/or
 - d) Environment with high risk of contamination such as close to works site or dusty environment or dirty water tap.

1.5 All information and observation regarding the sampling location shall be recorded, in particular, when a tap at a sampling location is considered not representative and rejected due to conditions mentioned in Clause 1.4 above.

1.6 Never rinse sample bottle prior to sample collection.

2. Collection of Water Sample from Potable Fresh Water Plumbing System (excluding Fresh Water Flushing and Fire Service Supply)

2.1 Collection of Water Samples for Free Residual Chlorine, Heterotrophic Plate Count (HPC) and *E. coli* Tests at Water Tap/Connection Point/Water Tank

2.1.1 For fresh water inside service in unoccupied buildings, before flushing, remove and cleanse the strainer. Flush the temporary sampling pipe/tap (for connection point/water tank) or water tap for at least 2 minutes. Close the sampling pipe/tap or water tap and reinstall the strainer after flushing. Disinfect the sampling pipe/tap or water tap in accordance with ISO 19458. Open the sampling pipe/tap or water tap and flush briefly² with a view to collecting a representative sample from the plumbing system for commissioning test. Place a sterile sample bottle under the sampling pipe/tap or water tap and take a 10-mL sample and conduct an on-site free residual chlorine test. The residual chlorine level detected shall meet the acceptance criteria specified in Table 2 before proceeding to the next sampling steps. Place a sterile sample bottle under the sampling pipe/tap or water tap and take a 250-mL sample for testing of HPC and *E. coli*. For fresh water inside service in occupied buildings, after collecting the water samples for on-site testing of free residual chlorine with satisfactory result, and subsequently collecting water samples for HPC and *E. coli* analysis as mentioned above, the strainer is removed and cleansed, followed by 3-minute flushing of the sampling pipe/tap or water tap. Then the strainer is reinstalled to the water tap before commencing the 30-minute stagnation period as stated in Clause 2.2.1.

2.2 Collection of Water Samples for Metal, Chemical and Physical Tests after Water Stagnation

² Flush briefly only to overcome the influence of disinfection of the tap or to remove non-representative volume of sample trapped inside temporary sampling pipe and tap which is not part of the new plumbing system.

2.2.1 Always collect the water sample for metal testing first after the stagnation period (for fresh water inside service in unoccupied buildings, the stagnation period is minimum 6 hours. For fresh water inside service in occupied buildings, the stagnation period is minimum 30 minutes) followed by collection of water samples for analysis of chemical and physical parameters. The start time of stagnation and the collection time of stagnation samples shall be recorded.

2.2.2 Sample Collection at Water Tap

2.2.2.1 At the end of the required stagnation period, place a 1-L sample bottle for metal testing under the tap. Collect 1 L of water with the tap opened as much as possible without spillage. Never rinse the sample bottle before sample collection.

2.2.2.2 Immediately after collection of 1-L of water sample, place a 500mL sample bottle for chemical and physical testing under the tap and collect 500mL of water. Close the tap after sample collection. *For the avoidance of doubt, the 500mL sample collected needs not be tested for free residual chlorine.*

2.2.2.3 Not used.

2.2.3 Sample Collection at Connection Point/Water Tank

2.2.3.1 For sample collected from temporary sampling pipe/tap, at the end of the required stagnation period, open the sampling pipe/tap and flush briefly³ with a view to collecting a representative sample from the plumbing system for commissioning test. Place a 1-L sample bottle for metal testing under the sampling pipe/tap immediately after the brief flushing. Collect 1 L of water without spillage. Never rinse the sample bottle before collection.

2.2.3.2 Follow Clause 2.2.2.2 to collect water samples for chemical and physical testing.

2A. Collection of Water Sample from Fresh Water Flushing and Fire Service Supply

2A.1 Collection of Water Samples for Physical, Chemical and Bacteriological Tests at Connection Point

2A.1.1 Flush the temporary sampling pipe/tap for connection point for at least 2 minutes. Place a 500-mL sampling bottle for physical and chemical tests under the sampling pipe/tap and collect 500 mL of water. Close the sampling pipe/tap after sample collection. *For the avoidance of doubt, the 500mL sample collected includes testing for free residual chlorine.*

2A.1.2 Disinfect the sampling pipe/tap in accordance with ISO 19458. Open the sampling pipe/tap and flush briefly³ with a view to collecting a representative sample from the new plumbing system for commissioning test. Place a sterile

³ Flush briefly only to overcome the influence of disinfection of the tap or to remove non-representative volume of sample trapped inside temporary sampling pipe and tap which is not part of the new plumbing system.

sample bottle under the sampling pipe/tap and take a 250-mL sample for bacteriological tests (i.e. *E. coli* and HPC).

3. Sample Labelling and Transfer

3.1 All sample bottles shall be properly labelled immediately after sample collection to avoid inadvertent mislabelling and sample mix-up. Pack each water sample bottle in a plastic bag and store them in a cold box for transportation. Deliver the samples to an accredited laboratory for analysis as soon as possible after completion of the sampling. Care shall be taken to avoid sample contamination during sample collection, handling, storage and transportation.

4. Retesting Arrangement

4.1 The retesting arrangement in Table 1 shall be followed when any result(s) of parameter(s) fail(s) to comply with the acceptance criteria in Table 2.

