SteriPEN™
safe drinking water anywhere

SteriPEN™ User's Guide

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Instructions for Using SteriPEN™ and Water Bottle Pre-Filter by SteriPEN™

Message from Hydro-Photon

Thank you for buying SteriPEN™, and congratulations on your purchase. Years of careful research, development and testing have gone into the creation of this unique product. If used as directed, SteriPEN™ can greatly reduce one's exposure to a wide range of infectious waterborne microbes.

Designed, Developed and Proven in the USA by Hydro-Photon, Inc.
P.O. Box 675
262 Ellsworth Rd.
Blue Hill, Maine 04614 USA
Toll-Free in US: (888) 826-6234
Phone: (207) 374-5800
Fax: (207) 374-5100
info@steripen.com
www.steripen.com

1. Operating the SteriPEN™

SteriPEN™ is intended for use with clear water. Discolored or dirty water should be pre-filtered until clear prior to SteriPEN™ treatment. See instructions for using the Water Bottle Pre-Filter by SteriPEN, page 17.

SteriPEN™ can treat two ranges of water volume:

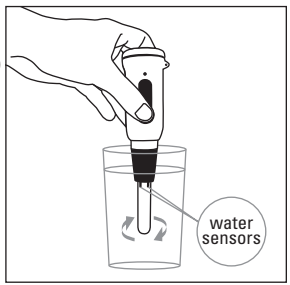
- up to 16 fl. oz. (0.5 litres)
- between 16 and 32 fl. oz. (0.5 – 1.0 litre)

To treat up to 16 fl. oz. (0.5 litres) of water:

1) Remove lamp cover

2) Push On/Off button **twice** – green LED (Light Emitting Diode) will flash for up to 15 seconds indicating SteriPEN™ is ready to use

3) Dip the ultraviolet (UV) lamp end of the device into the water to be treated (16 fl. oz. (0.5 litres) or less) so that lamp and water sensors are completely immersed. When water is detected, lamp will turn on automatically, emitting both UV and visible light. *Note: If visible light is not evident, SteriPEN's lamp is not on, and water should not be consumed.*



4) When lamp turns on, it is important to agitate the water by stirring with the SteriPEN™ until the lamp automatically turns off. Alternately, if the water container's mouth allows for a watertight seal with SteriPEN's rubberized neck, the container and SteriPEN™ can be inverted as a unit and rocked to agitate water. Once lamp turns off, green indicator LED (Light Emitting Diode) will turn on to show that the UV dose is complete. *Note: If red LED turns on after lamp shuts off, the dose was not complete due to low battery, removal of water sensors from water, or malfunction. (See "SteriPEN™ LED signals" later in this section)*

5) Remove SteriPEN™ from water, dry or shake off excess water and replace lamp cover.

To treat between 16 and 32 fl. oz. (0.5 – 1.0 litre) of water:

1) Remove lamp cover
2) Push On/Off button **once** – green LED (Light Emitting Diode) will flash for up to 15 seconds indicating SteriPEN™ is ready to use
3) Dip the UV lamp end of the device into the water to be treated (between 16 and 32 fl. oz. (0.5 – 1.0 litre) so that lamp and water sensors are completely immersed. When water is detected, lamp will turn on automatically, emitting both UV and visible light. *Note: If visible light is not evident, SteriPEN's lamp is not on, and water should not be consumed.*
4) When lamp turns on, it is important to agitate the water by stirring with the SteriPEN™ until the lamp automatically turns off. Alternately, if the water container's mouth allows for a watertight seal with SteriPEN's rubberized neck, the container and SteriPEN™ can be inverted as a unit and rocked to agitate water – see illustration. Once lamp turns off, green indicator LED will flash slowly to show that the UV dose is complete. *Note: If red LED turns on after lamp shuts off the dose was not complete due to low battery, removal of water sensors from water, or malfunction. (See "SteriPEN™ LED signals" later in this section)*
5) Remove SteriPEN™ from water, dry or shake off excess water, and replace lamp cover.

Safety

SteriPEN's lamp emits both visible and UV light. When SteriPEN's lamp is on, the light you see is visible blue and violet light, **not** UV light. SteriPEN's UV light is far outside the range detectable by the human eye.

