

How to Use BSF Instructions



Shaffaf Bani is a project of Silica Solar Waterloo, Canada www.silicasolar.com

How Does a BSF Work?



- 1** Pour a bucket of dirty water in the top of the filter. Water will start to flow out of the tube. Put the lid back on the filter. The filter should be filled between 1 and 4 times every day.
- 2** The top of the filter is called the reservoir. It can hold 12 liters of water—about 1 bucket. Water coming out will flow fastest when the reservoir is full.
- 3** It usually takes at least 1 hour for the water to stop flowing.
- 4** After the water stops flowing, the filter must rest. The filter must rest for at least 1 hour before pouring more water in. This is called the **Pause Period**.

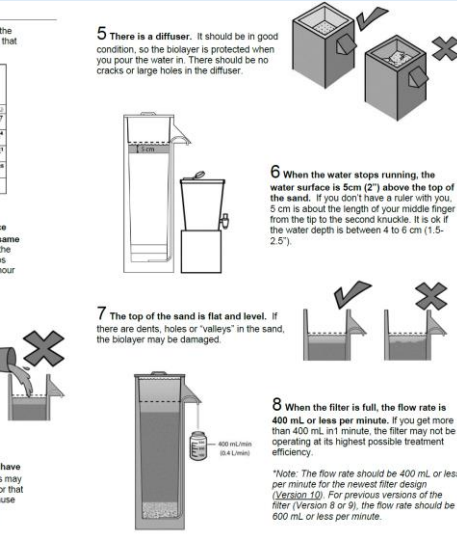
What Does Each Part Do?

- Lid**: The lid should be tight to prevent contamination and keep out unwanted pests.
- Reservoir**: The top of the filter where water is poured to collect in the reservoir. The reservoir can hold 12 liters or a bucket of water.
- Standing Water**: When the water stops flowing, there should be 5 cm of water on top of the sand. This layer of water protects the sand and the biolayer from drying out. The standing water also keeps the biolayer wet. If it dries out, the biolayer needs oxygen. Some oxygen can still get to the biolayer through 4 to 6 cm of water. But if there is more than 6 cm of water, the biolayer will die from lack of oxygen.
- Diffuser**: The diffuser catches the water poured into the BSF. It can be a tube or a plate. It has small holes in it so the water slowly drips through to the sand. The diffuser prevents disturbing the filtration sand and protects the biolayer from drying when the water is poured into the filter.

What Will Tell Me If a Filter is Working Well?

There are 6 points that can tell you if a filter is treating water well. They are called the **8 Key Filter Performance Points**. If these 8 points are met, you can be confident that the filter is removing most microbiological contaminants.

- 1** The filter was installed more than 30 days ago. It takes 30 days for the biolayer to grow and be working well.
- 2** The filter is used at least once every day, with water from the same source every time. Don't forget the Pause Period: after the water stops running, you must wait at least 1 hour before filling it again.
- 3** The water poured into the BSF is clear. The source water should be less than 50 NTU. If you only have dirty or cloudy water, leave it in a bucket until the sediment has settled to the bottom. Then pour the clear water in the bucket into the BSF. Do not pour the sediment in.
- 4** The filter container does not have cracks and is not leaking. Users may not use filters that don't look nice or that make a mess. Also, a leak may cause the standing water level to be too shallow, and the biolayer may be damaged.
- 5** There is a diffuser. It should be in good condition, so the biolayer is protected when you pour the water in. There should be no cracks or large holes in the diffuser.
- 6** When the water stops running, the water surface is 5cm (2") above the top of the sand. If you don't have a ruler with you, 5 cm is about the length of your middle finger from the tip to the second knuckle. It is ok if the water depth is between 4 to 6 cm (1.5-2.5").
- 7** The top of the sand is flat and level. If there are dents, holes or 'valleys' in the sand, the biolayer may be damaged.
- 8** When the filter is full, the flow rate is 400 mL or less per minute. If you get more than 400 mL in 1 minute, the filter may not be operating at its highest possible treatment efficiency.



