

# HOW TO PURIFY AND RE-MINERALIZE WATER



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## HOW TO PURIFY AND RE-MINERALIZE WATER

### HOW TO TEST YOUR WATER FOR POLLUTION AGENTS



In the other chapters about the killing agents in your water, we discussed some of the most dangerous contaminants that are often present in water. We also talked about what they can do to you, so you'll understand why it's so important to make sure that your water doesn't contain any of those pollutants.

In this chapter, we're going to discuss a few ways that you can find out what's in your water and even discuss a few signs specific to certain

chemicals or minerals. If you have city water, there are many different pollutants in that water.

Chemicals are added to make the water “safe” to drink or to add minerals such as fluoride to your diet because the government thinks that it’s in your best interest. Out-of-date plumbing, leaky sewage systems, and antiquated water delivery systems and filtration methods can also be sources of pollution.

Water tests of municipal water supplies have found pesticides, pathogens, carcinogens, arsenic, industrial chemicals and prescription medications in water that has supposedly been purified and deemed safe for drinking. Yuck.

There are standards in place that municipalities have to meet, but those standards are pretty low. Combine that with the fact that most water treatment facilities are poorly equipped to handle industrial spills or the daily pollutants released in industrialized, heavily populated cities and you have a polluted water source that’s been deemed safe to drink even though it isn’t.

Vulnerable people such as pregnant women, people with immune issues, small children, and the elderly are most at risk, though the right pathogens will make anybody sick.

Many of the same risks apply to waterways such as the ocean, lakes, ponds, rivers and streams. Sewage leaks, animal feces/carcasses, and farm and industrial plant runoff often makes its way into open water. Water can be polluted with all kinds of toxins, bacteria, protozoa, viruses, parasites, and chemicals that can cause immediate illness, death or long-term, chronic illnesses such as cancer, neurological disorders, and kidney disease.

So how do you know if water is safe? Whether it comes from your faucet or from a pond or creek that you’ve stumbled across, we’re going to tell you how to determine if water is safe to drink.

## Trust Nature

Let’s start by testing your water safety knowledge. If you come across two bodies of water, one that is crystal clear and free of plants and algae, and one that is not-so-clear and full of water plants and fish and has a few bugs swarming around, which one would you drink?

The logical answer is the clear water, right? Wrong.

Plants, animals, and insects in water are a good sign that the water is well-oxygenated, has a healthy pH, is mineral-balanced and is (relatively) free of harmful chemicals. If you have to choose, brush the algae away, filter the water, drop in a purification tab and drink from that pond. Steer clear of the crystal-clear, bug-free pond.

Note too that if algae is the only thing in the water, you should avoid it, too — it could be tainted with phosphorus runoff.

There’s no guarantee that the water in the dirty-looking pond is safe, either. It may still have parasites, bacteria, or other hazards. It’s just the better choice of the two if they are your only options.

## Use Your Senses

Some contaminants can be seen or smelled in water. For instance:

- Sulfur smells like rotten eggs and may taste salty, and it can be an indicator of certain bacteria in the water.
- Iron makes the water appear orange.
- Manganese in higher quantities makes water black or purple.
- Chlorine smells like bleach.
- Some parasites are actually visible, though many aren’t.

So the first thing you should do is look at the water and smell it before you drink it.

Water that smells or tastes like turpentine, gasoline, or similar chemicals may be polluted with methyl tertiary butyl ether (MTBE) or

xylenes. These are byproducts of oil, gas, paints, detergents, and other chemical agents. Don't drink it, even with purification tabs.

If the water smells or tastes metallic, it's a pretty good bet that it's got minerals such as mercury, lead, copper, iron, arsenic, manganese, or zinc in it.

Some are harmless in small doses, such as iron, but others such as lead, mercury, and arsenic aren't. Better to skip it.

Finally, if the water smells or tastes earthy, musty or like dirt, there is probably decaying organic matter in it. This is probably not a bad thing but it still tastes weird.

## Test the Water

Unfortunately, there is no way to test for the stuff that will really make you sick — bacteria, viruses and parasites — other than to use a water test kit.

There are several different types of these and you can get them fairly inexpensively — some run only \$15 or even less. Some test for minerals and some test for harmful pathogens such as E.coli and salmonella.

There are field tests that you can get to test your water for pollution agents that you can toss in your bug out bag and I'd recommend doing so if you're prepping for long-term, earth-changing events. After all, you can only store so many water purification tabs or pool shock.

Remember though that water quality changes so you need to take other measures or repeat the tests periodically. Even then, the tests don't cover everything but they're a good start.

The most effective way to ensure that your water is safe to drink is to filter it, then boil it, distill it, or use water purification tabs or other methods to purify it so that you kill the bacteria and other nasties in it.

But we'll talk about these methods in the next chapters.

## NATURAL AGENTS FOR WATER PURIFICATION



Water quality is very important as you cannot afford to get sick when confronted with crisis situations especially after SHTF. Getting sick from drinking water that is riddled with bacteria and other impurities can kill you, so knowing how to purify your water is essential to your survival.

