CT Filtron Ceramic Water Filter

Education and Maintenance Guide

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Drinking Dirty Water Can Make You Sick

- Many drinking water sources in Ghana have the potential to cause sickness.
- Sicknesses such as: diarrhea, cholera, typhoid, hepatitis A and B can be caused by drinking polluted water.
- Surface water – lakes, ponds, rivers, streams – may carry pollutants from animal and human faeces, from dead animals, from rubbish and industrial waste, from fuel and oil washed off the road, from motors and cars washed in the lakes and ponds, or from pesticides that wash off agricultural fields.
- Rainwater is usually of high quality. However, rainwater may carry contaminants from the roof such as bacterial contamination from bird faeces. So it is best to divert the first water that comes off the roof in a storm (first flush) away from a rainwater storage tank.

Storage of water is very important to keep it safe. Even if water is very pure at the beginning, poor storage can re-contaminate the water and make you sick. Water containers need to be:

- out of reach of floodwaters,
- in the shade (or covered) to prevent algal growth,
- dispensed using a clean dipper, or tap and not through human contact, and
- cleaned with a sterile cloth or brush.

Next time you or someone you know is sick from diarrhea, check where you got your drinking water from and how you treated and stored it. It may be contaminated.

Drinking contaminated water is not the only way you can get sick. Cleaning your teeth or preparing fresh vegetables with contaminated water can also make you sick. Additionally if you bathe or swim in VERY contaminated water, and splash water into your mouth, you may also get sick. So be careful what water gets into your mouth and your children's mouths. Teach your children not to drink water when bathing, or swimming.

Wet does not mean clean. If you wash your plates, food containers and cutlery in untreated water, YOU NEED TO dry them completely in the sun. Complete drying will bacteria and organisms that live in the water and can make you sick. If your containers are clean ***and dry*** – water borne diseases cannot survive.

How to Get Safe Drinking Water

While there are many ways your water can become polluted, the biggest risks for

Ghanaian drinking water at home is: contamination of the water by bacteria and from contamination in the groundwater.

Ceramic water filters provide an effective and affordable means to treat surface water and shallow well water by removing turbidity (dirt suspended in the water), bacteria, and many viruses.

Other ways to get safe drinking water is by:

- rapid boiling for 15 minutes,
- adding chlorine to the water (chlorine tablets can be purchased from
- pharmacies, markets – 12 tablets (25L) for 1200 riel), or
- Using biosand filters.

These are all safe ways to get safe drinking water.
Note: DO NOT USE A CERAMIC WATER FILTER, BOILING TREATMENT or a BIOSANDFILTER to treat water containing chemical contaminants.

Treated drinking water should be used for

- drinking;
- washing vegetables and cooking where boiling is not involved; and
- Cleaning your teeth.

Items that will touch food – such as plates, cups, cutlery, and pots – should be washed well with detergent and water then dried completely in the sun to kill any bacteria in the water.

How Ceramic Water Filters Work

Ceramic water filters;

- 'strain' the dirt and bacteria out of the water as it passes between the particles the ceramic filter element; and
- kill bacteria as it comes into contact with the silver solution

CT's filters also contain laterite which helps bind viruses, removing them from the water. The CT ceramic filter is manufactured from a mixture of clay and laterite and saw dust.

When clay is baked in the kiln it makes a strong container that can hold water. Water can pass between the particles of the clay, but dirt, bacteria, and other parasites cannot, they are kept behind in the filter. A normal clay pot only lets water seep through very slowly.

In the CT ceramic water filters, saw dust is added to the clay mixture. The saw dust burn out in the high temperatures of the kiln, creating thin clay walls with cavities in between. These thinner clay walls increase the speed that the water moves through the filter, while still requiring water to pass between clay particles and therefore still removing dirt and pathogens.

Silver also kills bacteria. It is used on airplanes, by NASA in space, and in hospitals as a disinfectant. The silver solution in ceramic water filters is very important in killing bacteria. Laterite added to the clay has a high amount of iron oxide in it. The iron has a positive charge when in the filter and seems to hold onto viruses which have a negative charge (like a magnet that holds onto metal). This can help remove viruses from the water.

The filter element is set in a plastic receptacle tank with a plastic lid and a faucet (or tap). The filter element is manually filled with 10 litres of source water. The water is purified as it seeps through the filter element at a rate of approximately 2 litres per hour.

While the filters do not remove chemical contaminants, having access to water filters enables communities currently dependant on chemical affected waters to access and treat alternative water sources, such as surface water, that without filters would be unsafe to drink. Treating Water is a Big Responsibility. Treating drinking water is a big responsibility for parents and family members, and for teachers and students in schools.

Filters are fragile. If you drop them and crack them, they may no longer function properly and should be replaced. Washing filters incorrectly can contaminate them. It is particularly important that the plastic receptacle is free from contamination, as only treated water should be in this container before it is used. If the water in the plastic receptacle becomes contaminated the filter may no longer be safe – this may cause you, your family, or your friends to get sick.

Keys to successful treatment

Make sure you understand the rules very well. Ask questions if you don't understand. Go home and try it. Come back and ask your distributor or your teacher any more questions you have.