Because UV light can be harmful to skin and eyes, it is important that SteriPEN™ be used properly. SteriPEN™ may be used in glass, plastic, ceramic or metal containers. While some of these materials are transparent to SteriPEN's visible light, they all absorb and reflect UV light, thereby shielding the user from UV exposure. Quartz is one of the few materials that is transparent to UV; it does not shield the user from UV light. Therefore, SteriPEN™ should not be used in quartz containers.

The air/water interface at the top of any drinking container is highly reflective to UV and reflects UV back into the container.

Radiometer testing of SteriPEN™ indicates that proper use according to instructions results in virtually no escape of germicidal UV light from the container being treated.

When batteries are low, SteriPEN's UV lamp will turn off and the red LED (Light Emitting Diode) will flash for 8 seconds. This red LED indicates that the last UV treatment was incomplete and batteries must be changed before further operation.

Water Sense Circuitry

SteriPEN's water sense circuitry is intended to prevent the UV lamp from illuminating unless it is completely immersed in water. Never attempt to by-pass this important safety feature. While the green LED (Light Emitting Diode) is flashing, place SteriPEN™ in water so that entire lamp and sensors are immersed. Water will then be sensed, causing the green LED to turn off and UV lamp to light. As long as the lamp is not removed from water for more than 1 second, lamp will remain on until the dose is complete or low battery voltage is detected. If SteriPEN™ is not immersed in water within 15 seconds of being activated, it will deactivate.

Agitation of Water

Once device has been immersed in water, and lamp has illuminated, it is very important for the user to agitate the water for the entire dose period. Agitation of the water by stirring with SteriPEN™ or rocking the container is essential for proper operation as this insures uniform exposure of all water to germicidal UV light.

Dose Period

Output from a UV lamp varies depending on lamp temperature and state (i.e. vapor or liquid) of mercury within the lamp. Warm lamps with vaporized mercury output more UV light than cold lamps. For this reason SteriPEN™ is equipped with an internal temperature sensor, a timer, and a micro-controller. The micro-controller monitors ambient temperature and lamp use. Monitoring these factors, SteriPEN™ can administer a UV dose for an appropriate time period. Generally, SteriPEN™ will provide a 48-second dose for volumes up to 16 fl. oz. (0.5 litres), and a 90-second dose for volumes between 16 and 32 fl. oz. (0.5 – 1.0 litre).

Cold Weather Considerations

If SteriPEN™ is at a temperature below 32°F/0°C it should not be used. Bring SteriPEN™ up to a temperature above 32°F/0°C before using. Also, battery performance may be adversely affected by cold weather; refer to section 6 for additional information.

Dose Counter

Ultraviolet lamp performance can degrade after many on/off cycles. While our research on test lamps has shown acceptable UV output levels after more than 9,000 cycles, we recommend replacing the lamp after 5,000 treatments. SteriPEN's internal micro-controller counts the number of doses the lamp has completed. Beginning at the completion of dose number 4,900 and continuing through the completion of the next 100 doses, SteriPEN's green LED (Light Emitting Diode) will flash slowly and then remain steady. This is to notify the user that the current dose was completed, but that the lamp should be replaced. When the counter reaches 5,000 doses, SteriPEN™ will disable the lamp and the red LED will flash slowly. SteriPEN™ will not function until the lamp is replaced. For UV lamp replacement, call your local distributor/importer.

SteriPEN™ LED (Light Emitting Diode) Signals

LED Color and Pattern Display	Indication
Green, fast flashing (after button push)	Unit is armed and ready to treat water
Green, slow flashing: 1 second on, 1 second off (after dose completion)	32 fl. oz. (1 litre) dose completed
Green, slow flash, then steady (after dose completion)	Over 4,900 treatments completed; lamp replacement needed in under 100 doses
Green, steady (after dose completion)	16 fl. oz. (0.5litres) dose completed
Red, single flash	SteriPEN™ not immersed in water within 15 seconds of button push
Red, fast flashing	Batteries low; replace or recharge
Red, slow flashing	Time to replace lamp; 5,000 doses have occurred
Red, steady	Dose is incomplete due to removal from water or damage to device

2. How does SteriPEN™ disinfect water?

SteriPEN™ uses short wave germicidal UV light to disinfect water. This range of UV light destroys the DNA within bacteria, viruses and protozoa, rendering them unable to reproduce and therefore, harmless. UV treatment is a proven and long-accepted method for disinfecting drinking water. Users of UV technology include municipal water treatment plants, water bottling companies, hospitals, hotels, and homeowners. For more detailed information on how germicidal UV light destroys micro-organisms, visit our web site at www.steripen.com.