Disasters can leave our sources of water contaminated; that's all the more reason why water purification should be at the top of our list of things to do immediately after SHTF. The clean appearance of water sadly does not make it pure. This chapter is going to look at ways you can both clean and purify your water without spending much money in the process. All ideas mentioned here cost very little but can save your life.

## Filtration



It will not be surprising if your source of water is cloudy and dirty looking from contamination from refuse disposal. The first step lies in pre-filtering your water using water filters.

Have at least two different water filters ready for this purpose. If your water is dirty looking, it is very likely that one filter will not do a good job of filtration. The second filter should be used to clean the water a second time.

In the absence of filters, we have a trick that would work equally well; read on. First, clean all your water containers with soap and clean water to remove any residue or dirt that may be hanging in there. Allow your container to air dry. Wash your funnels at the same time too.

The next step would be to insert a fine mesh pantyhose inside a clean white athletic sock, then slowly pour your unclean water into the opening so that water slowly drains from the socks into your clean container.

Several layers of clean clothing can be used instead of socks and panty stocking. Make sure the water is repositioned periodically so that water is dripping down through a clean surface. Repeat the process until the water looks reasonably clean.

## Solar Water Disinfection

This is one of the simplest methods of natural water purification that has been certified safe. All you need are clear plastic bottles and sunlight. Fill your plastic bottles with water and place them in the sunlight for a period of 6 hours. The sun's ultraviolet rays will do the trick by killing the parasites in the water.

This method of water purification will work even if temperatures are low in your location as long as the water reaches 30 degrees Celsius for a minimum of 5 hours.

## Boiling

Pour your clean water into a pot with a cover and boil for a minimum of 3 minutes. Boil for a longer period of time if possible. You don't want to take chances with your water and fall sick.

Make sure your pot or kettle used in boiling the water has lids so that you don't lose any more than necessary to evaporation. The aim is to conserve heat and bring the water to boil as soon as possible.

The benefits of solar water disinfection are:

- Proven reduction of viruses, bacteria, and protozoa in water
- Proven reduction of diarrheal disease incidence in users
- Acceptability to users because of the simplicity of use
- No cost to the user after obtaining the plastic bottles; Minimal change in taste of the water
- Although SODIS does not have a chemical residual, recontamination is unlikely because water is served directly from the small, narrow-necked bottles with caps in which it is treated.

The drawbacks of solar water disinfection are:

- The need for pretreatment (filtration or flocculation) of waters of higher turbidity

- User acceptability concerns because of the limited volume of water that can be treated at once and the length of time required to treat water
- The large supply of intact, clean, suitable plastic bottles required.

As with any other thing, boiling water should be done with caution during emergency situations. Care should be taken so as to prevent injury since getting medical attention during this period can be difficult.

After boiling, allow the water to cool before drinking. If there is scarcity of fuel after SHTF, then consider using the other methods mentioned below.

## Citrus Juice



Drops of citrus juice have been used for water purification for decades. Sources of citrus juice for this purpose include lemon and lime. A squeeze of citrus juice contains many antibacterial qualities that are known to serve as disinfectants.

This is especially useful in emergency situations when treated water cannot be obtained easily. Drops of citrus juice are used in commercial water treatment products where they are known to help in the process of water purification.

## Charcoal

Charcoal is another good method of purifying water naturally. Charcoal exists in different forms and not all forms are good to use for water purification purposes.

Compressed charcoal, also known as carbon block, is the best type of charcoal filter to use. This type of charcoal can remove chemicals and lead from water. It is best used with a sediment prefilter.

Powered charcoal can also be used for this purpose but it can be a messy process if you are not careful. Granular charcoal is not a very good option because water can flow around the granules without being filtered.

## How to Use Banana Peels to Clean Your Water



We've known for a couple of centuries now that contaminated water is deadly, but is there a way to filter it if you don't have access to charcoal or other traditional means? After all, charcoal may not be quite readily available in a post SHTF scenario and it's a bit pricey even now, especially if you want to filter large quantities of water. Coal is an option, but it's not environmentally friendly or readily available to everybody either.

So what's a natural, available alternative? Banana peels can filter water for survival, of course!

## How Banana Peels Filter Water

Banana peels are full of acids and other purifying molecules that aren't harmful to people. After all, we eat the bananas that are inside, right? One of the biggest sources of water contamination is heavy metals.

Mercury, lead, copper, iron, and other naturally occurring metals find their way into our water sources by both natural and man-made means such as agricultural and industrial waste and runoff.

They are lethal to us and the unfortunate part is that they build up in our bodies slowly over time. Lead and mercury in particular build up and can damage the nervous system and, specifically, your brain.

Typically, engineers use aluminum oxide, silica, cellulose, or other means to extract heavy metals but these are expensive and not readily available to John Q. Public.