Table 1: Retesting Arrangement

Parameters	Scenarios		
	fail	pass	pass
Metal parameters	fail	pass	pass
Physical and Chemical parameters	pass	fail	pass
Bacteriological parameters (<i>E. coli</i> and Heterotrophic Plate Count (HPC))	pass	pass	fail
Parameters to be retested	all parameters	all parameters other than metal	

Table 2: Acceptance Criteria

Parameters	Acceptance Criteria
<i>Chemical and Physical</i>	
Turbidity	≤ 3.0 NTU
Colour	≤ 5 Hazen Unit
pH at 25°C	≥ 6.5 and ≤ 9.5
Free Residual Chlorine	≤ 1.5 mg/L
Conductivity at 25°C	≤ 500 μS/cm
<i>Metals</i>	
Lead	≤ 10μg/L
Chromium	≤ 50μg/L
Nickel	≤ 70μg/L
Cadmium	≤ 3μg/L
Copper	≤ 2000μg/L
Antimony	≤ 20μg/L
<i>Bacteriological</i>	
HPC	≤ 20 cfu/mL
<i>E. coli</i>	0 cfu/100mL

5 Point to Note

5.1 If unsteady/sputtering flow with rush of air is observed during collection of water

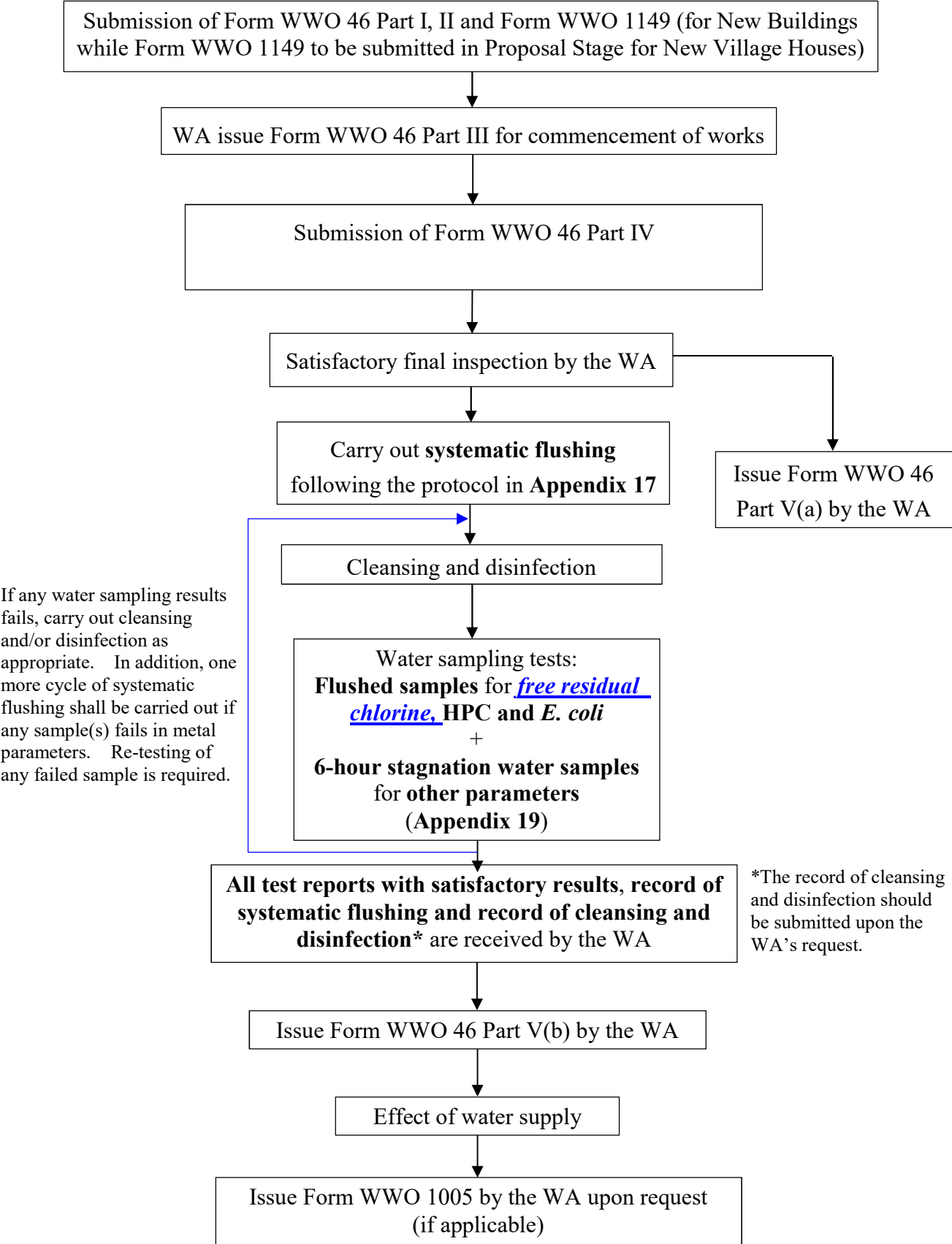
sampling, the flushing protocol may not be fully followed. Thus, the sample is considered not representative such that it should be discarded, i.e. the sample should be collected once again as per the sampling protocol for Commissioning Test of Fresh Water Plumbing System.

6 References

- 6.1 ISO 5667-3:2018 “Water Quality -Sampling Part 3: Preservation and handling of water samples”
- 6.2 ISO 19458:2006 “Water Quality – Sampling for microbiological analysis”

Appendix 6: Flowchart for the Submission Requirements at Construction Stage

(A) Fresh Water Supply for New Buildings/New Village Houses



(B) Fresh Water Supply for Occupied Buildings / Occupied Village Houses