Partial List of Micro-organisms UV Light Can Destroy

Bacillus anthracis (Anthrax)
Bacteriophage (E. Coli)
Cryptosporidium
Dysentery bacilli (diarrhea)
Giardia
Hepatitis
Influenza
Legionella pneumophilia (Legionnaire's Disease)
Poliovirus (Poliomyelitis)
Salmonella (food poisoning)
Salmonella paratyphi (Enteric Fever)
Salmonella typhosa (Typhoid Fever)
Staphylococcus epidermis
Streptococcus faecaelis
Tetanus
Tuberculosis
Vibrio comma (Cholera)

3. Warnings for Safe Use

- Improper operation of SteriPEN™ may cause injury. *Read and understand all warnings prior to operating SteriPEN™.*
- Use only as directed in Section 1, "Operating the SteriPEN™."
- Do not allow water to enter SteriPEN™ through the battery compartment. While the battery compartment seal is designed to be water resistant, it is not guaranteed to be impermeable.
- Do not submerge the battery compartment end of the device.
- Do not operate SteriPEN™ in quartz containers such as quartz laboratory beakers. Quartz will not shield the user from the lamp's UV light.
- SteriPEN's UV lamp should not be activated or operated unless lamp is fully immersed in a container of water.
- SteriPEN™ is not intended for use by children.
- SteriPEN™ is a high voltage device. Other than the batteries, there are no user replaceable or repairable parts. Please return to your local distributor/importer for any repair.
- Other than removal of the lamp cover, battery end cap, and batteries, never disassemble SteriPEN™. Removal or tampering with the electronic circuit board or lamp assembly may cause injury, or damage SteriPEN™.
- Do not allow anyone to use this product until they fully understand proper operating procedure as outlined in section 1 of this User's Guide.
- Do not open, expose, modify or touch internal circuitry; this can lead to high voltage shock.
- Do not attempt to bypass water sensor; this is an important safety feature.
- As with any water treatment system, you should always have a backup method available. In the event that your SteriPEN™ is lost, broken or non-functional due to low batteries, you will need an alternative to make your water safe.
- Like most fluorescent-type lamps, SteriPEN's lamp contains a small amount of mercury. Please return your SteriPEN™ at the end of its productive life to your distributor/importer to permit correct recycling or safe disposal.

- SteriPEN™ is not intended to disinfect surfaces of a drinking container, i.e. those that typically contact the mouth when drinking. Be certain that your drinking container has been properly cleaned/washed prior to using SteriPEN™.
- SteriPEN™ is not intended to disinfect water above the surface of the water in the container, i.e., droplets of water suspended on the side of the glass.
- SteriPEN™ is intended for use with clear water only. Dirty, discolored water should be pre-filtered until clear prior to treatment with SteriPEN. See instructions for using the Water Bottle Pre-Filter by SteriPEN on page 17.

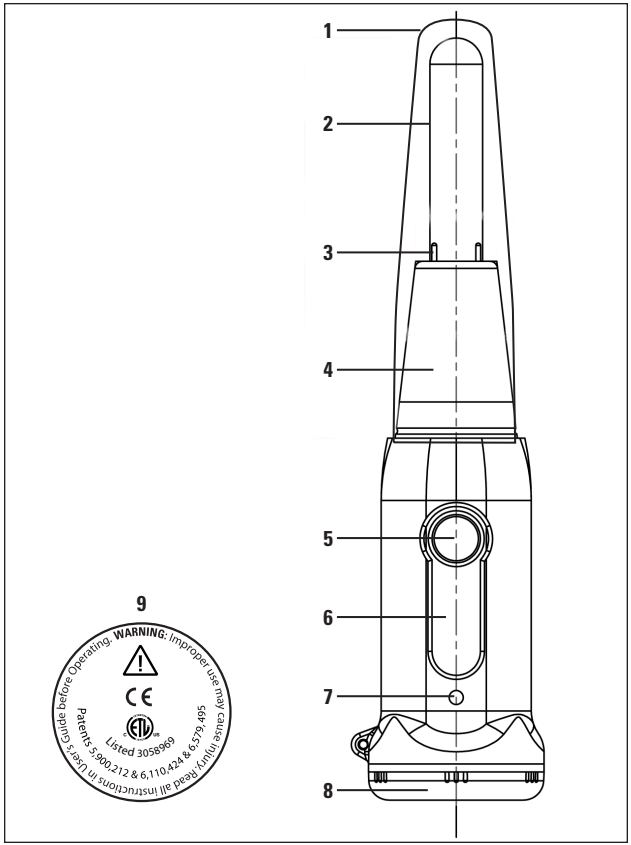
- SteriPEN™ is intended for use in clear liquid water only – not ice. It is not intended for use with other liquids or solids.
- SteriPEN™ is designed to treat 16 or 32 fl. oz. (0.5 or 1.0 litre) of clear water. If in doubt about volume of water to be treated, confirm volume with a measuring device such as a measuring cup.
- Do not use in visibly dirty water.
- Do not store SteriPEN™ for long periods with alkaline batteries installed. Dormant alkaline batteries can outgas and in rare cases have caused explosions in devices such as flashlights and radios.
- When operating properly, SteriPEN's lamp will emit visible light as well as UV. If lamp is not emitting visible light, it is not functioning properly, and should not be used until repaired.
- SteriPEN's lamp assembly must be clean prior to use. Dirt, oil or other materials on the lamp assembly will block UV light and may result in an insufficient UV dose.
- If SteriPEN™ is below 32°F/0°C it should be warmed above 32°F/0°C before operating.
- Do not allow impact to the lamp end. If lamp assembly (lamp or quartz sleeve) is cracked, chipped or damaged, do not operate. Return to your local distributor/importer for repair.
- Do not use as a light source.
- Do not use in liquids other than clear water.
- Do not use in water with ice.
- Do not use in water above 140°F/60°C.

