



Fresh Water Plumbing Maintenance Guide



Water Supplies Department

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November 2008 3rd Edition

Published by the Water Supplies Department
Printed with paper made from woodpulp derived from
renewable forestry



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1. Introduction

The quality of treated water from the Water Supplies Department fully complies with the World Health Organization guidelines for drinking water. To ensure good quality of water at the taps, the maintenance of the fresh water plumbing systems in buildings has to be consistently kept at a high standard.

According to the Waterworks Ordinance, the responsibility for fresh water plumbing maintenance lies with the registered consumers (i.e. the customers) or the registered agents (i.e. the owners' corporations or management agents). However, some registered consumers and registered agents are not aware of this. As a result, their fresh water plumbing systems are not properly maintained. The tap water may become discoloured or dirty. Choked or burst water pipes cause weak water flow or no water supply at taps. In extreme circumstances, leaking water pipes may cause water seepage at the ceiling or wall and nuisance to other parties. Please refer to Appendix 1 on how to deal with some of these problems. To avoid these problems, the fresh water plumbing systems have to be inspected regularly and any defects identified have to be rectified immediately. The sump water tanks and roof water tanks have to be cleaned regularly. Some examples of good and bad practices in relation to fresh water plumbing systems are shown in Appendix 2.

The purpose of this "Fresh Water Plumbing Maintenance Guide" is to provide the registered consumers and registered agents with advice on how to inspect and maintain their fresh water plumbing systems properly.

2. Recommended Practices

2.1 Cleaning of Water Tanks

The fresh water plumbing system in a building often includes a sump water tank and a roof water tank. The registered consumers or registered agents should clean all their water tanks regularly according to proper procedures to prevent accumulation of dirt, rust etc. which may lead to discoloured water.

(a) Frequency of Cleaning

The sump water tanks and the roof water tanks should normally be cleaned at least once every 3 months or more frequently if necessary.

(b) Preparation Work before Cleaning of Water Tanks

Before cleaning the water tanks, the registered consumer or registered agent should:

- (1) programme the cleaning in off-peak hours to minimize causing inconvenience to the occupants in the building;
- (2) serve notice to the occupants in conspicuous locations detailing the date and duration of water supply suspension necessary for facilitating water tank cleaning. The notice should also contain advice on what the occupants should do immediately before and after water tank cleaning (such as keeping all taps closed), and an emergency contact telephone number;
- (3) check that the relevant statutory requirements, such as the Factories and Industrial Undertakings (Confined Spaces) Regulations, Cap 59AE, are complied with; and
- (4) employ a person or agent who is conversant with the cleaning procedures and is capable of cleaning the water tanks to clean the water tanks.

(c) Cleaning of Water Tanks

For details of the cleaning procedures, please refer to Appendix 3.

(d) Post Cleaning Review

After cleaning the water tanks, the registered consumer or registered agent should review the whole process and working procedures taken. They should also address the problems encountered and complaints received due to the cleaning work and provide feedback to the occupants as appropriate.



2. Recommended Practices

2.2 Inspection of Fresh Water Plumbing Systems

(a) Inspection

Regular maintenance will help to ensure that the fresh water plumbing systems will perform as intended. It may also avoid unplanned interruption of water supply and extend the service life of the systems by identifying and rectifying the defects at an early stage.

To facilitate plumbing inspection and emergency use, the registered consumer or registered agent should maintain an up-to-date record of the plumbing system layout. The registered consumer or registered agent should employ a licensed plumber, a building services surveyor or an engineer to inspect the plumbing system at least once every three months or more frequently if necessary. A typical inspection checklist for components of a fresh water plumbing system is in Appendix 4 for reference. The licensed plumber or building services surveyor or engineer should follow the manufacturer's recommendations or instructions regarding preventive maintenance of the water pipes, fittings, pumps, pressure reducing valves, taps, valves, etc. He/she should rectify any defects found during the inspection immediately.

(b) Licensed Plumbers

A licensed plumber is a person licensed under the Waterworks Ordinance to construct, install, maintain, alter, repair or remove water supply plumbing. The licensed plumber directory is available in WSD's website <http://www.wsd.gov.hk/en/html/plumb/index.htm>.

For fresh water plumbing systems, a licensed plumber should be employed for:

- (i) installing plumbing in connection with new water meters;
- (ii) installing water-using appliances such as water tanks, washing machines, water heaters or baths; and
- (iii) installing or removing water taps, water pipes and fittings.

