



## DRINKING WATER TREATMENT WITH SLOW SAND FILTRATION SYSTEM: OPERATOR MANUAL

Maintaining water at drinking water quality standard is important to the health of the community. It prevents malnourishment, diarrheal diseases, and other illnesses. This manual discusses the testing parameters required to maintain water suitable for human consumption.

The chart below describes the basic parameters to be monitored to ensure water quality, the suggested limit, what can be used to test, test frequency, why it is important, and how to mitigate.

Parameter	Maximum Suggested Limit	Detection	Frequency	Mitigation	Notes/Rationale
Fecal Coliform	0 detectable /100 mL, 0 colonies present (see test kit directions as needed)	-3M Petrifilm or other E. coli test kit	Once a month, should be checked at first, middle, and last house/tap stand of the system	Clean out slow sand filter	Fecal coliforms are a parameter to check for contaminated water. If above the maximum suggested limit, the filtration system is not functioning properly and maintenance is needed.
Turbidity	<5 NTU or Secchi disk visibility inside the reservoir	Secchi disk or equivalent instrument	Weekly, after a big rain event, should be measured inside of the reservoir	Sedimentation	If water is turbid, it is an indicator the filter is not functioning properly.

To ensure water quality and source protection, conduct the following:

- Monitor the water flow from the filtration system, if flow is low the filtration system may need further cleaning (cleaning typically is needed every two weeks but should be conducted as needed)
- No latrines, open defecation, animals, trash disposal, vehicle washing/maintenance, and washing within 30-meters of water source
- From water source, no uphill or upstream fumigation or agriculture
- The perimeter fence is secure and no repairs are needed
- Water source remains clean of garbage
- Plants around water source maintained to keep water source easily accessible
- Ensure there are no leaks, all lids are in place with locks and all air vents are screened
- Check cleanout line for blockages

*After the first heavy rainfall, make sure to check turbidity and fecal coliform levels. Also look for garbage and plants around the water source*

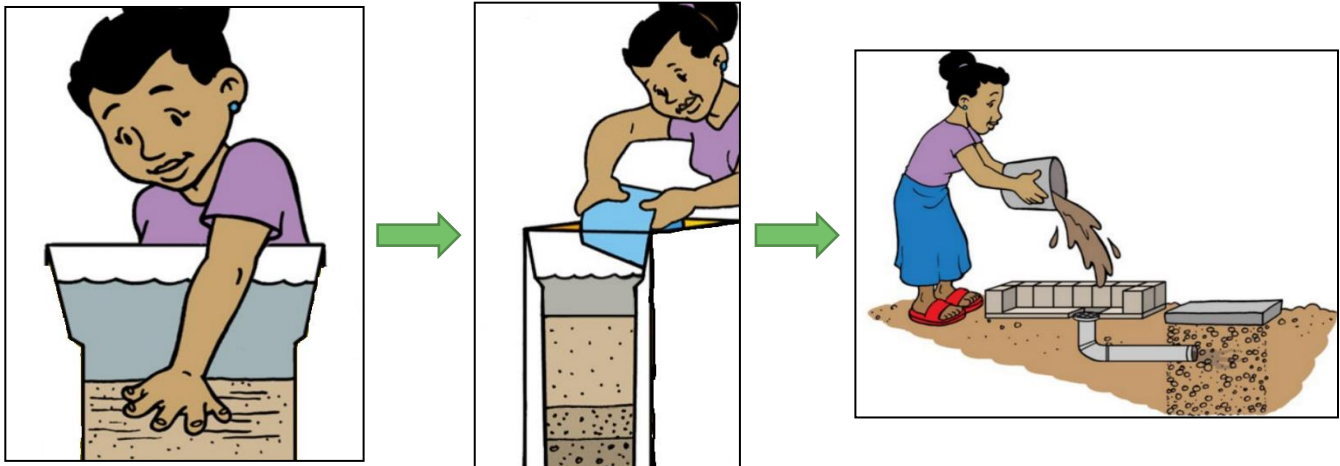
*Do not forget to conduct required government water quality testing.*



## Troubleshooting

**-Biosand filter is clogged/low flow coming from the biosand filter to the reservoir:** The contaminants trapped by this filter remain in the first layer of fine sand, and as they accumulate, they can cover the filter. Therefore, every two weeks or more frequently if the filter is overflowing or the flowrate is slower than normal, a simple cleaning should be carried out. For cleaning:

1. Ensure that the pump is switched off.
2. Remove the filter tank cover.
3. Remove the diffuser tubes that are inside the upper part of the tank (only if they interfere).
4. Stir the first 5 to 10 cm of sand with your hand or a clean broom handle so that the dirt from the sand comes out of the water.
5. Then remove the dirty water with a bucket and throw it where it can filter through the earth, away from the filters and where it will not cause much mud.
6. Finally, replace the diffuser tubes, close the tank lid tightly, and return the pump to normal operation.



**Water from tap is turbid:** If the water coming from the tap is turbid, the filtration system most likely needs to be cleaned. See "Biosand filter is clogged/low flow coming from the biosand filter to the reservoir" section above. If the water continues to be turbid, there is likely a break in the water line where sand is entering. Walk the water system to check for water leaks.

**-No Secchi disk:** if a Secchi disk is not available to test turbidity, one can be created with an old CD or DVD disk. With a marker, divide the disk into quarters and paint it black and white, as seen in the picture below. Using a 10-meter long string, put one end through the center of the disk and securely tie it to the disk. Tie it in a way to see the painted side of the disk when it is immersed in water. Also add weighted objects (i.e. washers, PVC pipe) as needed to ensure the disc sinks. At the reservoir, slowly lower the Secchi disk

into the reservoir until it reaches the bottom. At the bottom, if the colored part of the Secchi disk can be seen clearly, the water is not turbid. If it cannot be seen clearly, the water is turbid.

