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18 August 2023

Distribution: To all Licensed Plumbers and Authorized Persons

Dear Sirs,

WSD Circular Letter No. 5/2023

Updated Water Sampling Protocol for Commissioning of Fresh Water Plumbing System

This Circular Letter updates the water sampling protocol for commissioning of fresh water plumbing system, in which the water sampling arrangement for HPC and *E Coli.* tests are to be aligned as detailed in **Appendix A**.

Effective Date

2. The above updated requirement will apply to the works covered by Form WWO 46 Part IV submitted on or after 18 September 2023.

Enquiry

3. Should you have any enquiry, please contact our Engineer/Technical Support (4) at telephone no. 2829 5657.

Yours faithfully,

(Original Signed)

(YAU Hau Yin)
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
Hong Kong Institute of Vocational Education
Hong Kong Institute of Construction, Construction Industry Council
The Hong Kong Construction Association, Ltd.
Hong Kong General Building Contractors Association 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 Registered Contractors Association Company Ltd.
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
WSD 3318/15/8

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
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 PTFE[1], 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 HNO_3) 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: Sample bottles shall be made of plastics or glass except soda glass with a capacity of 500 mL. 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 250 mL 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] FEP: perfluoro (ethylene-propylene) plastic; PE: polyethylene; PP polypropylene; PE-HD: high density polyethylene; PTFE: polytetrafluoroethylene

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
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 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 briefly[2] 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 250-mL sample for testing of HPC *and E. coli*. For fresh water inside service in occupied buildings, after collecting the water sample for testing of HPC *and E. coli* as above, the strainer is removed and cleansed, followed by 3 minutes flushing at the sampling pipe/tap or water tap. Then the strainer is reinstalled to the water tap before commencing the 30-minute stagnation period 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 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 the 1-L water sample, place a 500-mL sample bottle for chemical and physical testing under the tap and collect 500 mL of water. Close the tap after sample collection.

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 briefly[3] 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.

2A.1.2 Disinfect the sampling pipe/tap in accordance with ISO 19458. Open the sampling pipe/tap and flush briefly[3] with a view to collecting a representative sample from the new plumbing system for commissioning test. Place a sterile 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**		
Metal parameters	fail	pass	pass
Physical and Chemical parameters	pass	fail	pass
Bacteriological parameters (*E. coli* and Heterotrophic Plate Count (HPC))	pass	pass	fail
Parameters to be retested	all parameters	all parameters other than metal	

[3] Flush briefly only to overcome 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.

Table 2: Acceptance Criteria

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

5 Reference

5.1 ISO 5667-3:2018 “Water Quality -Sampling Part 3: Preservation and handling of water samples”

5.2 ISO 19458:2006 “Water Quality – Sampling for microbiological analysis”

Remarks: Extracted from Appendix 19(B) of Guide to Application of Water Supply, with updated parts in *italic*.