

Cleaning and disinfection of storage tanks

Why is it important to clean and disinfect a storage tank ?

It is important to clean and disinfect storage tanks regularly (for example, every 6 months) or after any rehabilitation or maintenance work. A storage tank may be contaminated from animals such as rats, the feet or boots of workers, sedimented materials, etc. Therefore it is imperative that it is cleaned and disinfected recurrently, according to the risks of contamination brought about by lack of appropriate tank protection, lack of effective water disinfection practices, etc.

Making up a chlorine solution

The two forms of chlorine suitable for disinfecting wells are calcium hypochlorite and sodium hypochlorite. These are described in Fact Sheets 2.19 and 2.20.

Normally, a 0.2 per cent solution of chlorine should be made up using either sodium hypochlorite (liquid bleach) or calcium hypochlorite (HTH).

Safety for operators handling chlorine

The operation and maintenance of equipment for dosing of chlorine from cylinders should only be undertaken by trained and authorized personnel.

Chlorine is a hazardous substance. In solution it is highly corrosive and splashes can cause burns and damage the eyes.

When handling concentrated chlorine solutions, appropriate precautions should be taken. Ideally, gloves and protective eye glasses should be worn. In the event of splashes and especially splashes to the eyes, it is important immediately to rinse thoroughly with water.

All containers in which chlorine is stored should be labelled, identifying the contents, and with a hazard warning in a form which is readily understood locally.

Storage sites for chlorine in any form should be secure against unauthorized access and especially against children.

Sodium hypochlorite or liquid bleach

Liquid bleach is normally bought in bottles or sachets. Check that the contents are sodium hypochlorite and water only. The normal concentration of chlorine in liquid bleach is five per cent, but this may be lower if the bottle has been opened or stored for a long time (Fact Sheet 2.20 gives further details). Make up the solution as described in Box 1.

Box 1. Using sodium hypochlorite (liquid bleach) to make a chlorine solution

- Fill three plastic buckets with clean water to about 5 cm from the top to allow for the bleach to be added. Most commercially available buckets hold 12.5 litres, but the quantity of water should be checked.
- Add enough liquid bleach to each bucket to make up a 0.2 per cent solution of chlorine.

Example : Capacity of bucket, 12.5 litres water = 12500 millilitres.

Need 0.2% or 0.2 grams of chlorine per 100 millilitres of water,

therefore $\frac{12500 \text{ ml}}{100 \text{ ml}} \times 0.2 \text{ grams} = 25 \text{ grams}$ chlorine is needed per bucket.

Liquid bleach is assumed to contain 4% or 4 grams of chlorine per 100 millilitres,

therefore $\frac{25 \text{ grams}}{4 \text{ grams}} \times 100 \text{ millilitres} = 6.25 \times 100 \text{ millilitres} = 625 \text{ millilitres}$ of
4 grams liquid bleach must be added
to 12.5 litres of water to make
a 0.2 per cent solution of chlorine.

So, 625 millilitres of liquid bleach must be added to each bucket of water.

- Mix the water and bleach well, before use.

Calcium hypochlorite or HTH

Calcium hypochlorite or high test hypochlorite (HTH or HTHC) comes as white granules and can often be bought from a local ministry of health office or from commercial warehouses and pharmacies. Calcium hypochlorite is much stronger than liquid bleach and does not lose strength so quickly. Calcium hypochlorite comes in various forms which can have from 20 to 70 per cent chlorine. Fact Sheet 2.19 covers calcium hypochlorite in more detail.

The best type of calcium hypochlorite to use is high test hypochlorite (HTH or HTHC), as this normally contains 50 to 70 per cent chlorine. Always check with the supplier or on the side of the container to be sure of the percentage chlorine content. Make the chlorine solution as described in Box 2.

Box 2. Using calcium hypochlorite to make a chlorine solution

- Fill three plastic buckets with clean water to about 5 cm from the top to allow for the calcium hypochlorite to be added. Most commercially available buckets hold 12.5 litres, but the quantity of water should be checked.
- Add enough calcium hypochlorite to each bucket to make up a 0.2 per cent solution of chlorine.

Example : Capacity of bucket, 12.5 litres water = 12500 millilitres.

Need 0.2% or 0.2 grams of chlorine per 100 millilitres of water,

therefore $\frac{12500 \text{ ml}}{100 \text{ ml}} \times 0.2 \text{ grams} = 25 \text{ grams chlorine is needed per bucket.}$

If calcium hypochlorite contains 50% chlorine or 50 grams of chlorine per 100 grams of powder, then 25 grams (the amount of chlorine needed per bucket) is contained in

$\frac{25 \times 100 \text{ grams}}{50} = 50 \text{ grams of powder.}$

Therefore, 50 grams calcium hypochlorite must be added to 12.5 litres of water to make a 0.2 per cent solution of chlorine.

So, 50 grams of calcium hypochlorite should be added to each bucket of water.

- Mix the water and calcium hypochlorite well and leave to dissolve for an hour. Some white sediment will sink to the bottom of the bucket ; only the clear liquid should be used to disinfect the tank and the sediment should be thrown away.

Storage tanks

When the tank is ready to go back into service, the disinfected water should be drained and the tank flushed with clean water to reduce the chlorine residual to below 1 mg/l. The chlorine content of the clean water should be checked and water only allowed to flow into the pipe network once an acceptable chlorine residual is reached.

Testing for bacteria

All storage tanks should be tested for contamination with bacteria every six months. If, some days after disinfection, a storage tank still has high levels of contamination, it may need to be continuously chlorinated by adding a small amount of chlorine solution every day. The level of chlorine in the tank should be checked every morning using a pocket tester (as shown in Figure 1) to make sure that there is enough chlorine to kill the germs.

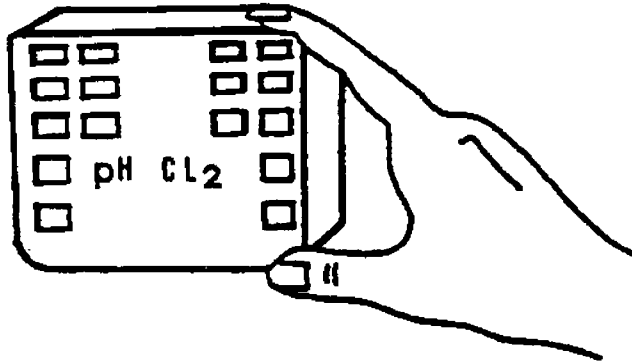


Figure 1. Pocket chlorine tester