

# HOW DRINKSTATION® PROPERLY FILTERS YOUR DRINKING WATER

*Why it is necessary to properly filter your tap water before you drink it or use it for cooking.*

- Every time water goes down the drain, whether to a sewer, septic system, storm drain or wherever it rains, the water carries contaminants with, which usually end up in someone's drinking water. Americans expect cheap, clean, safe drinking water from every faucet, but achieving this level of convenience is impossible for municipalities or communities! Limited budgets, obsolete water-treatment plants, and aging water delivery infrastructure (with lead ducts) prevent additional levels of filtration of the water before it is pumped into the pipes and delivered to communities. In addition, in the past 50 years, human activities (industrial and residential) have generated a huge amount of NEW contaminants that pass effortlessly through municipal water treatment processes. Pesticides, herbicides, pharmaceuticals and personal care products (PPCPs), such as antibiotics, hormones, opioids, cosmetics, detergents, in addition to nitrites and nitrates from fertilizers, etc. all these contaminants and many thousands more, pass through your local municipality water-treatment plant without any problem. There is no way that your city or community water-treatment facility can block any of these contaminants. That's why it is your duty to properly filter your water before you drink it, or before your family and kids drink it! There are two different threats to your health hidden in the water you are using daily: *chemical contaminants* and *waterborne pathogens*.
- Chemical contaminants. The Environment Protection Agency is supposed to regulate the contaminants that are present in the drinking water entering the homes and businesses in the United States. Unfortunately, it only regulates about 100 contaminants and monitors another 200 chemicals, while "*there are more than 85,000 different contaminants in the water you are drinking*" (ref. ANH-USA, June 4, 2013). In other terms, the water you are drinking at your own home, office, or in a restaurant, contains many, many thousands of potentially seriously harmful substances that no one is regulating or monitoring. Why? Because it is technically impossible with the current financial and technical resources available at your city or community level, to control and, in particular, to remove most of these thousands of contaminants. Therefore, American homes and businesses are exposed to thousands of cancer-causing chemicals that are not regulated by any governmental agency. The American water treatment and delivery infrastructure is aging and outdated. While the authorities are trying to do their very best with their limited budgets, American citizens must take responsibility to improve the safety of centrally supplied drinking water by removing ALL contaminants from the water they drink.
- Waterborne pathogens. In addition, the same EPA ranks drinking-water pollution as one the top environmental threats to human health. However,

while the EPA is unable to put in place measures to effectively reduce pesticides, herbicides, pharmaceuticals and other contaminants directly derived from industrial and agricultural activities, the US Agency is also focused on waterborne diseases that break out in community water systems (one third of which are never detected, investigated or even reported). Waterborne diseases range in size from extremely small viruses of sub-micron range, to relatively large bacteria or cysts that can approach 50 microns in diameter. Various forms of micro-organisms, coliform bacteria, viruses and protozoa might enter your water pipes causing all sort of diseases. In order to reduce the chances of waterborne pathogens, municipalities introduce Chlorine into your water. In fact, chlorine can deactivate micro-organisms through a variety of mechanisms. Chlorination is not 100% effective against waterborne pathogens, but it is the cheapest solution municipalities can afford to put in place before delivering potable water to communities. Unfortunately, chlorination creates a number of undesirable by-products. Today, it is widely proven that disinfection by-products (like the THMs) produced by the chlorine in your water do cause cancer. And, in recent years, THMs production has increased by chlorine chemically reacting with PPCPs. The World Health Organization recently stated: *“the risk of death from [waterborne] pathogens is, at least, 100 to 1000 times greater than the risk of cancer from disinfection by-products...”*. In other terms, consumers are being told that they must choose between illness and/or death from waterborne pathogens, or the risk of cancer from chlorine compounds and the inevitable by-products of disinfection (DBPs). A tough choice, indeed. Therefore, your only solution here is to take responsibility, again, for your health and your family’s health, by completely removing chlorine, chloramine and DBPs, from your drinking water. In addition, you also need to definitively eliminate those waterborne pathogens that survive/escape the entire chlorination process performed by water-treatment plants.

- Conclusion. If you want to safely drink water from the tap, the water has to go through a proper filtration or purification process to remove contaminants and waterborne pathogens. In theory there are two solutions, but only one is completely safe: Whole-House Filtration which is commonly called Point-Of-Entry (POE) filtration, or the Point-Of-Use, (POU) filtration, which defines the filtration that is located right when you consume (use) the water for drinking or cooking (in your kitchen). By all accounts, the safest - and cheaper - solution is the POU filtration: i.e. filtering or purifying your water at the moment you use it!