It is an offence if any person, other than a licensed plumber, carries out installation or modifications of the fresh water plumbing systems in buildings. However, alterations or repairs to plumbing systems which in the opinion of the Water Supplies Department are minor in nature may be carried out by a person other than a licensed plumber. Typical examples of minor works are replacement of defective water pipes, taps, stopcocks, gate valves, ball valves, repairs of leaking water pipes or fittings and rewashering of taps.

2.3 Replumbing

The quality of water is affected by the conditions of the fresh water plumbing systems, which are often related to the age of the buildings. Since December 1995, the use of unlined galvanized iron pipes and fittings as fresh water plumbing systems in new buildings or replumbing of existing buildings has been prohibited. As a result, new buildings constructed or existing buildings replumbed after 1995 should have used corrosion-resistant water pipes. The problem of discolouration due to rusting water pipes for these buildings is not common.

If the registered consumer or the registered agent experiences water quality problems due to corroded water pipes or fittings, he/she should consider replacing the corroded water pipes and fittings by new ones. When replumbing is necessary, the registered consumer or registered agent should obtain approval of the Water Supplies Department before carrying out the replumbing work.

The "Building Safety Loan Scheme" managed by the Buildings Department aims to provide loans to individual owners of all types of private buildings including domestic, composite, commercial and industrial buildings who may wish to obtain financial assistance in carrying out works (including replacing water supply pipes) for improving the safety of their buildings. The registered consumer or registered agent may apply for financial assistance from the scheme if applicable.



Recommended Practices

Choice of Pipe Materials

The pipes and fittings used in the fresh water plumbing systems shall conform to Part 1 of Schedule 2 of the Waterworks Regulations. The following table summarizes the different types of pipe materials commonly used in the fresh water plumbing systems:

| Pipe Material | Fresh Water Inside Service | | Standards (or other Equivalent Standards) |
|---|----------------------------|-----------|---|
| | Cold Water | Hot Water | |
| Copper | ✓ | ✓ | BS EN 1057 |
| Ductile iron | ✓ | ✓ | BS EN 545 |
| GI with PVC-C lining | ✓ | ✓ | BS 1387 & Internal lining of an approved type |
| GI with PVC-U/ PE lining | ✓ | ✗ | BS 1387 & Internal lining of an approved type |
| Polybutylene (PB)* | ✓ | ✓ | BS 7291 |
| Polyethylene (PE)* | ✓ | ✗ | BS 6572 (below ground) |
| | ✓ | ✗ | BS 6730 (above ground) |
| Chlorinated polyvinyl chloride (PVC-C)* | ✓ | ✓ | BS 7291 |
| Unplasticized polyvinyl chloride (PVC-U)* | ✓ | ✗ | BS 3505 Class D or above |
| Crosslinked polyethylene (PE-X)* | ✓ | ✓ | BS 7291 |
| Stainless steel | ✓ | ✓ | BS 4127 |

BS: British Standards

✓ : Suitable for use when the relevant standards are complied with.

✗ : Not suitable for use.

* : Unless specially treated, plastic materials generally will degrade on prolonged exposure to ultra-violet light

2.4 Use of Filters or Purifiers

The quality of treated water supplied by the Water Supplies Department to the customers at the connection points at the building lot boundary fully complies with the World Health Organization guidelines for drinking water. Provided that the water is free from contamination within the plumbing system in a building, it is not necessary to use filter or purifier.

If the registered consumer or registered agent wishes to use filters or purifiers in the plumbing system, he/she should maintain the filters or purifiers properly by cleaning them or replacing the filter cartridges regularly. Filters or purifiers which are not properly maintained will easily provide breeding grounds for bacterial growth and will give rise to health hazards.

2.5 Checking of Water Wastage

The registered consumer or registered agent can check if the fresh water plumbing system is leaking and wasting water by the following simple "Do-It-Yourself Method":

- Turn off all water taps in the premises.
- Compare the water meter readings taken at the start and at the end of a 30-minute period (or longer if necessary) to see if the water meter is registering flow.
- If the water meter registers flow when all water taps are turned off, it suggests that the plumbing system is leaking. The registered consumer or registered agent should employ a licensed plumber to conduct an investigation and to rectify the defects immediately.

It should be noted that the above method cannot detect very small leakage such as seepage. For seepage cases, the registered consumer or registered agent should employ a licensed plumber to conduct a thorough investigation and to rectify any defects found.



3. Quality Water Recognition Scheme for Buildings

The treated fresh water provided by the Water Supplies Department complies fully with the Guidelines for Drinking-water Quality recommended by the World Health Organization. However, in order to ensure that consumers can enjoy good quality of water at the taps, building owners have to maintain their plumbing systems properly as well. To encourage building owners to do this and with the endorsement of the Advisory Committee on the Quality of Water Supplies (ACQWS), the Water Supplies Department launched the Quality Water Recognition Scheme for Buildings (formerly known as Fresh Water Plumbing Quality Maintenance Recognition Scheme) on 22 July 2002. Participation of the Scheme is voluntary. The target groups to join the Scheme are the owners, operators and management agents of buildings in general.