They also have side effects of their own. Charcoal filters out impurities but basically it can only get bigger pieces, so it's not even that effective.

Banana peels, which are now being studied extensively for use as a water filter, contain atoms of sulfur and nitrogen, along with carboxylic acid and other compounds. Now, we're going to get a little scientific but I promise to keep it brief. Think magnets, sort of.

The carboxylic acid ions become negatively charged and the heavy metals in water tend to be positively charged.

See where I'm going here? The metals dissolved (or floating) in the water are attracted to the acids, which are bound to the banana peels. They stick to the peels and can be removed when you take the peels out of the water. You may not get them all, but you will get a significant amount of them.

## Supplies Needed to Make Banana Peel Water Filters

This doesn't have to be complicated. You need banana peels. Oh, and water. Typically, for a scientific process I would also recommend a book or a board game because they take so long.

However, in this instance, results are seen immediately, and if you're willing to wait 10 minutes, you'll see about a 60% reduction in heavy metals. If you'd like to measure your progress, you can always get some heavy metals and some water test strips, available online.

## How to Filter Your Water with Banana Peels

There are a couple of different methods that you can use, but it seems that the peels work better when they've been dried a bit. Here are your options after drying the peels for a few hours:

Cut the peels into small chunks, and place the peels in the food processor and make a dust or meal out of them.

Now, on to the actual process. You may place the peels or powder in a coffee filter or cheesecloth and pour the water through them.

You also have to option of tossing the peels directly into the water letting it sit. Using the sieve method extracts a significant amount of the metals but letting the chunks or powder sit in the water for about 10 minutes extracts even more.

Studies show that you've achieved maximum results at ten minutes so there really isn't any reason to let it sit any longer. After they've sat, simply use a clean fish net (if using powder) or a slotted spoon (if using chunks) to remove the peels. You can also just pour the water through a strainer or coffee filter to remove the peels or powder if you're doing small quantities.

A surprising point that was discovered during research: the banana peels can be used as water filters up to 8 times and still be effective, so you're getting some serious bang for your buck there.

## Conclusion

The conclusion here is that banana peels can be used to filter water for survival. They are more effective than most other methods for removing heavy metals from water. This doesn't mean, however, that they're useful for killing bacteria, so you still need to use your water purification tabs.

We recommend using both methods if you're drinking from a water source that you're not sure about.

Banana peels get the metals but not the disease; purification tabs get the disease but not the metals.

## How to Purify Water with Iodine



Without a doubt, water should be your number one priority after personal safety in a survival situation.

In this subchapter, we're going to tell you how to purify your water with iodine for survival.

### How Does Iodine Purify Water?

Iodine kills the bacteria in water by disrupting the ionic balance within the pathogenic cells. It replaces the chemicals necessary for the bacteria or virus to thrive with iodide ions.

You can buy iodine in tablets, crystals, or tincture of iodine. The tincture is the same exact orangish red stuff that your mom probably put on your cuts and scrapes when you were a kid.

Be careful not to confuse iodine with betadine, though. The two are different and only iodine is cleared as a safe, effective way to purify water.

If you remember correctly, iodine smelled funny and it dyed your skin orange. It does the same thing to your water and can be toxic if you use too much, just like bleach can. It can be especially harmful to kids and pregnant women and we don't recommend that you use iodine as your primary water purification method in a survival situation.

However, it will do in a pinch and is most assuredly effective.

## How Much Iodine Does It Take to Purify Water?

If you're using tincture of iodine, use about 2 drops per quart of clear water and 10 drops for cloudy water. Let it stand for at least 30 minutes in order for the iodine to kill the nasties. Be warned that using tincture of iodine is going to change both the flavor and the color of your water.

If you're using crystals, follow the directions on the bottle. One small bottle of iodine crystals can treat up to 2000 quarts. But if you're in the US, this product is tough to come by because it was nixed by the DEA. Apparently it was being used illicitly to make crystal meth so they banned it even though it was a great, portable, inexpensive way to kill pathogens without drastically changing the flavor of the water.

If you're using tablets, follow the directions on the packaging, though the most popular ones typically require 2 tablets per quart of water. Again, you'll need to let the water sit for at least 30 minutes so that the iodine can effectively kill the pathogens in the water.

### A Few Important Notes about Using Iodine to Purify Water

As we've already stated, iodine can be toxic if you use more than directed. There may also be health consequences for long-term use.

On the other hand, iodine in small amounts is required by your body in order to function properly, which is why the government mandated that salt be iodized in the 1920's. People were severely iodine-deficient and were experiencing some pretty severe health issues such as goiters and other thyroid issues. It's like many other nutrients — you can't live without it, but it will kill you in large doses. Just follow the directions.

Filtering your water to remove the larger pieces of debris prior to adding the iodine is ideal. Pathogens tend to cling to large particles so removing them makes the iodine more effective, faster. You don't want to drink chunks of stuff anyway.

