

Inspection, cleaning and sterilisation of water storage tanks

A Inspection and cleaning procedures

- 1 The inspection and cleaning of water storage tanks shall be undertaken by a licensed water service plumber.
- 2 Before the commencement of any cleaning and sterilisation work, the licensed water service plumber shall notify the Authority on prescribed forms of the work to be carried out.
- 3 Before the commencement of any cleaning and sterilisation work, a joint inspection with the owner or his representative shall be carried out to check on the condition of the water storage tank (including its associated fittings such as the overflow pipes, air vents, nettings, tank manhole covers, etc and ancillary equipment).
- 4 Before the commencement of any inspection or cleaning and sterilisation work on the water storage tank, the owner or his authorised representative shall turn off power supply to the water tank. The licensed water service plumber shall place a log-out/tag out card at the switch board after the power supply to the tank has been switched off. The licensed water service plumber shall use a contactless voltage meter to test the exposed areas on the water tank to confirm that it is safe to inspect and work on and in the tank before he proceeds with his inspection/work. All persons involved in the inspection and cleaning and sterilisation work shall use proper rubber gloves and safety shoes. On completion of inspection and cleaning and sterilisation work, the licensed water service plumber shall remove the log-out/tag out card at the switch board and the owner or his authorised representative shall then turn on power supply to the water tank. The licensed water service plumber shall use a contactless voltage meter to again test the exposed areas on the water tank to confirm that it is safe electrically.
- 5 Water storage tanks which are equipped with water level sensing devices with control circuits that regulate the water level inside the tanks and activate / deactivate the electric water pump(s) shall use extra low voltage (e.g. d.c. voltage source at 36 volts or a.c. voltage source at 24 volts) for the water level control circuits. Power supply to the water level sensing devices shall be independent of each other, i.e. the power supply to any one individual water level sensing device must be able to be shut off without affecting the power supply to the other water level sensing devices.
- 6 All remedial works to the tank and its associated fittings and ancillary equipment arising from the joint inspection shall be carried out before commencement of cleaning work. Before the commencement of any cleaning and sterilisation work, adequate notice should be given to consumers and adequate signboards shall be displayed to indicate that the water tanks are undergoing cleaning and sterilisation.
- 7 The water in the tank shall be used to around 150 to 200 mm above the bottom of the tank before the tank is isolated and the outlet pipes shut off.
- 8 The external of the tank and the tank manhole covers shall be cleaned before the tank covers are opened.

- 9 All tank manhole covers shall be opened to admit light and for ventilation and access. It shall be ensured that the tank is isolated and all outlet pipes are shut.
- 10 All statutory safety requirements as well as other necessary and relevant safety measures shall be complied with at all times to ensure that it is safe to enter the tank.
- 11 All workers involved in the cleaning work must be certified by a medical doctor to be free from water-borne diseases.
- 12 All workers involved in the cleaning work shall wash, clean and disinfect themselves thoroughly before entering the tank.
- 13 All workers involved in the cleaning work must observe safety measures at all times and must be properly equipped with the necessary safety equipment and gear.
- 14 Equipment and tools used shall not have sharp edges that may damage the inside of the tank. The equipment and tools shall be exclusively used for the cleaning of potable water tanks only and shall be disinfected before every use.
- 15 To prevent sludge and sediments from entering the outlet pipes, all outlets of these pipes shall be covered. The sludge and sediments shall be placed in containers for disposal at authorised dumping grounds.
- 16 The internal of the tank including the floors, walls, roof, internal of the tank manhole covers, etc shall then be cleaned using appropriate methods such as scrubbing, pressure jet, etc, Sediments and solids shall be collected in containers for disposal at authorised dumping grounds.
- 17 The roof and sides of the tank walls above the overflow level shall be cleaned and disinfected too. Chlorine solution of 200 mg/litre shall be applied onto the internal surfaces of the roof and sides of the tank walls above the overflow level (by spraying or brushing) and left there for at least 30 minutes after they have been cleaned and washed.
- 18 The entire tank (including the roof and sides of the tank walls above the overflow level) shall be thoroughly washed and flushed until it is clean and free from dirt, solids, chemicals or other foreign matter which may affect the quality of water stored and supplied to consumers.