Successful buildings will be awarded certificates, which are classified into three grades according to the length of the continuous period for which a building has joined the Scheme, to recognize that their fresh water plumbing systems have been properly maintained. In addition to the names of the buildings, the names of the owners' corporations and management agents are also shown on the certificates to commend their contribution. The owners' corporations and management agents are entitled to use the certificates or copies for display in their buildings, stationeries and promotional materials, subject to the guidelines issued by the Water Supplies Department.

Starting from 1 January 2008, three grades of certificates will be awarded according to the following criteria:

- Blue certificates: New participation or continuous participation* of less than three years;
- Silver certificates: Continuous participation* of three years or more but less than five years;
- Gold certificates: Continuous participation* of five years or more.

*Continuous participation means there was no break of more than three months.

Certificates for new applications will be valid for one year while certificates for renewal applications submitted within three months before or after the expiry of the last certificates will be valid for two years. Applications submitted later than three months after the expiry date of the last certificates will be considered as new applications and the validity periods of such new certificates will be reset to one year, starting from the new approval dates.

The certificates under the Scheme are issued in recognition of proper maintenance of the plumbing systems of the buildings concerned. They are properties of the Water Supplies Department, and are subject to continuous satisfactory maintenance of the plumbing systems during the validity period.

Any enquiry about the Scheme can be made through the Water Supplies Department Hotline or by fax or by e-mail.

Telephone Enquiry Hotline: 2824 5000
Fax Hotline: 2824 0578
E-mail: wsdinfo@wsd.gov.hk
Website: www.wsd.gov.hk

Appendix 1 Troubleshooting

The common water supply problems encountered are water quality problems, weak water supply and no water supply.

(a) Water Quality Problems

Drinking water should be clear with a very slight chlorine odour detectable only to those sensitive consumers.

Sometimes, tap water may appear milky white. One possible cause of this is the minute air bubbles trapped in the fresh water plumbing system. These minute air bubbles are air drawn in through the air valves installed in the plumbing system. This has nothing to do with the water quality. When the minute air bubbles escape from the water, the water will become clear again.

If the water remains stagnant in rusty water pipes for a long time, it may look cloudy and discoloured due to the presence of very fine suspension of iron oxide. In most cases, although the water may be aesthetically unpleasant, it is still suitable for drinking as the amount of iron is very minute.

If there is suspected water quality problems in the premises, the registered consumer is suggested to leave the water running for a moment to see if the water will become clear again.

If the problem persists, the registered consumer is suggested to check with the neighbours first. If the neighbours experience no water quality problem, the problem likely lies within the registered consumer's own plumbing system, in which case the registered consumer should employ a licensed plumber to check his/her plumbing immediately.

If water quality problem is also experienced by the neighbours, the registered consumer is suggested to check with the registered agent to see if the roof water tank and sump water tank have been cleaned recently or there is any corroded pipework in the plumbing system. If the registered agent still cannot find out the cause, please contact WSD's Customer Telephone Enquiry Centre at tel. no. 2824 5000.



Appendix 1 (cont'd) Troubleshooting

(b) Weak Water Supply

If a registered consumer experiences weak flow at the taps, he/she should check with the registered agent to see if the problem is due to any works in the building or due to defects of the pumps or the plumbing system such as the main control valve, stopcocks etc.

If the problem is not due to the above defects, the registered consumer is suggested to engage a licensed plumber to conduct an investigation. If the licensed plumber cannot find out the cause of the problem, please contact WSD's Customer Telephone Enquiry Centre at tel. no. 2824 5000 for assistance.

(c) No Water Supply

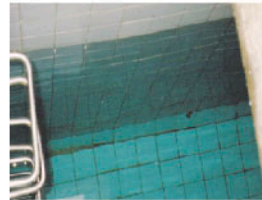
If a registered consumer has no water supply in his/her premises, he/she should check with his/her neighbours to see if they have normal water supply. If his/her neighbours have normal supply, the problem likely lies within the registered consumer's own plumbing system, in which case the registered consumer should employ a licensed plumber to check his/her plumbing immediately.

If neighbours also do not have water supply, the registered consumer should check with the registered agent to see if it is due to defects of the common sump-and-pump system or emergency maintenance works in the building. If the registered consumer still cannot find out the cause, please contact WSD's Customer Telephone Enquiry Centre at tel. no. 2824 5000.

