

Appendix D – Water Supply Disinfection Specification

(Normative)

D1 Disinfection of pipelines and fittings

After flushing the main to remove all debris and air, the main shall be filled with water containing a free available chlorine concentration of $15 \text{ g/m}^3 \pm 5 \text{ g/m}^3$ and allowed to stand for a minimum of 12 hours for all new mains. At the end of the disinfection period, the free available chlorine (FAC) concentration shall be at least 5 g/m^3 . If the FAC is less than 5 g/m^3 at the completion of the period, the disinfection shall be repeated until a satisfactory result is obtained. Note that the main should not be drained after flushing unless all high points are 'vented' to allow for complete removal of air.

Under no circumstances will the use of handfuls of hypochlorite powder or chlorine tablets dumped into the pipe and hydrant tees be an acceptable practice.

The sterilising solution should be fed by gravity or pumped into one end of the main and the 'flushing' water in the pipe displaced out of the opposite end of the main until tests carried out show that the water being displaced contains the full FAC concentration. The authorised officer will arrange for testing of the FAC concentration and, to this end, the contractor shall give 24-hours notice of intention to sterilise.

The contractor shall provide all temporary fittings necessary to allow for the introduction of the sterilising solution to and its removal from the main.

See also D3.

D2 Methods of introducing the sterilising solution

Methods of introducing sterilising solution will depend on the volume of solution required for the particular main and the availability of appropriate equipment.

In general, wherever the pipe volume is less than 10 m^3 , the most practical method is to add sufficient calcium or sodium hypochlorite (powder or solution) to a potable water tanker suitable for carrying potable water to achieve the desired 15 g/m^3 FAC concentration. (This may require two tankers full.)

For greater quantities, the sterilising solution may be injected into the main using a portable gas chlorinator or a hypochlorinator. An approved backflow preventer shall be installed if either of these options is used.

D3 Disposal of sterilising solution

After the satisfactory completion of the sterilising process, the chlorine solution shall be flushed into the sanitary wastewater pipe or, alternatively, retained in a temporary surface storage pond until the TA's authorised officer is satisfied that the FAC has reduced to a satisfactory concentration before being allowed to flow down the stormwater drainage system or into a natural watercourse.

D4 Acceptable method for sterilising mains

(a) Use sodium hypochlorite solution. This solution usually has 10% or 15%

FAC;

- (b) Obtain a clean water tanker, as used for potable drinking water. The tanker should have a known water capacity;
- (c) Measure the required amount of sodium hypochlorite solution into a beaker and pour it into the empty tanker;

NOTE – The final strength of the chlorine to water is to be 15 g/m³ ±5 g/m³.

- (d) Fill the tanker to the appropriate volume and ensure the solution is well mixed;
- (e) Charge the new main with the chlorinated water from the tanker at one end of the main or into a new hydrant through a standpipe. All service pipes and hydrants shall be left open and allowed to run for a couple of minutes. The services and hydrants shall then be closed to allow the highest end of the main to fill completely;

NOTE – The main should ideally be charged from the highest point. This will allow the water to be gravity fed into the main. If this is not possible the water tanker shall have a truck mounted pump to pump the chlorinated water in.

- (f) Seal off the main and leave it charged with the chlorinated water for 24 hours;
- (g) Take samples and test for residual chlorine;
- (h) After 24 hours flush the main well until the chlorine smell is gone. Once the main is connected into the reticulation system it should be flushed thoroughly before the services are connected up.

NOTE – For large mains, a water tanker may not have the required capacity so a dose pump system shall be used and approved by the authorised officer.

Example:

- A. Calculate the volume of the mains to be chlorinated, that is, 85 m of 100 mm dia. main

$$\text{Vol.} = \frac{85 \times \pi \times 0.1^2}{4} = 0.67 \text{ m}^3$$

$$= 667.6 \text{ litres}$$

Plus 110 m of 150 mm dia. main

$$\text{Vol.} = \frac{110 \times \pi \times 0.15^2}{4} = 1.944 \text{ m}^3$$

$$= 1.944 \text{ litres}$$

$$\text{Total volume} = 1,944 + 667.6 = 2,611.6 \text{ litres}$$

- B. The total volume of 2,611.6 litres is less than the volume of the water tanker (say 5,000 litres) so calculate how many millilitres of sodium hypochlorite is required for the 5,000 litre tanker to give a final solution of 15 g/m³.

$$v = \frac{V \times c}{s \times 10}$$

v = volume of sodium hypochlorite in ml

V = volume of water tanker

c = concentration of final solution in g/m³

s = strength of concentrated hypochlorite in % FAC

$$v = \frac{5000 \times 15}{15 \times 10} = 500 \text{ ml}$$