B Sterilisation procedure

- 1 The sterilisation of water storage tanks shall be undertaken by a licensed water service plumber.
- 2 After cleaning, potable water is fed into the cleaned tank up to overflow level. Sterilising chemical in solution form containing chlorine shall be gradually added while the tank is being filled to ensure thorough mixing. Safety procedure for the

handling of such chemical must be observed at all times. Introduction of the sterilising chemical into the tank in powder form is not allowed.

- 3 The chemical concentration for sterilisation of the tank shall be 50 mg/litre of free chlorine (i.e. 50 ppm of free chlorine). Ordinary “bleaching powder” in solution form or sodium form or sodium hypochlorite solution may be used with equivalent concentration.
- 4 While the water in the tank is being sterilized, all outlet pipes from the tank must be closed tight and no water shall be allowed to flow into these pipes as the water under sterilisation may not be safe for human consumption.
- 5 The sterilized water shall be kept in the tank for at least 24 hours. The water in the tank is then drained off completely through the wash out pipe and the tank refilled with potable water through the inlet pipe. It must be ensured that all outlet pipes are closed tight before re-filling the tank with potable water.
- 6 Water samples shall then be taken from the tank sampling tap for bacteriological and chemical analyses at a SAC-SINGLAS accredited laboratory. In the absence of a tank sampling tap, water samples shall be taken from the bottom of the tank using an appropriate sampling device.
- 7 Water samples shall be taken by a licensed water service plumber and should be sealed and marked by the owner or his representative and escorted to the SAC-SINGLAS accredited laboratory. Alternatively, the water samples may be taken by personnel from the SAC-SINGLAS accredited laboratory and sealed and marked by the owner or his representative. Water samples with broken seals shall be rejected.
- 8 The tank and the water shall only be put into use after satisfactory test reports are obtained from the SAC-SINGLAS accredited laboratory. All downfeed and distributing pipes from the tank shall be thoroughly flushed until clean before water from the tank is put into use.
- 9 If the test reports from the SAC-SINGLAS accredited laboratory are unsatisfactory, sterilization shall have to be carried out again.
- 10 After cleaning and sterilization have been completed, a final joint inspection with the owner or his representative to check on the condition of the water tank shall be carried out to ensure that all remedial works have been carried out and all tank openings (such as air vents, overflow and warning pipes, etc) have been properly screened to prevent birds, insects and other possible contaminants from entering the water tank.
- 11 Upon completion of cleaning and sterilization work, the licensed water service plumber shall notify the authority on prescribed forms of the completion work accompanied with the laboratory water sample test reports within the time period stipulated by the Authority.

- 12 Only in cases where the tank cannot be shutdown for 24 hours or more, the following sterilisation procedure may be used:

Observe procedures B1 to B11 but add sufficient chemicals to give the water a dose of 500 mg/litre of free chlorine. Then keep the sterilized water in the tank for at least 2 hours before draining completely.

Following the draining and refilling to overflow level, the tank and water can be put into use. On-site testing of the chlorine concentration in the water in the tank shall be carried out to ensure that the chlorine concentration is satisfactory before the tank and water are put into use. All downfeed and distributing pipes from the tank shall be thoroughly flushed until clean before water from the tank is put into use.

Water samples shall be taken at the same time and sent to a SAC-SINGLAS accredited laboratory for bacteriological and chemical analyses. If the test reports from the SAC-SINGLAS accredited laboratory are unsatisfactory, sterilisation shall have to be carried out again.

The use of any other sterilising chemical other than chlorine for the sterilisation of water storage tanks is allowed only if the chemical and its application procedures have been approved by the Authority. Similarly, the use of any other cleaning or sterilisation procedures is allowed only if the procedures have been approved by the Authority.