Iodine only kills living pathogens. If water is contaminated with poisons such as fertilizers or pesticides, heavy metals, certain parasites, radiation, or other forms of toxins, iodine isn't going to help.

If you're allergic to iodine, don't use this method to purify your water. Of course this is a no-brainer, but still. Just don't.



Iodine is effective against disease-causing pathogens, is affordable, and is extremely portable. Since it's simple to use, it makes a great emergency water purifier but we still recommend using a combination of filtration and purification just to make the cleanest drinking water available.

Chlorine tabs or liquid are also effective methods and actually work better than iodine, but if you don't have those options, iodine will most certainly work in a pinch.

## WATER PURIFICATION OFF-GRID



Through the years, I've heard many stories, horrible stories, about campers stranded out in the wild for days and days on end. Some of them never made it back to civilization, but those who survived and got back to tell the tale managed to find themselves a steady supply of the one thing that we can't live without: clean water.

Unlike food, we can live without water for just a few days. If we're in an extremely hot environment; those days can be cut to as little as just a few hours.

Chances are that you won't be able to carry enough water to sustain yourself, or you'll run out after a few days; either way you'll need fresh, clean water to drink and cook with. Fresh, clean drinking water doesn't just bubble up from pristine springs anymore, though.

The problem with surviving for extended periods of time in the wilderness is that there's no way that you can carry enough water, equipment, and food with you to last for weeks. Hence, if you're a prepper who knows his priorities, you already know that you need to acquire the survival skills (and tools) to find what you need in the wild, before you boldly go where no camper has gone before.

And at 8.3 pounds per gallon, don't underestimate how heavy water can get. The average adult needs 2–3 liters a day, minimum, so having a reliable, portable method of effective water filtration or purification really comes in handy.

Let's face it; it's much easier to find and purify available water on the spot than it is to carry the weight that an adequate supply of potable water in the wilderness would mean. In fact, I'll have to say that that's pretty much impossible, as I told you before.

To start with, an adult requires about a gallon of drinking water every 36 hours; even more if they are performing considerable physical effort or in that hot environment. Dehydration is a silent killer; one that comes without warning, depleting you of your strength in no time; it also impairs judgment; so you should avoid getting dehydrated at all costs.

Now, let's take a look at the main ways of procuring and purifying water in the wild in order to mitigate the risk of contamination with bacteria, or other parasites:

## 1. Boiling

Boiling is the easiest and oldest way to purify water, as we've already explained in the previous chapter.

Prior to boiling the water, filter out the larger particles with a piece of fabric. If you have nothing else, a t-shirt or a bandana can be used as a makeshift water filter. Simply secure your shirt or bandana over the container of your choice and pour the water you wish to filter through the material of the shirt / bandana.

This is a very down and dirty method of water filtration, which does nothing for microbes, bacteria or fine sediment, but t-shirt / bandana filtering will get leaves, twigs, rocks, and other large sediment out of the water.

Then you need a fireproof container and the means to make fire. It's shameful to live in the 21st century and not know the basics of outdoors living, don't you think? So you should never go out, risking your life, without knowing the basics of survival, i.e. making fire like the Cro-Magnon man did 50,000 years ago.

Boiling your water will kill most pathogens and bacteria, although it won't help with any heavy metals and other chemical contaminants.

Remember when you're at higher altitudes that the boiling temperature of water drops, so you'll need to boil your water longer to achieve the sterilizing effects.

## 2. Activated Charcoal Filters

These filters are a slightly better form of water filtration than the shirt / bandana method, but they are far from perfect.

Generally used in conjunction with another filtration method, activated charcoal filters are capable of cleaning the water of many impurities and absorbing heavy metals and other chemical pollutants in the water.

One of the main uses of activated charcoal filters is in cleaning water of foul-tasting odors.

### EASY DIY CHARCOAL WATER FILTER

Needed for the project:

- Plastic bottle
- Charcoal
- Sand
- A piece of cloth
- Sharp knife or scissors for cutting the bottle

Cut off the end of a 2 liter soda bottle. Fill the smaller opening with a piece of fabric to prevent the charcoal from falling out. Place the crushed charcoal into the container, to create a matrix for the water. You may add another piece of cloth, sand or grass on the top of the charcoal.

Place your DIY filter atop of a container, and pour in slowly the untreated water. The clean water will drip slowly out the bottom of the filter.

### 3. Drops or Tablets

You can buy and carry military style water purification drops or tablets. Used with boiling of the water and/or basic filtration, iodine treatment can render your water much safer to drink due to its antibacterial, antifungal, antimicrobial and anti-pathogenic effects.

This is one of the easiest to use water purification methods. The downside of the method is that the water treated that way doesn't taste so great. The main ingredient in these tablets is iodine, but there are also chlorine/potassium permanganate pills.

The military only recommends using these methods when other methods are not available. Considering the flavor, I have to agree with them.