#### ***Why your whole-house-filter might not make your water safe to drink.***

- Many water-treatment professionals will recommend you buy (very expensive) whole-house (POE) filtration systems, emphasizing how convenient it is to have “good” drinking water from each and every faucet of your home. The most common of these POE systems are carbon filters. These huge external carbon filters, are often installed along with other treatment technologies such as water softeners or, more rarely, together with ultra-filters and UV (Ultra-Violet)

disinfection lamps. In very rare cases, water-treatment professionals also suggest installing a Reverse Osmosis (RO) system for the whole house. While all whole-house POE systems are certainly helpful in order to make your drinking water safer, there are a series of problems that they do not address, in addition to generating new critical health issues by the sole presence of these whole-house filters.

- Let's examine, quickly, case by case:
  - 1. Use carbon filter for the whole-house. It probably removes chlorine from your water (although it is not meant to remove chloramine). Carbon filters are good for odor, taste and the aesthetic characteristics of water (NSF42). They often reduce volatile compounds (those employing Granular Activated Carbon, GAC). If combined with sediment filters (like polypropylene), they also reduce particulates. Unfortunately, carbon filters DO NOT reduce all the other contaminants! Conclusion: they are totally inadequate for the purpose of eliminating all new contaminants in your drinking water and give you the false impression that, having eliminated bad taste and odor from your municipality water, that water is now safe for you to drink. In addition, now the downstream pipes inside your home must be disinfected regularly. In fact, if not in use for more than a few days - while households are on vacation, for instance - waterborne pathogens might grow in your home's pipes and fixtures, (remember that the chlorine is now inhibited by your whole-house carbon filter) and, consequently you might be now exposed to diseases that otherwise, without your whole-house filtration - you would have avoided. In other terms, with not properly maintained pipes, you also seriously risk getting legionella and other illness right from your own home!
  - 2. Combination of carbon filter + softener. The problems are the same as above. The softeners reduce the hardness of your water and make it smooth. However, when they are not regularly or properly maintained, several types of softeners might release salts that are not exactly healthy to drink.
  - 3. Combination of carbon filter + ultrafiltration and UV lamp. This combination is the best because it effectively reduces a lot of incoming contaminants, thanks to the ultrafiltration membrane. This system is extremely costly and the membrane must be frequently replaced due to the amount of water that needs to be filtered. However, although this is the best combination possible, the issue regarding the need for regular disinfection of your downstream pipes and flushing of the system remains.
  - 4. Reverse Osmosis system for the whole house. This solution, with or without the carbon filter, must be avoided because, while the Reverse Osmosis is effective in removing almost all contaminants present in your water, it also demineralizes it and, therefore, you cannot keep drinking water in your home's copper and brass pipes without absorbing a significant percentage of heavy metals from those pipes, (in fact, the

purified water inside your pipes and fixtures will absorb heavy metals from those same fixtures). This whole-house filtration system is, over the years, extremely dangerous for your family's health and must absolutely be avoided.

***Why buying bottles of water from the local store is not a healthy alternative.***

- Plastic bottles have two main problems: plastic is made from toxic hydrocarbon molecules that leach into water, especially when exposed to direct sunlight. The BPA substitute in PET bottles, BPS, is now shown to have an endocrine-disrupting activity on a par with BPA. In addition, a recent study of 259 water bottles has found tiny pieces of plastic in more than 90 percent of them, prompting a review by the World Health Organization (WHO). <https://www.theguardian.com/environment/2018/mar/15/microplastics-found-in-more-than-90-of-bottled-water-study-says>
- In conclusion, if you drink water from plastic bottles you have a 90% chance of ingesting micro-plastic particles (thousands of them) and, in addition, being exposed to carcinogenic substances due to the leaching of PET into the water. Glass bottles of water are exempt from those problems, of course. However, you must pay attention to their chemical content since bottled water are not regulated by the EPA and, therefore, subject to an even less restrictive set of rules concerning potential pollutants. In addition, pay attention to the date the water was actually bottled, because you don't want to drink water that has been sitting for too much time (months, or even more than one year), thus potentially developing algae inside. It is a known fact that water which is not fresh, over time, develops algae and, later, micro-organisms.

