

WATER STORAGE / PURIFICATION

Principles

Prophetic counsel

“We encourage members world-wide to prepare for adversity in life by having a basic supply of food and water and some money in savings.” —First Presidency

Water versus Food

You can last on average about **two to three weeks without food**, but only about **three days without water**. (This is a rough estimate; there are a lot of influencing factors that would increase or decrease these numbers.)

Often Neglected

One estimate suggests that no more than **5% of families** have more than two weeks of water storage in their home. Water is one of the most important storage items, yet for whatever reason is often neglected.

Related Links

- LDS Church water storage guidelines: TinyURL.com/LDSWater
- FEMA info on water storage: TinyURL.com/CDCH2O
- Red Cross information on water storage: TinyURL.com/RedH2O

Problems

Size

Water storage consumes a great deal of space. A typical 55 gallon drum is about two feet wide by three feet tall.

Not everybody has an unfinished basement or garage with sufficient space to store multiple barrels or other containers.

Storage

Water may be stored in a variety of containers. Some containers and storage locations adversely affect the water supply by leeching chemicals into the water or affecting the taste. Additionally, some containers may degrade or disintegrate with time, leaking your water into the surrounding area.

Contaminants

It is hard to know with accuracy the history of the water you are drinking. Where has it been, what has it been treated with, and how long has it been sitting still? What temperatures has it been subjected to, how much sunlight exposure has it had, and for how long?

Poor conditions such as those listed above create opportunities for unwanted bacteria and organisms to grow in your water supply.

Purification

There are a variety of suggestions on how best to purify water, many of them conflicting with each other.

Practices

STORAGE

Water should *only* be stored in food-grade plastic or other material that is created specifically for long term storage of liquids intended for consumption. It is important that you be careful what you store your water in, as some containers can leech, crack, degrade, or otherwise cause problems with your water.

Before storing your water, it is usually a good idea to wash and sanitize the container. This can be done by mixing 1 teaspoon (5 ml) of liquid household chlorine bleach to one quart (1 liter) of water. Do not use bleach that has scents, additives, or thickeners.

It is not necessary to treat water that is already chlorinated before storing it. Many cities chlorinate their water supply, so if that's the case in your city, any water from your tap is safe and ready to be stored in an appropriate container without any extra action on your part.

Exposure to light plays a large part in the development of bacteria; where possible, it's best to store your water in a cool, dark place (same goes for your food).

The following are a few of the more popular methods for storing water.

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55 gallon water drums



55 gallon drums of water are a popular choice for home storage. Maceys sometimes sells them. You can also find them at ULINE. UtahWaterVault.com has a more expensive option. Water stored in barrels should ideally be rotated once yearly, but you can get away with storing it for a few years and purifying it before drinking.

Pros:

- Dark blue plastic restricts light, thus helping prevent bacteria and algae growth
- Some drums/barrels can be stacked to maximize space

Cons:

- Difficult to move once filled
- Siphon/pump must be used to retrieve water from top of the barrel (working against gravity)

(Cost per gallon: **\$1.55**)

(assuming \$85 for a new barrel)

250+ gallon water tanks



Companies like Sure Water make larger water tanks that store 250+ gallons. These food-grade plastic bladders have spouts at the bottom allowing you to remove water using gravity instead of having to pump it out of a barrel

Make sure your flooring can support this weight!

Rotate water stored in these tanks once yearly.

Pros:

- Water spigot is at the bottom, so you can use gravity to get the water out
- Some versions like Sure Water's allow you to fit inside a door to put it in your basement.

Cons:

- Higher initial cost
- Difficult to move once filled

(Cost per gallon: **\$3.65**)

(assuming \$950 for 260 gallon tank)

4.2 ounce water pouch



Emergency water pouches are a good item for your 72 hour kits, but should not be used for home storage.

Pros:

- Lasts up to five years
- Easy way to store small amounts of water in 72 hour kits, backpacks, cars, and other locations

Cons:

- Inefficient method of storing a large amount of water

(Cost per gallon: **\$9.45**)

(assuming \$0.31 for 4.2 oz. pouch)

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PURIFICATION

Depending on how you have stored your water and how long it's been sitting in its container, it will be necessary to purify it before it is used.

There are a variety of methods out there, and lots of information that is difficult at times to sift through. It is important that you review the possible purification methods, and decide what works for you.

