

We plan to do the chlorination of the well after every pump installation made by Inter Aide or for every well that the water quality tests indicate a faecal contamination inside the well. This will lead to the disinfection of the water contained inside the well and suppress any contamination coming from the outside of the well.

I. Before going to the field

1. From the store, you need:

- A sufficient quantity of HTH (Chlorine powder) from the store. Keep it into a glass or a plastic container.
- A plastic tablespoon
- A strong rope (sufficiently long for the well you go to chlorinate)
- A metal bucket with a strong handle
- A decametre and a plumb



2. From the lab, you need:

- The turbidity tube
- The Chlorine and pH tester
- The 2m metal sample cable
- The sampling metal cup
- DPD1 tablets
- Phenol Red tablets



II. In the field

- Introduce you to the community and explain them your job and the issue of the visit
- For every step of your work, explain them what and why you do it. Do not go too deep into technical details.
- Before chlorinating the well you should measure the turbidity, the pH and the height of the water column

1. Water sample

- Fetch a water sample from inside the well. Use the sampling metal cup linked to the 2m metal cable. The metal cup must be clean but not necessarily sterile.
- Fix the metal cable to the decametre and make it get down the well.
- Take a water sample for the middle under the surface but not from the bottom of the well.

2. Measuring the turbidity

1) Take the 2 halves of the turbidity tube. Push the upper tube (open at both ends) squarely into the lower tube and align the graduation marks up the side. Look through the open end of the tube at the black circle printed on the yellow base of the tube; this is the marker. Ensure that there is good illumination available. Normal daylight is adequate for this purpose.



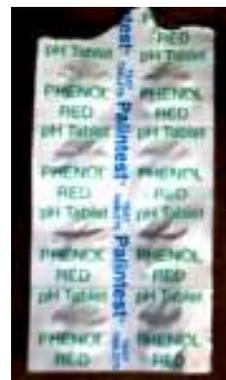
2) Hold the tube vertically (hold the lower tube!) and pour the water sample into the tube until the marker just disappears when viewed from the top of the tube. Avoid creating bubbles, as these may cause false reading. Do not strain to see the black circle as this can sometimes cause biased results.

3) Hold the tube vertically and read the turbidity using the graduation on the side of the tube



3. Measuring the pH

1) Wash the left comparator cell 2 times with the water that is to be analysed, then fill the left cell with the sample. Drop one Phenol Red tablet into the left hand cell.



2) Replace the lid of the comparator and push down firmly to seal. Invert the comparator several times until the tablet have dissolved completely.

Read the pH by holding the comparator up to the daily light and matching the colour in the cell with the left standard colour scale.

Prerequisite conditions for chloration

To be efficient, the chlorination should be done in water with:

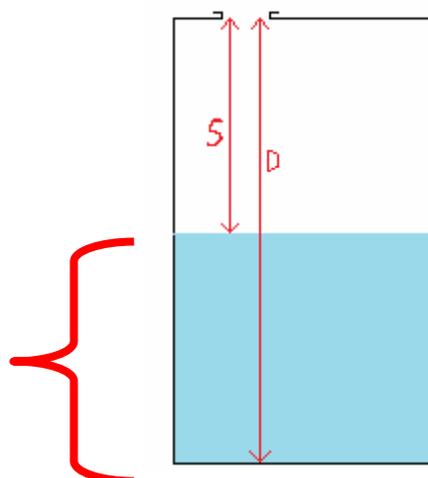
- pH < 8
- Turbidity < 20 N.T.U.

If you meet these 2 required conditions, to can start the following chlorination protocol

4. Measuring the water column

Use the decametre. Open the inspection cover. Measure the distance (S) from the opening of the inspection cover to the surface of the water table. Then let the plumb to down to the bottom of the well and measure the distance (D) from the opening of the inspection cover to bottom.

Subtract the first measurement (S) to this second measurement (D). The result is the water column.



III. Chlorination

1. How to prepare the chlorine solution?

PREVENTION (after installation)

- **As prevention you have to chlorinate the water AND to clean the walls.**

For a preventive chlorination after well construction/rehabilitation and pump installation

Walls cleaning:

Mix a table spoon (15g) of HTH chlorine powder (70%) in a 10 litres bucket. Use a cup or a small pan to splash the wall until the entire wall surface is wet.