Iodine is often sold specifically as a survival tool for the purpose of purifying water, but it can also be used topically as a disinfectant and taken internally to reduce the uptake of radioactive iodine by the thyroid in the case of a nuclear event.

### 4. Pumps and Filters

Most preppers buy one of the high-tech filtration/purification pumps. This type of gear is available at any camping or outdoors supply shop.

There are many types of pumps with various kinds of filters, which will purify water instantly. They work by squeezing the water through a ceramic or charcoal filter, while treating it with chemical substances.

It's much easier to carry a water filter around with you than burden yourself with 5 gallons of water, right?

There are also water filtering straws and water bottles with built in filters. These use suction power for filtering the water and have the

obvious advantage of being easier to carry around.

You can improvise your own DIY water filter as well, making a bio-filter out of things that you find in the wild, you can get charcoal fairly easy from your fire.

While it won't work as good as activated charcoal, it will provide some filtering, especially if you break it into small pieces.

Allow the water to percolate through the layers, coming out at least somewhat purified at the end. Keep in mind that the more filtering that the water has, the better it will come out.

There is my personal favorite: the Katadyn Microfilter.

With a re-cleanable ceramic filter designed to filter out all particles and organisms down to 0.2 microns and rated with a filter life of 13,000 gallons of water, the pocket Microfilter is a veritable beast. Katadyn makes a number of portable water filters, but this is their premier portable unit, and with good reason.

Weighing in at 20 ounces, the Katadyn Microfilter has a 20 year warranty from the manufacturer and is only 10 inches tall by 2.4 inches wide.

Indeed, this portable filter is so cool that it comes with an outtake hose that will clip onto the rim of your water bottle or container and it has an internal gauge to indicate when you should replace the ceramic filtration element.



Output of the Microfilter is approximately 1 quart per minute, and the filter has a very convenient pump-action handle for ease of operation.

On the downside, the ceramic filter doesn't last forever.

In some cases ceramic filters of a similar design have become breeding grounds for the very bacteria and fungus that they filter out of the water, as well, though this hasn't been known to be an issue with the Microfilter.

Unfortunately, the Katadyn Microfilter comes with a rather steep price-tag, generally \$270–\$300.

## 5. Ultraviolet Light

A final method, albeit not the most feasible of methods for most people, is the use of ultraviolet light (UV light) to purify water and kill microorganisms, pathogens, and bacteria.

Regardless of which method of filtration or purification you use, always choose the best water you can to start with.

Water from running streams and rivers is always preferable to water from still pools or ponds. If you have a tarp or bucket to collect it in, you can also collect rainwater for consumption; simply run it through your filter or purification system, boil it, and use it.

Beware of collecting water from rivers downstream of established cities, though, due to the frequency with which sewage overflows from the sewers and spills into the river.

## HOW TO CHOOSE A WATER FILTER



There are many reasons that you may want to filter your water. Maybe you don't like the chemicals used by municipal treatment plants. Perhaps you want a back-up plan in case SHTF.

Regardless of WHY you want to filter your water, knowing how to choose a water filter before you invest your hard-earned money just makes sense.

## Why Filter Water?

Even the clearest stream may be full of invisible protozoa, bacteria, and viruses that can make you sick or even kill you. Never assume that any water source is safe just because it looks clean; most of the contaminants in water are too small to see with your eyes.

Even if it comes straight from your tap, your water may still contain harmful contaminants. Many water treatment facilities were built so long ago that they're just not equipped to filter water properly. Pipes get old and leak and the sheer mass of pollution produced by a large city can overwhelm an aging system.

Also, many cities add fluoride to your water. The potential dangers of fluoride are a source of controversy, so many people don't want to drink fluoridated water.

If disaster should strike, water services may go down or something may happen to make your tap water unsafe. You may even have to depend upon other sources of water to survive.

In the event of a radioactive event, the water won't be safe to drink. In these cases you absolutely **MUST** filter and purify your water before you drink it.

## What's the Difference between Filtration and Purification?

You need to understand the difference here because it's critical to your decision. There are three types of disease-causing pathogens in water, not counting minerals and pharmaceuticals.

We published an article not too long ago about the various contaminants in water that you can read a summary of here. Here's the basic rundown for now:

- **Bacteria:** Some examples that you've probably heard of are E. coli and salmonella. There are many more and, so that you know what filter to look for, they can be as small as 0.1 microns, though a 1-micron filter will capture 99.9% of bacteria.

- **Protozoan Cysts:** These are hardy little "eggs" that have an extremely hard shell. The only way to kill them is by boiling them but they can be filtered out. Examples include Giardia and Cryptosporidium. They range in size from 1–300 microns.
- **Viruses:** Right now, these are rarely found in American or Canadian waters but that could change quickly if SHTF. Viruses include hepatitis A and rotavirus and range in size from 0.005–1 micron. Only purification by some means can remove these from the water; filters won't work because the viruses are so small.