Get someone who understands the rules to take responsibility for cleaning the water filter at home, or in the school. Other people can help, but a single person should be aware of all water going into the filter, and how it is being looked after. Implement the rules you have been taught.

Using a Ceramic Water Filter Safely

Identify who is responsible for filling up, cleaning and managing the water filter.
Find a clean and safe place to store the filter – away from animals (eg dogs licking the faucet can contaminate it), floodwaters, toilets.

The filter should be stored in the shade to prevent algal growth, and to protect the plastic which may break down in the sun. If the filter is placed in the sun algae may

make the water taste unpleasant, and possibly contaminate it, and prevent proper treatment of the water.

Cover the filter with a lid to prevent dust and insects which will clog the filter.

Use a cloth over the top of the filter - tied on - to strain water if it is very dirty or has material in it.

Fill up your filter regularly - eg 2-3 times per day if there are many people using the filter - so that you always have a supply of safe water for drinking.

Before using for the first time: When you take a new filter home, fill and empty the clay filter element 2-3 times and dispose of this water (30L total). This will flush out any silver taste, and to remove the taste of the clay.

Clean the filter and receptacle using the steps below;

Cleaning the Water Filter

- Cleaning of the clay filter element is DIFFERENT to cleaning the plastic receptacle. This is because the inside of the filter is where unclean water is placed, whereas the outside of the filter and the inside of the plastic receptacle should only ever be exposed to clean and treated water.

- The clay filter element should not be exposed to soapy water because it is hard to rinse off and will make the water taste bad. Soap may also decrease the activity of the silver solution as a biocide.

General instructions for cleaning the filter system are provided here. More detailed instructions are also available that give detailed procedures.

Scrubbing the Clay Filter Element
Scrubbing the clay filter element is important to release the dirt, dust, and dead bacteria and organisms trapped on the inside of the filter, and to remove any build up of biofilm (slime) on the outside of the filter element.

You should scrub the inside of the filter element **when the flow rate drops a lot, or every 2-4 weeks.** The outside of the clay filter element only comes into contact with the very clean filtered water. This surface should only be **scrubbed with filtered or boiled water**. The scrubbing brush should be clean – eg boiled in a pot of water, or cleaned with detergent and rinsed thoroughly.

DO NOT TOUCH THE OUTSIDE OF THE FILTER ELEMENT WITH YOUR HANDS.
The inside of the clay filter element is where the bacteria, dirt, and other impurities become trapped. As they build up, they slow down the flow of water. Sites for binding

viruses also become saturated and the ability of the filter to deliver clean water is reduced.

This surface needs to be **scrubbed with filtered, or boiled, water and a brush** to release the dirt and dead bacteria from the clay; it should then be rinsed out. Some clay may come away with the scrubbing, but it is minimal and will not affect the filter's effectiveness. The silver solution soaks right into the clay and **will not** be removed too much from scrubbing.

Cleaning the Plastic Receptacle
It is most important that the plastic receptacle is ***cleaned and dried well***. The water in the plastic receptacle is not retreated so it is important it does not contaminated here.

If any bacteria or algae get into the plastic receptacle it can become very contaminated – it is warm and wet inside, which creates an environment that grows lots of bacteria and algae.

The inside of the plastic receptacle, and the plastic faucet should be cleaned with a **brush or firm clean cloth and *soapy filtered (or boiled) water every 2-4 weeks.***

Once cleaned, the plastic receptacle should be rinsed with fresh filtered or boiled water to remove the soap.

After cleaning, the plastic receptacle should be air dried. When it is completely dry, any remaining water borne bacteria and pathogens will die.

Life of a Water Filter – maintenance and replacements

CT recommends you replace your filter element every 3 years.

The filter element should be replaced sooner if:

- It has been dropped (dropping may produce small cracks that you cannot see that may stop the filter working properly)
- It is visibly cracked; or
- After cleaning, the flow rate is too slow.

The plastic receptacle should be replaced if it is cracked, or broken the faucet should be replaced if it is broken.

While CT recommends filter elements are replaced every 3 years, recent studies have indicated no reduction in effectiveness for up to four years as long as the filter element is not broken or cracked (Brown and Sobsey, 2006).

Frequently Asked Questions

Question 1: When I scrub the filter with the brush, clay comes off. Does this mean my filter will stop working? Does it mean the silver is coming off?

Answer 1: No. The silver soaks into the pores deep within the clay so cannot be scrubbed off. Scrubbing that removes some clay may actually improve the performance of the filter by opening up more sites for virus binding and silver action.

Question 2: The filter is too slow, and I can't get the water I need fast enough. What can I do?

Answer 2: Scrub the inside of the filter and rinse out the material that is produced. If after scrubbing it is still too slow, replace the filter with a new one.

Question 3: The outside of my filter element feels like jelly/slimy? Does that mean I need to clean it? Will it make me sick if I don't?

Answer 3: Clean both the inside and the outside of the filter. The jelly substance is called biofilm. Often it is harmless and will not cause bad health, but sometimes it may have a negative effect.

Adopted from rdic. February 2010