Appendix D: Sawyer PointONE Water Filters

Introduction

Sawyer PointOne water filters are UWP's water treatment technology of choice for both household and facility settings in Uganda. The Sawyer PointONE's hollow-fiber membrane technology provides a lightweight and compact filter design, without compromising water treatment capabilities. The filter is easy to transport, simple to use, and effectively removes both waterborne pathogens and turbidity. According to manufacturer specifications, with proper use, each filter can last several years and filter as many as 1,000,000 gallons (3.8 million liters). As a point-of-use treatment technology, Sawyer PointOne water filters are used to treat water between collection and consumption. If the filtered water is not consumed immediately following filtration, it should be stored in a safe water storage container to prevent subsequent recontamination.

UWP Sawyer PointONE Distributions

UWP distributes Sawyer PointONE water filters with each rainwater catchment installation. Under normal circumstances, four filters are distributed per rainwater catchment; when special circumstances arise, alternative arrangements may be made. During monitoring visits, if UWP determines that a facility has shown exemplary stewardship of their original filters and would benefit from additional filters, more may be provided. Beyond project-based distributions, UWP actively distributes Sawyer PointONE filters as a part of its household filter distribution program. Filters are also distributed at facilities that do not qualify for a rainwater catchment installation, but have a clear need for point-of-use water treatment. UWP also sells Sawyer PointONE filters (with bucket adapter kit and yellow jerrycan) at a cost of 200,000 UGX. In exceptional cases, UWP will distribute Sawyer PointONE water filters *ad hoc* to deserving recipients from communities and partner organizations.

Effectiveness

Sawyer PointONE water filters employ hollow fiber membrane technology, akin to that used for kidney dialysis. The filter itself consists of "U" shaped micro-tubes with pores certified to be 0.1 microns or smaller. These micro-pores allow water to pass through the membrane, but trap any contaminants 0.1 microns or larger. This means that Sawyer PointONE filters effectively remove more than 99.9% of bacteria, protozoa, helminths, and cysts. The filter is also effective at removing turbidity, providing crystal clear water for consumption. Unfortunately, Sawyer PointONE filters are not as effective at removing viral contaminants, nor are they designed to remove chemicals from the water.

Flow Rates

The hollow-fiber membrane inside each Sawyer PointONE water filter is composed of a substantial number of micro-tubes which create significant surface area within the filter. This high surface area permits relatively fast flow rates, making Sawyer PointONE filters reliable as point-of-use water treatment

solutions. Though filter flow rates vary, a typical Sawyer PointONE filter can treat between 32 and 47 liters per hour. Ultimately, filter flow rates are dependent on three variables: head pressure (greater pressure, faster flow), altitude (higher altitude, slower flow), and cleanliness (uncleaned filters may develop blockages).

Bucket Adaptor Kit

All Sawyer PointONE filters distributed by UWP are accompanied by Sawyer bucket adapter kits, which allow filters to be attached to elevated holding containers for gravity-fed filtration. The bucket adapter kit facilitates connection to any storage container; UWP uses the adapter kit to connect Sawyer PointONE filters to 20L yellow jerrycans, the most common water collection container used in Uganda. Each filter distributed by UWP comes equipped with a 20L yellow jerrycan and pre-installed bucket adaptor. By using a 20L jerrycan as an elevated holding container, UWP filter kits can treat a substantial volume of water without requiring continuous refills.

Filter Kit Assembly

Using a 22 mm (13/16”) hole cutter, drill an outlet hole 1.5 inches from the bottom of the bucket, directly below the jerrycan neck on the jerrycan’s front face. Atop the jerrycan, beside the jerrycan neck, drill a small hole to hang the filter clip. Using UWP’s custom adaptor kit tool, extend the hex-bolt and inner rubber o-ring to the bottom of the jerrycan via the jerrycan neck. From the outside of the jerrycan, connect the adapter, including the outer rubber o-ring, and tighten the bucket adapter to create a tight connection. Attach the hose to the bucket adapter and screw the other end of the hose to the Sawyer PointONE filter (depending on the model, a grey nipple may be required to connect the hose to the filter). To prevent leaks, ensure that the white plastic seal inside the thread-side of the Sawyer PointONE filter is in place (it can become dislodged and fall out). Attach the clip to the Sawyer PointONE filter and hang it on the jerry can using the small drilled hole.