Here are the different water filtration units commonly available:

- **Standard water filters** filter out sediment, Giardia, and other large protozoa and some bacteria that may be in the water.
- **Micro filters** remove most microorganisms including bacteria and protozoa. You'll still need to add a disinfectant to kill viruses. They also often remove most toxic heavy metals such as lead and fluoride.
- **Water purifiers** remove all microorganisms from the water, including viruses but they may not remove debris such as dirt. They may come in the form of tablets or liquid such as iodine or bleach. Distillation, boiling, and desalination processes also purify water.

As you can see, there's a big difference here. Most water filters nowadays are micro filters. Just read the micron size on the box or in the advertisement to make sure that the filter is made of material that will filter the water based upon your needs.

Thanks to modern technology and good old fashioned common sense, there are many different types of water filters and purifiers on the market.

We recommend, at the very least, using a micro filter that's no larger than 1 micron: that will eliminate about 99.9% of the bacteria in the water. Many micro filters start at .2 microns. Of course, viruses are still an issue but there are other alternatives to that.

## Questions to Ask when Buying a Water Filter

Basically, the type of water filter that you need depends upon what you need it for. Before starting your search, ask yourself these questions:

- Do you want a system for your house or one that's portable?
- What do you want to use the filter for (whole house, drinking/cooking, survival)?
- If you want a portable one, how much space and weight can you allow?
- Compare what the filter removes to what you want it to remove (what is the micron rating?)
- How long does the filter last?
- Can you clean or easily replace the filter?
- How much clean water does the filter produce daily compared to what you need?
- How much water does the filter waste?
- How difficult is the filter to use or install?
- How much are you willing or able to spend?

Once you answer these questions, you'll have a better idea of what type of water filter or purifier that you need.

## What Type of Water Filtration Do You Need?

This is a major factor in deciding what type of filter is best.

### Home Filtration Units

If you want to filter water for your entire house, we recommend using a point-of-entry system or a point-of-delivery system.

The latter is going to be much cheaper and just as effective. We recommend using a reverse osmosis (RO) or distillation system if you want to filter out everything.

You can pick a really good RO system up for under the sink for about \$200. The filters are about \$20 but you'll also see a hike in your water bill.

Reverse osmosis filters out the clean water and pours the excess water, or brine, down the drain. Most systems lose about 3 gallons of brine to get one gallon of fresh water.

Many people adjust for this by re-routing the brine to a bucket that they use for watering plants or other uses that don't require purified water.

You can also get standard carbon or ceramic filter units that are just about as good as reverse osmosis, though they don't filter out viruses and some heavy metals. Some do come with chemical components that take care of the viral worries, though.

### Refrigeration Units

You probably already know about these and may even have one in your fridge. It's a carbon or ceramic filtration unit that holds anywhere from a quart to several gallons of filtered water.

They're great for improving the taste of your water and removing particulates, bacteria, heavy metals, and most protozoa. The most commonly known brand name for these units is Brita.

### Portable Units



These consist of water bottles and survival pieces such as straws that allow you to drink directly from the water source because they filter out impurities, bacteria and some heavy metals as you drink.

Most don't filter out viruses though.

Examples include the LifeStraw and Brita's water bottles.

There are also portable bags that purify by using the UV rays in sunlight. They're light and take up very little space; in fact, the Life Sack, currently used to purify water in 3rd world countries, doubles as a grain delivery package that is then used as a water purifier. It even has a 15nm water filtration unit at the point of exit.

## Desalination Units

This is a biggie for survivalists and preppers that live along the coast.

It turns salt water into drinkable water while also removing bacteria, protozoa, heavy metals, most prescription meds, and even viruses.

We found a great one called the Survival Still that turns contaminated water, even salt water, into pure drinking water. The unit costs under \$300 and is fairly portable.

Another upside of this unit is that it's made in the USA with USA materials and is stainless steel so rust isn't an issue.

## WATER RE-MINERALIZATION



The debate about the health benefits of purified versus distilled water is a hot one. There are those who claim that they feel tons better since switching to distilled water and there are those that claim that distilled water is the devil.

The purpose of this article isn't to discuss that debate; it's simply to provide some options for those who want to know how to re-mineralize water for drinking.

## Why You Need to Re-Mineralize Water

Water already has minerals in it, right? Well, yes but not after it's been distilled or purified using reverse osmosis. Both of those processes remove most of the impurities — up to 99.5% of them — from the water.

The purification process is indiscriminate, though. It removes the “good” minerals along with the bad stuff. Proponents of re-mineralizing water advocate the process for a few different reasons.

You need the minerals, especially if you’re not eating properly or you’ve been out in the heat sweating. The primary minerals that your body needs to replenish are calcium, magnesium, potassium, and salt, though there are many others, too.

Re-mineralized water quenches thirst better and is absorbed by your body faster. This is a point of contention but the argument for faster hydration states that adding minerals back into the water boosts the pH and brings it back to an alkaline state. The water becomes ionized, which makes the water molecules cluster into smaller groups, which makes it easier for your body to absorb.