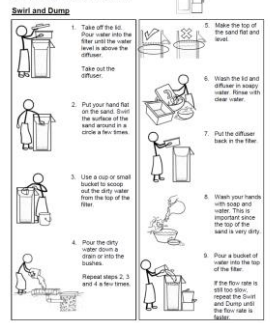
3. How to clean the filter

- The users must know how to clean the filter. There are 2 ways they must clean the filter.
1. Wash the diffuser, lid, and the outside of the outlet tube.
 2. Whenever the flow rate gets too slow, they should do a Swirl and Dump to make the flow rate faster again.
- Cleaning the parts of the filter**
- The diffuser collects dirt and large particles that are in the water. It may get very dirty. The dirt will not harm the drinking water, since the water is filtered after it touches the diffuser. But it is a good idea to clean the diffuser. Cleaning the dirt off the diffuser will help keep the dirt from clogging the sand. It will help keep the flow rate from getting too slow.
- It is also good to wash the lid. If the family stores anything on top of the lid, it should be clean. Also, it will look nicer if it is clean.
- Once a week, wash the diffuser and lid in soapy water. Then rinse them in clear water.
 - You do not have to use safe, filtered water to wash the diffuser and lid. But the water should be as clean and clear as possible.
 - If you don't want to put the lid into the water, you can wipe it with a clean, wet cloth.
- It is important to keep the outlet tube clean. Sometimes the outside of the tube can get dirty. This may make the drinking water dirty again. This is one reason the water should be disinfected after being filtered.
- Once a week, wipe the outside of the outlet tube. Use a cloth with chlorine. Let the tube air-dry.
 - If you do not have chlorine or bleach, use a wet soapy cloth. Then use a clean, wet cloth to rinse off the soap. Use filtered water to clean the outlet tube.
- !** The user should **NEVER** put chlorine inside the outlet tube or into the top of the filter!

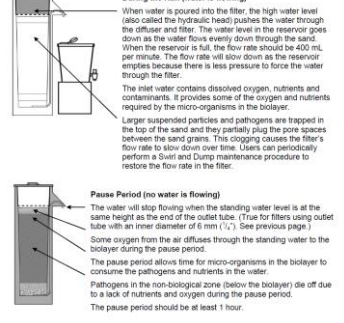
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Stage 1: Educate the User



How the Biosand Filter Operates



What Kind of Water Can I Use?

- You can use any kind of water in the BSF—water from the river, from a pond, from a well, or tapwater.
- Use the best quality water you can in the filter. The water should be the cleanest available since the filter is not able to remove 100% of the pathogens and possibly viruses or protozoans. If the source water is very contaminated, the filtered water may still have some contaminants.
 - Use clear water. The turbidity of the source water is also a key factor in the operation of the filter. Higher turbidity levels will stop the filtration and lower more capacity. In this case, the user will need to do maintenance more often. Swirl and Dump more often to maintain a consistent flow rate. If the source water is more than 50 NTU, it is recommended to do a disinfection method such as boiling the water or using a filter. A single use of a disinfection method such as boiling the water will not work. Place this on top of a paper with yellow letters on it such as the Clorox tag on the manual. If you can see the letters looking down through the top of the bottle, the water probably has a turbidity of less than 50 NTU.
 - Do not pour water that has been chlorinated into the filter. The chlorine will kill the biolayer.
- Clear water**: The filter will work well. **Dirty water**: After a few weeks, the filter will not be able to clean the water. **Very dirty water**: The filter will quickly stop to filter the water. You will need to clean the top of the sand to clean the filter. You will need to clean the top of the sand to clean the filter.
- !** If you have only water, wipe the dirt out of the water by setting it all in a bucket for a few hours before pouring it into the BSF.



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Effectiveness

Parameter	Effectiveness	Laboratory Efficiency
Bacteria	Effective (>90%)	98.7% 1, 2
Viruses	Somewhat Effective (>80%)	85.90%
Giardia	Very Effective (>99%)	100% 3
Cryptosporidium	Very Effective (>99%)	99.88% 3

* All laboratory and field efficiency values shown are from independent testing only.