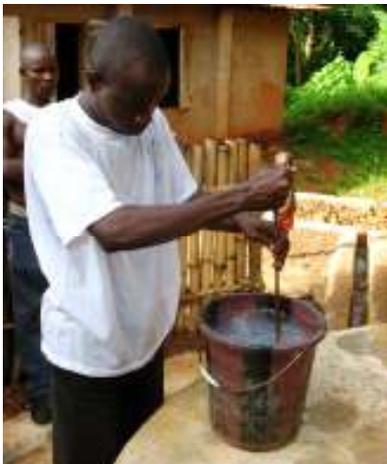
Water chlorination

You need 2 spoons of Chlorine powder as the number of meters of water column. (Round up to nearest)

*Ex: For 2.35m water column.
Round up to 3m... means you need 6 spoons*



Fill ONE bucket of 10 litres with water. Pour TWO tablespoons of chlorine powder in this bucket. Mix it to dissolve the powder. Pour the chlorine solution into the well. Repeat this as many times as you need to drop spoons of chlorine into the well



This is a light chlorination. People can keep drinking the water without problems.

INTERVENTION (after water quality test and bad results)

- **As INTERVENTION: to disinfect the well when faecal contamination has been detected**

Standard Chlorination: The quality of the water inside the well is MODERATE (11 to 50 E.Coli Bacteria colony per 100ml of water)

Walls cleaning:

Mix a table spoon (15g) of HTH chlorine powder (70%) in a 10 litres bucket. Use a cup or a small pan to splash the wall until the entire wall surface is wet.

Water chlorination

You need **5 table spoons of HTH Chlorine powder per meters of water column.** (Round up to nearest)

Ex:

For a 2.35m water column. Round up to 3m... means you need 15 spoons

For 3.83m water column. Round up to 4m... means you need 20 spoons

Fill ONE bucket of 10 litres with water. Pour 2 tablespoon of chlorine powder in this bucket. Mix it to dissolve the powder. Pour the chlorine solution into the well. Repeat this as many times as you need to drop spoons of chlorine into the well

After chlorination, the well access must be forbidden up to the following day. The chlorine concentration is still to high to drink the water. The day after chlorination you need to empty half the well and allow it to recharge until reaching a slight chlorine taste.

Shock chlorination: The quality of the water inside the well is HIGH or VERY HIGH (above 50 E.Coli Bacteria colony per 100ml of water)

Walls cleaning:

Mix a table spoon (15g) of HTH chlorine powder (70%) in a 10 litres bucket. Use a cup or a small pan to splash the wall until the entire wall surface is wet.

Water chlorination

You need **10 table spoons of HTH Chlorine powder as the number of meters of water column.** (Round up to nearest)

Ex: For a 2.35m water column. Round up to 3m... means you need 30 spoons

For 3.83m water column. Round up to 4m... means you need 40 spoons

Fill ONE bucket of 10 litres with water. Pour 4 tablespoons of chlorine powder in this bucket. Mix it to dissolve the powder. Pour the chlorine solution into the well. Repeat this as many times as you need to drop spoons of chlorine into the well

After chlorination, the well access must be forbidden up to the following day. The chlorine concentration is too high to drink the water. The day after chlorination you need to empty totally the well and allow it to recharge totally before drinking the water.

After this first chlorination you need to come back at 3-4 days after the well emptying. Measure the residual chlorine concentration.

4. Measuring the residual chlorine

1) Wash the right comparator cell 2 times with the water that is to be analysed, then fill the right cell with the sample. Drop one DPD1 tablet into the right hand cell.



2) Replace the lid of the comparator and push down firmly to seal. Invert the comparator several times until the tablet has dissolved completely. Read the residual chlorine concentration by holding the comparator up to the daily light and matching the colour in the cell with the left standard colour scale.

The concentration of residual chlorine must be under 0.2mg/L to be possible to do any bacteriological analysis. No red coloration must be revealed by the DPD1 tablet test



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Follow up

If the residual chlorine concentration from inside the well is less than 0.2mg/l, take a water sample to bring back to the lab. Test the faecal contamination again. If the quality is not above 10 E.Coli per 100ml a second chlorination is needed. This must be repeated up to three times. If after three chlorinations, the contamination remains, it has to be concluded that the aquifer itself is contaminated. If it is the case and if no reasons have been found to explain this contamination (old abandoned latrine, very close latrine...) or if the reason has been discovered and can not be solved, it has to be discussed about the possibility to ban the well.