Re-mineralized water tastes better. Though this is subjective, it’s true that the human palate is used to the flavor of water with minerals in it. It gives it a fuller flavor (that is to say, it gives it SOME flavor) that many people find preferable to distilled water.

Now that you know WHY some people prefer to re-mineralize water, let’s talk about how to do it. There are a few different ways that you can re-mineralize your water but since we love to do things on a budget, we’re going to discuss the ones that are wallet-friendly.

## **The Reverse Osmosis System**

These are available at Home Depot and other home improvement and hardware stores. You can buy under-cabinet systems for your sinks, showers, and fridge and they’re fairly affordable.

Right now, the one for under the sink runs about \$350 at Home Depot and Amazon. This system purifies your water using reverse osmosis then adds calcium and magnesium back into the water.

You can also buy after-market re-mineralizing cartridges to your existing system. Just do a quick search on the internet and you’ll find what you need. They cost about \$50.

## **Using Celtic or Himalayan Salt**



Celtic sea salt adds about 80 different vital trace minerals to your water. You want to use the grey kind that sticks to the sides of the container.

Himalayan salt is the pink salt that you often see in gourmet stores. It contains about the same number of minerals as Celtic sea salt but they do taste a bit different.

However, since you’re just putting a pinch in your water, taste isn’t going to be an issue. Himalayan salt also has a bit less sodium in it. Use either of these that you would like but stay away from table salt; that stuff is horrible for you.

## **Using Pascalite Clay**

This clay comes from high up in Wyoming’s Big Horn Mountains. It’s classified as a white clay but is actually cream-colored. It’s rich in natural minerals and won’t affect the flavor of your water. Bentonite could work too.

As a side note, Pascalite also has purported medicinal properties including being good for burns, bug bites, infections, rashes, acne, cuts, and scrapes. It’s also used in mud baths for detoxifying and softening



skin and can even be used as a natural deodorant or body powder. Native Americans actually called it The Mud That Heals. How's that for multi-purpose?

## Using Mineral Drops or Tablets

There are actually commercial drops that you can use to add the minerals back in to your water. One brand is ConcenTrace and another is Sea MD. An 8oz bottle of ConcenTrace will run you about 15 bucks on Amazon and it states that it has 72 minerals in it. Sea MD will cost you about \$20 for 4oz.

Mineral tablets may be another option for you to consider. You can get 300 ConcenTrace tablets on Amazon for about \$23.

## Now You Know

As you can see, there are several different methods that you can use to re-mineralize your water. The drops and the tablets are probably your best option for your bug-out bags or to store in your stockpile but for now, the filters or entire system may be more convenient and cost efficient since you don't have to add something to your water every time that you pour a glass or crack a bottle.

If you're buying bottled water from a store while you're out, there are a few brands that are properly re-mineralized including Fiji, Evian, Vittel, Volvic, and Trinity.

These may be brands that you wish to consider storing in your stockpile if minerals in your water are important to you. It's certainly the easiest method of re-mineralizing your water though it may not be quite as cost effective — those are some of the pricier brands of bottled water.

To be honest, most of your minerals come from your food. The only time that minerals in water become seriously important is if you're not eating a balanced meal that provides all of the nutrients that you need.

Even then, the minerals in water are there in trace amounts. If you absolutely can't afford any of these options, purified water will be fine.

## HOW TO CALCULATE YOUR WATER NEEDS



This is one of the questions that we get most often — “How much water should I store?”

Well the question doesn't have one set answer, but today we're going to try to give you some calculations and numbers that will help you determine how much water you'll need in order to survive.

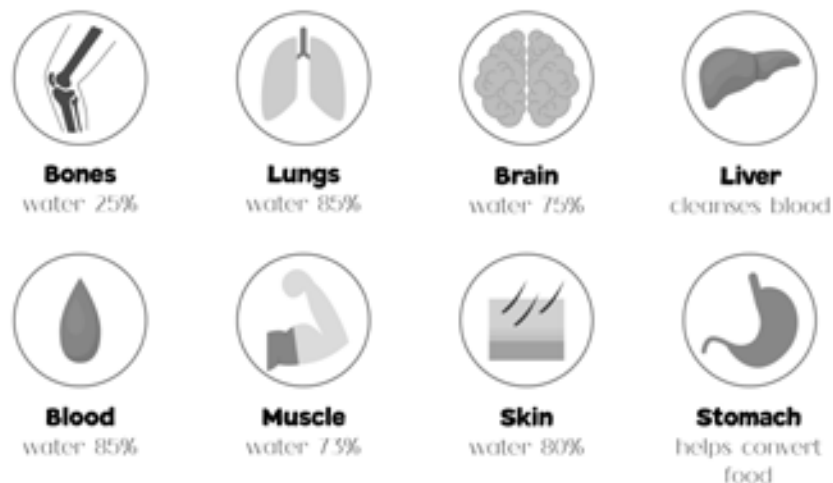
For the record, the Red Cross recommends storing 1 gallon per person, per day but we're not entirely satisfied with that answer.