Appendix 2 Examples of Maintenance Practices

Some common examples of good and bad practices in relation to fresh water plumbing systems are illustrated below:

Good Practices



Clean Water Tank

Bad Practices



Dirty Water Tank



Water Tank with Raised Neck & Double-sealed Cover



Defective Water Tank Cover



Overflow Pipe with Self-closing Lid



Overflow Pipe without Lid



Appendix 2 Examples of Maintenance Practices

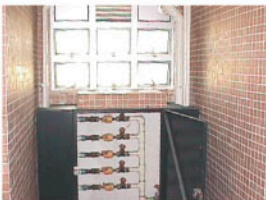
Good Practices



Water Tank with
Proper Maintenance



Properly Maintained
Water Pipe



Proper Meter Box

Bad Practices



Poorly Maintained
Water Tank



Corroded Water Pipe



Inaccessible Water Meters

Appendix 3 Cleaning Procedures for Water Tanks

The water tank cleaning procedures are as follows:

- (a) Close the inlet and outlet valves of the water tank; to save water, water should be consumed to a level of about 500mm above the bottom of the tank before cleaning.
- (b) Empty the water tank through the washout pipe.
- (c) Thoroughly scrub and clean the water tank and the inlet/outlet pipes with fresh water.
- (d) Drain away the dirty water through the washout pipe.
- (e) Scrub the water tank thoroughly with a solution of chloride of lime or bleaching powder containing not less than 50 parts per million of chlorine solution.

(For chloride of lime or bleaching powder contains 33% of available chlorine in weight, a 50 parts per million chlorine solution can be prepared by mixing 15 grams of chloride of lime or bleaching powder in 100 litres of water. Please wear protective gloves and mix the solution with care!)
- (f) Rinse the water tank thoroughly with fresh water.
- (g) Drain away the water through the washout pipe.
- (h) Refill the water tank with fresh water.
- (i) Open the inlet and outlet valves and the water tank is ready for use.



Appendix 4

Typical Inspection Checklists for Components of a Fresh Water Plumbing System

| Components | Inspected by | Checklist | Findings | Recommendations / Follow up actions |
|---------------------------|--|--|---|--|
| Supply System Arrangement | Registered Agents | Is the fresh water tank connected to the fire service water tank? | Yes. | It gives rise to potential danger of contamination to the fresh water plumbing system. The registered agent should apply for an independent fire service connection immediately. |
| | | Is the originally approved sump and pump system converted to direct supply system? | Yes. | It may give rise to weak water supply. A licensed plumber should be employed to restore the supply system to the originally approved sump and pump system. |
| Meter of Accounts | Registered Agents & Registered Consumers | Is the water meter registering normally? | The water meter does not register flow when the tap is opened. OR The flow registered by the water meter is fluctuating when the water is flowing steadily out of the taps. | The water meter may be defective. Please request the Water Supplies Department to arrange for an inspection. |
| | | Does the water meter register flow when all taps in the flat are closed? | Yes. | This is an indication that the water pipe is leaking. A licensed plumber should be employed to check. |
| | | Is the water meter housed in a meter room or box? | No. | To protect the water meter against exposure to weather, falling objects and other undue external interferences, a licensed plumber should be employed to house the water meter in a meter room or box. |
| Water Pipes | Registered Agents & Registered Consumers | Are the pipes or fittings fixed properly? | The pipes or fittings are loosely fixed. | This may give rise to potential leakage at the pipe joints or fittings and vibration noise. A licensed plumber should be employed to fix the supports or fittings properly. |
| | | Is there any vibration noise? | Vibration noise occurs when the water tap or valve is opened or closed quickly. | The water taps or valves should be opened or closed slowly to prevent vibration noise. If vibration noise still persists, a licensed plumber should be employed to check. |
| | | Are the water pipes in good conditions? | Cracks are found on the surface of the water pipes. | The water pipes may leak or even burst. A licensed plumber should be employed to check and to replace them. |
| | | Are the water pipes free of any sign of corrosion or leakage? | There are signs of corrosion or leakage in the water pipes. | A licensed plumber should be employed to check and to replace them. |
| | | Are abandoned water pipes and fittings disconnected? | No. | A licensed plumber should be employed to disconnect the abandoned water pipes and fittings and to plug the ends of the disconnected pipes. |



Appendix 4 (cont'd)

