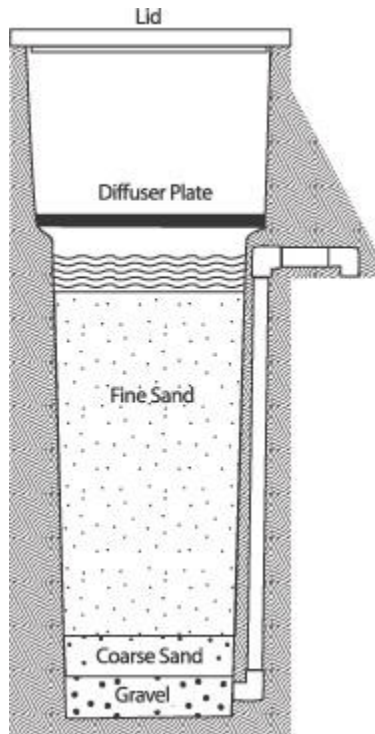


BIOSAND FILTER

What is it?

The Biosand filter is an innovation on traditional slow sand water filters, having been specifically designed for intermittent use.

Slow sand filtration has been used for centuries



The filter can be produced locally anywhere in the world because it is built using materials that are readily available. It is simply a concrete container, enclosing layers of sand and gravel whose purpose is to eliminate sediments, pathogens and other impurities from the water.

How does it work?

Water is poured into the top of the filter as needed, where a diffuser plate placed above the sand bed dissipates the initial force of the water. Traveling slowly through the sand bed, the water then passes through several layers of gravel and collects in a pipe at the base of the filter. At this point, the water is propelled through plastic piping encased in the concrete exterior, and out of the filter, for the user to collect.

How does it remove contaminants?

As with all slow sand filters, the removal of pathogens occurs in the BioSand filter due to a combination of biological and mechanical processes.

When water is poured into the top of the filter, the organic material it is carrying is trapped at the surface of the fine sand, forming a biological layer or 'schmutzdecke'.

Over a period of one to three weeks, micro-organisms colonize the schmutzdecke, where organic food and oxygen derived from the water abounds.

Four processes remove pathogens and other contaminants in this filter:

- Predation
- Natural death
- Adsorption
- Mechanical trapping

Predation

The schmutzdecke micro-organisms consume bacteria and other pathogens found in the water, thereby providing highly effective water treatment.

Natural death

Pathogens are removed due to food scarcity and less than optimal temperatures.

Adsorption

Viruses are adsorbed (become attached) to the sand grains. Once attached, they are metabolized by the cells or are inactivated by antiviral chemicals produced by the organisms in the filter. Certain organic compounds are also adsorbed to the sand and thus removed from the water.

Mechanical trapping

Sediments, cysts and worms are removed from the water by becoming trapped in spaces which lie between the sand grains. When precipitated, the filter can remove some inorganic compounds and metals from the water.

How effective is it?

Slow sand filters have been proven to almost entirely remove the disease-causing organisms found in water. The Biosand technological adaptation of slow sand filtration has proven as effective as traditional slow sand filters, in both laboratory and field tests.

In conjunction with the introduction of the technology to communities, the filter has been tested by various government, research, and health institutions, as well as by non-governmental agencies.

Overall, these studies have shown that the Biosand filter removes:

- More than 90% of fecal coliform
- 100% of protozoa and helminths
- 50-90% of organic and inorganic toxicants
- 95-99% of zinc, copper, cadmium and lead
- < 67% of iron and manganese
- <47% of arsenic
- all suspended sediments

The Centre for Affordable Water and Sanitation Technology (CAWST) is has more information on water and treatment processes. Visit www.cawst.org.