Calculating your water needs depends upon several different factors: How active are you? What is the weather? How old are you? Are you pregnant or nursing? Do you want to store enough for hygiene, or just for drinking? How long are you prepping for? We're going to try to give you calculations for account for each scenario so that you'll know how much water to store regardless of your situation. Read more about water needs on World Health Organization website.

First, though, realize that water goes bad just like every other food. Well, it doesn't go BAD exactly but it will start to taste funny. You should rotate it just like you do the rest of your stockpile. You can revive "flat" water by pouring it back and forth between containers to re-oxygenate it.



### WATER BALANCE



### Why Stockpile Water?

You can only survive for 3 days without water and you'll start to feel the ill effects of dehydration way sooner than that.

Your skin will become dry, your brain will slow down, your thoughts will become muddled and your critical thinking skills will be impaired. Then, of course, you die. That's something we try to avoid at all costs. Better to store water!

You're going to need two types of water: Potable, or drinkable, and non-potable that you can use for bathing, washing dishes, and laundry, and performing other non-drinking tasks.

Of course, you can always store potable water and just use it for everything if you find that easier. Many people choose to use rain barrels for collecting non-potable water and have even hooked up filtration systems to them to make the water safe to drink.

### Weather Factors Affect Water Needs

Many people think that you would need more water in hot weather than you do in cold but that's actually not the case.

If you're working outside in extreme temperatures, you really do need much more water than if you're sedentary in moderate temperatures. If you're a relatively sedentary adult living in moderate temperatures, here's a good rule of thumb: divide your body weight in half and that's how many ounces of water per day you should be drinking, assuming you're not lactating.

If you're sweating profusely for long periods of time, you need at least 1.3 gallons of water per day. That same rule applies regardless of whether you're sweating in the sun or sweating while you're at the gym or shoveling snow.

Another reason that you should drink plenty of water in winter is that your body isn't absorbing as much water from the air as it does in the humid months of summer. Shivering also utilizes a ton of energy and you need plenty of water to support the production of that energy.

Since it's cold, many people don't drink enough in the winter but in a survival situation, a decline in cognitive or motor skills caused by mild dehydration could be the difference between living and dying.

## Special Needs of Water for Different Categories

### Lactating Women

If you're nursing a baby, chances are good that you're going to need more water. A simple way to calculate how much you'll need is to simply figure  $\frac{2}{3}$  of your body weight and drink that in ounces per day.

That's not a hard and fast rule, but it's a good place to start. If you feel thirsty, drink more.

In other words, it may be a good idea to store your full body weight in ounces per day for as long as you'll be breastfeeding during the emergency.

### Infants

Babies need much more water than adults do. As a matter of fact, they need 3x more than we do.

Of course, if the baby is being breastfed, he can get all that he needs from mom, assuming that she's drinking enough.

If he's on formula, he'll need to drink more.

The formula will count for some of his needs so figure about  $\frac{1}{3}$  of his bodyweight in ounces of extra water and don't forget to account for growth during the duration that you're stockpiling for.

### Children

Again, we're going by weight, not age because it's more accurate. Because kids are growing and are also typically more active than adults, they need much more water than we do.

Remember that drinks such as milk count toward their water needs but in total, figure that they need about 1.33 ounces of fluids per pound of body weight per day.

### The Elderly

Older people don't necessarily need more water than the average adult but they do need some reminders to drink it in order to stay healthy.

Mild dehydration is a much bigger deal for an older person than for a younger adult because kidneys don't function as well and the body's sense of thirst often diminishes with age.

Also, swallowing capacity, mobility, and comprehension is affected more quickly with dehydration in older people.

Remind them to drink even if they're not thirsty because thirst is the first stage of dehydration!

### Elevation

People who live at higher elevations need more water than those who live closer to sea level. If you live above 5000 feet above sea level, this applies to you. If you're over 11,500 feet, your water needs increase even more because there is very little humidity and reduced oxygen. It takes more water to breathe because you breathe faster in order to get enough oxygen. You also urinate more often and may not feel as thirsty.

According to the Institute for Altitude Medicine, you should drink an additional 1-1.5 liters per day if you're over 5000 feet and if you're at altitudes over 10k feet, you need to increase your carbohydrate intake by about 300 grams too, so drink sports drinks or other sugary drinks as 3-4 liters of your fluid intake.

Now that you know how much water each person in your family needs to drink each day, add at least another half-gallon per person for hygiene. Then simply multiply the total number by how many days you are prepping for and you now know how to calculate your water needs.

If you're planning for a long-term event, you may wish to consider stockpiling water purification tabs and finding alternate ways to capture water such as water barrels or irrigation systems.

This is a good idea for a number of reasons. You'll need water for your garden and storing large quantities of water isn't exactly feasible for most people, especially if you have a large family.

Regardless of how you decide to store your water, good luck and happy prepping.