- UV light can be harmful to eyes and skin. Never look at an unshielded UV lamp during operation. When used properly, according to instructions, the user is well shielded from SteriPEN's UV light.
- Do not operate near skin.
- Do not operate near eyes.
- Do not insert into bodily orifices.
- While carefully controlled microbiological testing of SteriPEN™ has been conducted, use of SteriPEN™ in the field may produce results that vary from our laboratory test data. (See Section 10 of this User's Guide).
- Do not use in any manner other than instructed in this User's Guide.

It is important to remember that infectious microbes can be encountered not only in drinking water. Some other ways that infectious diseases can be spread are through:

- Improperly prepared or cooked food
- Foods washed in unsafe water
- Contact with infected people, animals or objects
- Water unintentionally consumed, as when brushing teeth, showering, swimming or taking medications.

Opportunities for infection are abundant and virtually everywhere, so it is important to realize that use of SteriPEN™ does not guarantee that the user will avoid illness. To avoid microbial infection, one must take a wide range of precautions. Use of SteriPEN™ is an important precaution, but not the only precaution that one should take.



4. Guide to SteriPEN™ Parts

1) UV Lamp Cover
2) UV Lamp Assembly
3) Water Sensors (2)
4) Rubberized neck
5) On/Off Button
6) Thumb Grip (finger grips on opposite side of device)
7) Indicator LED (Light Emitting Diode): shows activation status
8) Battery Compartment End Cap
9) Warning label

5. Battery Selection & Installation

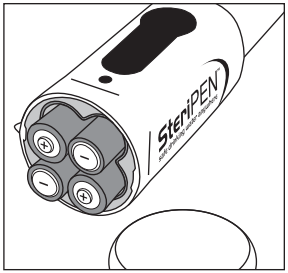
SteriPEN™ uses 4 AA cell batteries. Disposable alkaline, rechargeable nickel metal hydride (NiMH), and Lithium ion (LiI) 1.5V batteries may be used. Nickel Cadmium (NiCad) batteries may also be used, but provide a much smaller number of doses.

While any AA cell batteries work, our tests show that Lithium batteries average 130 16 fl. oz. (0.5 litres) treatments, NiMH average 150 16 fl. oz. (0.5 litres) treatments, and Alkaline offer 20-30 16 fl. oz. (0.5 litres) treatments. Colder ambient temperatures may negatively affect the number of doses per battery charge. NiMH rechargeable batteries are the best choice for economical use as well as for cold weather. Store your batteries in your pocket or warm place when in cold weather conditions.

Note that alkaline batteries should not be stored in the SteriPEN™ for long periods of time as they may outgas. There have been rare reports of dormant alkaline batteries causing explosions in devices such as flashlights and radios. If you use alkaline batteries, remove them from SteriPEN™ before storing the device.

When batteries are low, SteriPEN's UV lamp will turn off and the red LED (Light Emitting Diode) will flash for 8 seconds. This red LED indicates that the last UV treatment was incomplete and batteries must be changed before further operation.

