

SODIS Water Bags

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A Word of Caution

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To learn more about SODIS (solar disinfection) in general, please refer to my previous page (<http://www.h2ohow.com/sodis>) on this topic.

I am always on the lookout for new plastic food storage and freezer bags that can be modified to serve as inexpensive and reasonably durable SODIS water bags. SODIS water bags have many advantages over bottles including they are easier to store, easier to transport, easier to distribute, and easier to fill. When off-the-shelf bags are used, the cost is low (~ 22-cents/unit). Moreover, food storage and freezer bags can be found in most markets throughout the world. However, bags leak and burst if mishandled and are challenging to store when filled. Nonetheless, in desperate situations where **rapid deployment is needed** - bags beat bottles every time. You can deliver *40 bags* with 120-liter capacity in the space of *one* 2-liter bottle.



Figure 1. Modified 1-gallon freezer bag called into SODIS service.

I have tested several types, sizes and brands. In general, I've found the 1-gallon freezer bags with zippers to be the best. When filled with water, most of these bags will eventually leak from the

zipper and the bottom seam. The trick is to find a brand with as watertight a seal as possible and then reinforce the bottom (and sometimes the sides) with clear plastic 2-inch tape. I found that folding up about 3/4-inch of the bottom seam and taping down the entire width, works well. Also, don't over fill the bags - first try about 1/2 filled (2-quarts) and don't exceed 3/4 filled (3-quarts). Finally, there may be *some* leakage from the zipper seal, but not enough to make a difference. There is no such thing as a completely *watertight* seal. Firmly press the length of the seal with your fingers to ensure it is closed. The bag needs to retain *most* of its' water for at least 6 hours. Particular bags that leak too much, should be disposed. ***It's a good practice to test each bag before fielding.***

Right now, I'm using the [Ziploc®](#) Slider Bags, Smart Zip with Expandable Bottom. I will recommend this brand, until I find something better. Figures 1 and 2 show this SODIS water bag(s) in action. The zipper seals the bag (watertight) and taping the bottom so that it *doesn't expand* completes the picture. In general, use 1-gallon freezer bags with watertight zippers and follow the 6-steps, below:

1. Use clear plastic 2-inch adhesive tape to reinforce the bottom of the bag. Do this by folding up ~ 3/4-inch of the bottom seam and taping the entire width of the bag. Depending on the quality, you may need to reinforce the seams on both sides too.
2. Fill the bag no more than 3/4 of the way with water (< 3-quarts). First time, try just 1/2 filled (2-quarts). Press and fold the bag to remove most air. Some air will remain, but that's alright.
3. Zip the bag shut. Firmly press the length of the seal with your fingers to ensure it is closed. *The little zipper tab doesn't always do the job.*
4. Shake the bag back-and-forth for 20 seconds to oxygenate the water.
5. Place the bag(s) sideways on a sheet of shiny aluminum foil or [aluminum canvas](#). The shiny aluminum reflectes direct UV/IR solar energy - amplifying the waters exposure to germ-killing sunlight.

Check the seal(s) one last time before walking away.

6. Allow the bag(s) at least 6 hours of direct sunlight on sunny days and 2 consecutive days when the weather is mostly cloudy.



Figure 2. 12-quarts of hazardous water being treated by 4 handmade SODIS bags on a sheet of [aluminum canvas](#). This amount of water will satisfy the daily needs of most households. The setup in this picture costs about \$2-dollars.

References Used

[Solar Water Disinfection: A Guide for the Application of SODIS](#). Swiss Institute for Aquatic Science and Technology (EAWAG) and Department of Water Sanitation in Developing Countries (SANDEC), 2002

[Diarrhoea: why children are still dying and what can be done](#). UNICEF/WHO, 2009

[Household Water Treatment Options in Developing Countries: Solar Disinfection \(SODIS\)](#). CDC, January 2008

[Combating waterborne disease at the household level](#). World Health Organization, 2007

A. Acra, M. Jurdi, H. Mu'alleem, Y. Karahagopian, and Z. Raffoul. [Water Disinfection by Solar Radiation](#). International Development Research Centre (IDRC - Canada), 1990

[Burch, J. D., and Thomas, K. E., Water Disinfection for Developing Countries and Potential for Solar Thermal Pasteurization](#), Solar Energy Vol. 64, Nos 1–3, pp. 87–97, 1998

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