Operation

To operate the Sawyer PointONE filter, users must fill the upper jerrycan with water. When the filter is hung using the filter clip, it will be elevated above the top of the water level, turning the filter off. To begin filtering, users must unclip the filter and let it hang below the water level. Water will flow down the hose and through the filter cartridge. The greater the distance between the filter and the top of the water line, the faster the water flows. After passing through the filter, water is safe to drink. It is best to capture filtered water in a safe storage container placed directly below the filter. A clean funnel (or a soda bottle with the bottom cut off) can be used to ensure all flow is directed into the safe water storage container. Any water that comes out of the filter will be safe to drink; the safe water storage containers prevents water from becoming recontaminated after filtration. To ensure filtered water does not become recontaminated, the safe storage container must be cleaned weekly using a bleaching liquid (Jik, vinegar, WaterGuard, etc).

Maintenance

Sawyer PointONE filters are designed to trap any dirt and contaminants greater than 0.1 microns in size. Consequently, the hollow-fiber membrane pores begin to clog after use, restricting or completely obstructing flow. To keep flow rates high and prevent blockages from developing, the filter must be back-flushed using the syringe (or bottle adapter with plastic soda bottle) provided in the filter kit. UWP recommends that filters be back-flushed after each use or whenever the flow rate slows.

Backflushing Instructions

To backflush Sawyer PointONE water filters, users need a minimum of 500 mL (16 ounces) of clean, filtered water. UWP recommends that filtered water from a Sawyer PointONE filter be used for backflushing. However, in the case of complete blockage, water from another safe source (such as bottled water) is sufficient. Next, users should fill the syringe with filtered water, remove the white push-pull cap, and commence backflushing. The filter should remain attached to the hose during backflushing. Backflushing entails using the syringe to push water through the filter opposite the direction that it normally flows (opposite the arrow on the filter). This process will push dirt, debris, and contaminants backwards, out of the filter and into the yellow jerrycan. Repeat this process with 5 full syringes of clean filtered water. After backflushing is complete, any water that has been backflushed into the yellow jerrycan can be discarded. At this point, the yellow jerrycan can be refilled and filtration can begin again.

Trouble-Shooting

If the filter becomes severely clogged, it is possible that regular backflushing will not restore flow rates. Often, this occurs when the filter dries out with dirt still inside. If a severe blockage occurs, steps can be taken to resolve the problem. To begin, UWP recommends tapping the filter on the palm of your hand several times to dislodge any build-up (do not tap on a hard surface). After tapping, regular backflushing can be attempted. If this does not resolve the problem, backflushing using warm water should be tried. It is important to not use hot water; you should be able to put your hand in the warm water without burning it. If the filter remains clogged after this attempt, it should be allowed to soak in a container of warm water for approximately 30 minutes. After soaking, backflushing with warm water should be attempted again. If a warm-water soak still does not remove the blockage, the filter should be soaked in vinegar for an hour. After a vinegar soak, the filter should be backflushed with warm water.

Complete UWP Filter Assembly

A complete UWP filter assembly includes a Sawyer PointONE water filter with bucket adaptor kit attached to a 20L yellow jerrycan, a filter stand (wooden or metal), and a safe water storage container (20L white jerrycan with a spigot). From experience, UWP has found Sawyer PointONE filters are used most frequently and properly when placed on a designated stand that supports both the upper and lower jerrycans. For this reason, UWP distributes metal stands with all facility-based distributions and requires household filter recipients to procure their own stand. UWP manufactures wooden and metal stands, for both distribution and sale. Each model is designed to support up to two filter kits. In addition to stands, safe water storage

containers are distributed with filters at facilities and are considered a requirement for household distributions.

Filter Kit Component	Distributed With Rainwater Catchment Installations	Distributed For Household Program	Sold by UWP	Price
Sawyer PointONE Filter	✓	✓	✓	200,000 Ush *(sold together)*
Bucket Adaptor Kit	✓	✓	✓	
Yellow Holding Jerrycan	✓	✓	✓	
Metal Filter Stand	✓		✓	60,000 Ush
Wooden Filter Stand			✓	25,000 Ush
White Storage Jerrycan	✓		✓	15,000 Ush