To replace batteries, remove the battery end cap. Remove and dispose of, or recharge, old batteries depending on the type of battery used. Install new batteries in the end cap with polarities as shown. Re-install end cap.



6. Care and Cleaning

When not in use, SteriPEN™ should be kept in a clean, dry, non-abrasive area or container. SteriPEN™ should not be exposed to ambient temperatures above 140°F/60°C or below -4°F/-20°C. When storing SteriPEN™ for long periods, remove batteries.

To clean SteriPEN™, wash with a soft cloth and a mild soap solution. Rinse soap from device and dry with a clean, soft cloth. Note that while the battery compartment of SteriPEN™ is designed to be water resistant, it is not guaranteed to be impermeable and should therefore never be submerged.

7. Troubleshooting

If flashing green LED (Light Emitting Diode) shows that SteriPEN™ is armed, but the lamp does not light when immersed in water, check to be sure lamp is completely immersed and that water is contacting both sensors.

If immediately after completing a treatment another treatment is attempted, but fast flashing green LED will not activate, check to see that SteriPEN's water sensors are not immersed in water or wet. Remove SteriPEN™ from water or dry sensors off and press On/Off button again.

If fresh batteries have been installed, but SteriPEN™ will not complete a dose, low temperature may be the cause. Batteries are often adversely affected by cold. If the batteries are very cold, warm them up and try again. Lithium and alkaline batteries are particularly bad performers in cold. NiMH rechargeable batteries are a better choice for cold weather applications.

8. Repair Information

Any repairs to your SteriPEN™ should be done by an authorized technician. Please contact your local distributor/importer for all repairs. See inside back cover of User's Guide for distributor/importer contact information.

9. Technical Information

Battery Type: AA
Battery Voltage: 1.5 nominal
Number of Batteries: 4
Device Body: ABS (FDA approved)
Device Weight without Batteries: 3.7 oz. (105 grams)
Device Length: 7.5 inches (19 cm)
Device Maximum Diameter: 1.7 inches (4 cm)

10. Testing

At Hydro-Photon, we believe that careful testing is an important part of successful and responsible product development and quality control. A wide range of testing has gone into the development and production of your SteriPEN™. To see SteriPEN's full microbiological test reports conducted at the University of Arizona, Tucson; University of Maine, Orono; and Oregon Health Sciences University, Portland, visit the "Testing" section of our web site at: www.steripen.com.

11. Certifications & Patents

Compliance testing of SteriPEN™ for the cETLus and CE marks was successfully completed at Intertek Testing Services (ITS), Boxborough, MA, USA. This testing is described in ITS test report number: J20027896.01, October 18, 2000.

Listed 3058969. Conforms to UL Standard UL 61010B-1

Certified to CAN/CSA C22.2 No. 1010.1-92

Conforms to EN 61010-1: 1993 + A1 + A2 and EN 61326

U.S.E.P.A. Company #73679, U.S. EPA Establishment #07369-ME-001

Used as directed, SteriPEN™ meets the standard as set forth in the U.S. E.P.A. Guide Standard and Protocol for Testing Microbiological Water Purifiers on 16 fl. oz. (0.5 litres) volume. Microbiological tests at the University of Maine on 32 fl. oz. (1 litre) volume indicate that results should substantially exceed the U.S. E.P.A. guidelines on the removal/inactivation of bacteria, viruses and protozoan cysts when SteriPEN™ is used as directed.

SteriPEN™ technology is patented in the USA with further U.S. patents pending and patents pending worldwide. U.S. Patents numbers: 5,900,212, 6,110,424, 6,579,495. SteriPEN™ is a trademark of Hydro-Photon, Inc.

12. Product Registration & Warranty Information

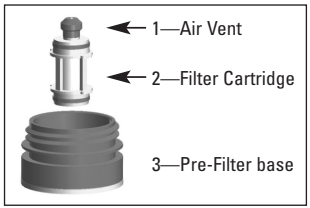
For product registration and warranty information, please visit www.steripen.com/warranty or contact your local distributor/importer. See the inside back cover of the User's Guide for distributor/importer contact information.

13. Contact Information

Please see local distributor/importer contact information on the inside back cover of the User's Guide.