Please note that water storage, like any emergency preparedness, should have various contingency plans in place. Your desired method of purification might be to boil the water, but if you have no fuel, you'll need a Plan B.

Prioritize the three methods you would like to use and then acquire the necessary supplies or skills that will allow you to purify in each method.

It's also not a bad idea to double up on purification, just to be sure. For example, you may sift your water through a particle filter (such as a coffee filter) to remove any debris, add some iodine drops to the water, and then pass it through a carbon filter. Better safe than sorry!

The following are a few of the more popular purification methods.

Bleach



Disinfecting with household bleach kills some, but not all, types of disease-causing organisms. The bleach must contain chlorine in order to work. Do not use scented bleaches, color-safe bleaches, or bleaches with added cleaners. Most household chlorine bleaches have 4-6% available chlorine, in which case you should add 1/8 teaspoon (8 drops) of regular, unscented, liquid household bleach for each gallon of water (2 drops per quart/liter), stir it well, cover, and let it stand for 30 minutes before you use it. Double the amount of chlorine if the water is cloudy, murky, or colored, or if the water is extremely cold. If after sitting covered for 30 minutes the water doesn't have a slight chlorine odor, repeat the dosage and let sit for another 15 minutes. Most of the chlorine content in bleach will evaporate within a year, so this is not a good long-term storage item.

Iodine (drops/tablets)



Disinfecting with iodine is generally less effective than chlorine in controlling the parasite Giardia, but it's better than no treatment at all. It kills many, **but not all**, of the most common pathogens present in natural fresh water sources.

Add 5 drops of 2% iodine (from the medicine chest or first aid kit) to every quart/liter of clear water; add 10 drops if the water is cloudy. Let the solution stand for at least 30 minutes.

For commercially prepared chlorine or iodine tablets, follow the instructions that come with them. If you don't have instructions, use one tablet for each quart/liter of water to be purified.

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Gravity carbon filters



Gravity-based systems are very effective in removing contaminants from water because of the extremely long “contact period.” Some of the other filtration systems rely on water pressure that forces water molecules through the filters at 60-90 PSI.

In such systems, individual water molecules come in contact with the filter media for a mere fraction of a second. Water molecules passing through the ceramic purification elements in these filters are drawn gently by gravity and stay in contact with the media for several minutes.

You can filter water in these units for around **two cents per gallon**, and they are great at removing dangerous organisms such as protozoan cysts (Cryptosporidium, Giardia, etc.) and microscopic bacteria (E. coli, Salmonella, etc.).

The two leading brands of these types of filters are the Aquarain and Berkey units.

Chlorine



Chlorinating concentrate can be found at your local pool/spa store and can be used to purify your water. This is a granulated powder. The powder can last a lot longer than its corresponding (and diluted) liquid form, so you should store the powder until you are ready to use it.

You must be sure that the active ingredient of the product you’re purchasing is 97-99% Sodium dichloro-s-triazinetriene dihydrate. Several chlorine products have other additives that should not be used, so make sure that you check the label.

To use, mix 1/4 of a teaspoon into 55 gallons of water. Close the lid, wait 24 hours. Open lid - if you don’t smell chlorine, repeat the previous step. When you smell chlorine, leave lid off and let chlorine gas escape until there is no smell. It is ready for use when the smell is gone.

Be careful how you store the powder; where possible, it’s best to keep it in its sealed container so prevent fumes from escaping and damaging surrounding items.

Boiling

Boiling kills most types of disease-causing organisms and is the most recommended purification technique.

Bring the water to a rolling boil for at least one minute, then let it cool. If you are more than one mile above sea level, boil for three minutes.

Though it is important to conserve fuel, the longer you boil your water, the better chance you have at eliminating any possible organisms or bacteria.

As the water cools, you can stir it once a minute to mix air into the water, which will help reduce any bad taste the water may have.

Sports Bottle with Filter

A recently popular preparedness item is a sports bottle with a carbon-based filter included.

These bottles would allow you to filter water “on the go” in an emergency, such as from a lake, stream, or other body of water.

If using a source of water that might contain extreme bacteriological or viral contamination, it is recommended that two drops of plain chlorine or iodine be added to each refill before filtering. This will kill minute pathogens such as viruses. The disinfectant will then be filtered from the water entirely, removing its odor, color and taste.

*Please do not consider this information to be comprehensive;
you should still do your own homework!*

To download a PDF copy of this handout, go to <http://connorboyack.com/drop/water.pdf>