Typical Inspection Checklists for Components of a Fresh Water Plumbing System

| Components | Inspected by | Checklist | Findings | Recommendations / Follow up actions |
|------------------------------|--|--|---|---|
| Water Pipes | Registered Agents & Registered Consumers | Are the fresh water pipe connected to the flushing water pipes? | Yes. | It gives rise to potential danger of contamination to the fresh water plumbing system. A licensed plumber should be employed to disconnect the connection immediately. |
| Water Taps | Registered Agents & Registered Consumers | Are the water taps watertight? | Water is leaking out of the water taps. | A licensed plumber should be employed to repair or replace them. |
| | | Is there any attachment (including a hose pipe) fixed to a tap or outlet to cause backflow of water? | Attachment such as a hose pipe is fixed to a tap or outlet. | To prevent water from backflowing to the fresh water plumbing system, the attachment should be disconnected. |
| | | Is the seal of the taps in good condition? | Water is leaking out of the water taps. | A licensed plumber should be employed to repair or replace them. |
| | | Are there sufficient cleansing taps provided at the car parks for car or floor washing? | No. | Please apply for new water supply for car or floor washing from the Water Supplies Department. |
| Valves | Registered Agents & Registered Consumers | Are the working parts of the valves operated properly? | The working parts of the valves cannot move freely. OR Water is leaking from the valves when they are being operated. | The valves are not functioning properly. A licensed plumber should be employed to repair or replace them. |
| Pressure Reducing Valves | Registered Agents | Is the water pressure at the downstream side set to the designed value? | No. | The pressure reducing valve is not working properly. A licensed plumber should be employed to check the pressure reducing valve and replace it if necessary. |
| Meter or Valve Chamber Rooms | Registered Agents | Is the access door or cover easy to open? | No. | To facilitate meter reading and maintenance of the water meters, the access door/cover should be kept easy to open. |
| | | Is there adequate floor space, headroom, lighting, ventilation and drainage, satisfactory hygienic environment and an independent entrance to the water meter or valve chamber room? | No. | To facilitate meter reading and maintenance of the water meters, adequate floor space, headroom, lighting, ventilation and drainage, good hygienic environment and an independent entrance to the meter or valve chamber room should be provided. |
| Pumps | Registered Agents | Is the pump operating without abnormal noise? | The pump is operating with abnormal noise. | This is an indication that the pump is not working properly. A licensed plumber should be employed to check the pump and replace it if necessary. |
| | | Are all components of the pump free of corrosion? | There are signs of corrosion in some components of the pump. | A licensed plumber should be employed to replace the corroded components with components that are not susceptible to corrosion. |



Appendix 4 (cont'd)

Typical Inspection Checklists for Components of a Fresh Water Plumbing System

| Components | Inspected by | Checklist | Findings | Recommendations / Follow up actions |
|---|-------------------|---|---|---|
| Water Tanks | Registered Agents | Are the fresh and flushing water tanks connected? | Yes. | This gives rise to potential contamination to the fresh water tank. A licensed plumber should be employed to disconnect the connection immediately. |
| | | Is the water tank free of leakage or overflow? | There are signs of leakage or overflow in the water tank. | This is an indication that the water tank is not working properly. A licensed plumber should be employed to inspect the water tank and rectify the defects. |
| | | Are all components of the water tank free of corrosion? | There are signs of corrosion in some components of the water tank. | A licensed plumber should be employed to replace the corroded components with components that are not susceptible to corrosion. |
| | | Are the supports of the water tank rigid and secured? | No. | The water tank supports should be fixed properly. |
| | | Is the overflow or warning pipe working properly and kept free from obstructions? | The overflow pipe or warning pipe is blocked. | The blockage of the overflow or warning pipe should be cleared immediately. |
| | | Is the overflow or warning pipe provided with a grating and self-closing non-return flap? | No. | A licensed plumber should be employed to provide the overflow or warning pipe with a grating and self-closing non-return flap. |
| | | Is the access manhole provided with raised necks to prevent ingress of rain water etc.? | No. | The access manhole should be provided with raised neck. |
| | | Is the access manhole cover double-sealed and locked to prevent ingress of water and insects etc.? | No. | A double-sealed cover under lock should be provided. |
| | | Are all internal surface of floors, walls and ceilings of the fresh water tanks lined with a white non-toxic smooth finish such as ceramic tiles? | Not all internal surface of floors, walls and ceilings of the fresh water tanks are lined with a white non-toxic smooth finish. | To facilitate cleansing of water tanks, all internal surface of floors, walls and ceilings of the fresh water tanks should be lined with a white non-toxic smooth finish such as ceramic tiles. |
| Is there any notice plate or board provided to record the dates when the water tanks are cleaned? | No. | A notice plate or board with the cleaning dates records should be provided. The notice plate/board should be securely fixed at a conspicuous location easily accessible and visible by the residents and the building management staff. | | |