Water Bottle Pre-Filter User's Guide

The Water Bottle Pre-Filter by SteriPEN™ is designed to remove large particulate matter from drinking water prior to purification treatment. While the Pre-Filter can be used in conjunction with any purification method, it is specifically designed for use with the SteriPEN™ ultraviolet water purifier.



The Pre-Filter can be used in two ways: "Pour-through" and "Immersion."

Pour-through:

1) Screw Pre-Filter base onto Nalgene® type 32 fl. oz. (1 litre) wide-mouth bottle until tight.
2) Insert filter cartridge into opening in Pre-Filter base with open end of cartridge down. Twist filter cartridge to lock in place and pull air vent valve open.
3) Pour water through filter cartridge until bottle is filled to desired level.
4) Remove Pre-Filter base and cartridge as a unit from bottle. Remove cartridge from filter base and wipe away particulates from base with cloth. Rinse particulates from cartridge if necessary.
5) After cleaning, screw Pre-Filter base onto water bottle until tight.

6) Activate SteriPEN™ and insert lamp end into opening in Pre-Filter base until SteriPEN™ creates a watertight seal.

7) While holding SteriPEN™ in place, invert water bottle and SteriPEN™ together. Check that the SteriPEN™ lamp is emitting visible light *(Note: If no light is visible there is a malfunction and water should not be consumed).* Gently agitate water until lamp turns off and green LED (Light Emitting Diode) light indicates treatment is completed. Turn bottle and SteriPEN™ upright and remove SteriPEN™.

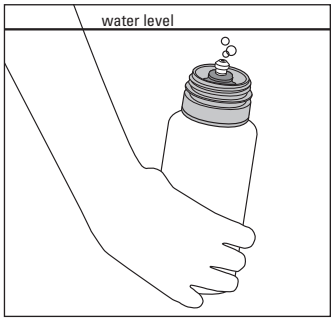
Immersion:

Note: The "O" ring on the rim of the filter base seals against the flange of the water bottle neck to prevent untreated water from contaminating the threads and outer rim of the bottle.

1) Screw Pre-Filter base onto Nalgene® type 32 fl. oz. (1 litre) wide-mouth bottle until tight.

2) Insert filter cartridge into opening in Pre-Filter base with open end of cartridge down. Twist filter cartridge until it locks into place and pull air vent valve open.

3) Completely immerse water bottle with Pre-Filter end up. *(See diagram to the right)*



4) Once water bottle is filled to desired level, remove from water and wipe away droplets from filter base, making sure the upper portion of water bottle is dry.

5) Remove Pre-Filter base and cartridge as a unit from bottle. Remove cartridge from filter base and wipe away particulates from filter base with cloth. Rinse particulates from cartridge if necessary.

If using with SteriPEN™, follow steps 6 and 7 from Pour-through instructions on page 18.

Storing the Pre-Filter

1) Push air vent valve closed and dry off valve end of filter cartridge with cloth. Install cartridge, valve end down, into opening in Pre-Filter base. Twist filter cartridge to lock in place.

2) Pre-Filter may be stored on bottle. Screw water bottle cap onto top of filter base. To drink, unscrew Pre-Filter and water bottle cap as a unit.

The Pre-Filter by SteriPEN™ weighs less than 2 ounces (57 grams) and may be stored on a Nalgene® type wide-mouth bottle. Pre-Filter cartridges may be rinsed and reused many times. Occasional washing of the Pre-Filter base and cartridge with mild soap solution is advisable. Replacement Pre-Filter cartridges are available at SteriPEN™ retailers.

WARNINGS:

- This Water Bottle Pre-Filter is designed to remove large particulate matter from water. It will not remove microbiological or chemical contaminants.
- Do not use this Water Bottle Pre-Filter with liquids other than water.
- In some cases where fine sediment is present, water may be collected in a large container and clarified by allowing sediment to settle. When

particulates are very small, this Water Bottle Pre-Filter may be ineffective in clarifying water. If clear water cannot be obtained, SteriPEN™ should not be used.

- While the Pre-Filter is designed to prevent untreated water from contaminating bottle threads, bottle neck and threads should be inspected for droplets and dried off if necessary.

Replacement Filter Cartridge

To replace filter cartridge:

1) Attach filter base to water bottle
2) Insert filter cartridge
3) Pour water through Pre-Filter

Pre-Filter cartridge is re-usable after cleaning.

Product Specifications:

weight: 1.5 oz. (42 grams)
dimensions: 2.7 in. (7 cm) diameter x 1.8 in. (5 cm) height

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