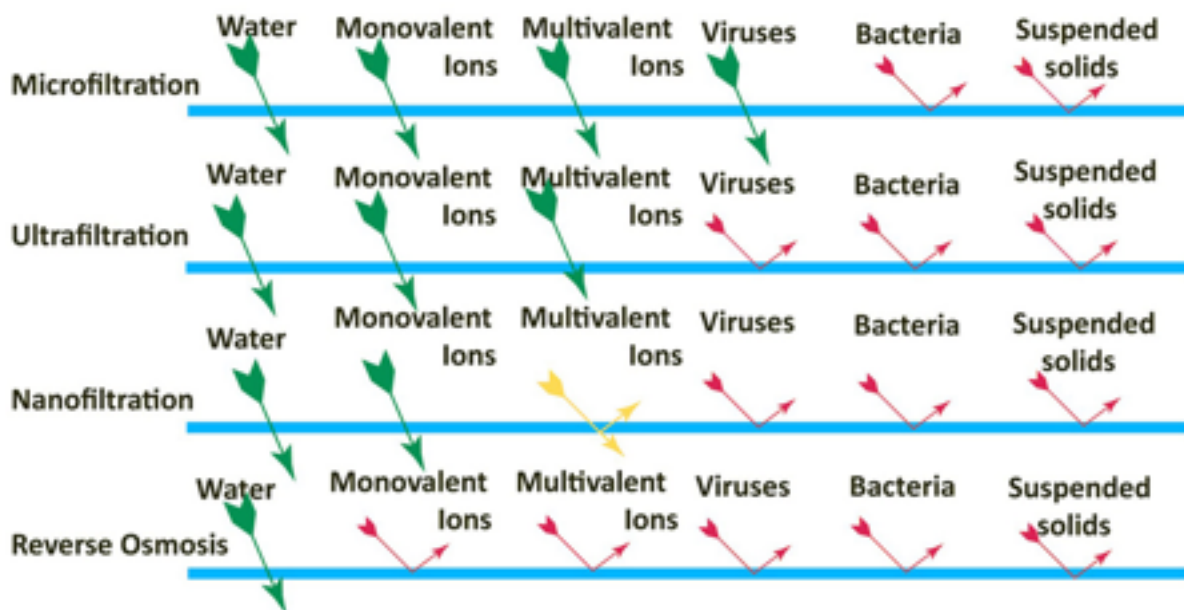
***Why drinking fresh properly filtered water from your tap is the only really healthy solution.***

- Here are the facts, as above depicted:
  1. Your drinking water normally contains many thousands of contaminants, including pesticides, herbicides, pharmaceuticals, volatile organic compounds, heavy metals, fluoride, nano-particles, including micro-plastics and a myriad of manufactured contaminants which do not readily degrade in nature; chlorine, chloramine and byproducts from the chlorination process. It might also contain waterborne pathogens, like cysts, bacteria and a vast variety of viruses.
  2. Drinking water from bottles is not a healthy alternative, as seen above.
  3. Installing a whole-house filtration system is not a much safer solution either.

The only healthy way is, in fact, to properly filter the water you are going to use for drinking (and also for cooking) at the Point-Of-Use (POU) and right at the moment you consume it, so that you can always drink it clean and also fresh.

***What is a proper water filtration system to be installed at the Point-Of-Use?***

- The effectiveness of the different water filtration systems in removing harmful substances and pathogens is based on the size of the membrane the water has to pass through as well as its absorption properties.
- Looking at the table below, there are only two types of very effective filtration systems possible: one is based on a nano-filter (NF) membrane and the other is based on a reverse osmosis (RO) membrane. DRINKSTATION® has, in fact, 2 different models based on these two membranes: the nano-filter membrane and the reverse osmosis membrane. See below to understand the effectiveness of these two membranes.



The above illustration should be read as follows: Red arrow shows what is blocked from passing into water at the various stages. In conclusion: the Nano Filtration does an excellent job of removing anything which is larger than a Nano size, whereas the the NF plus RO only allows the passage of pure water. Customers who choose the Absolute Purifier option, which include the RO membrane, should integrate their hydration by drinking the Alkaline water regularly to obtain a good amount of electrolytes and minerals present in our Alkaline water.

**The [MULTI-STAGE NANO-FILTRATION](#): an electromagnetic multi-layer filtration system with dynamic absorption.**

An Ultra-filtration barrier (UF) is positioned between a sediment filtration media (polyphosphate) and a carbon block. Particles level 1, Chlorine, Cysts and Bacteria are all eliminated. This filter is followed by a chloramine-type of carbon block. This multi-stage filtration system is also complemented with the smallest commercially available nano-fibers in the world. The nano-fibers used herein have the unique property of generating a positive charge that radiates a distance of up to 1 micron from each nano-fiber. This charge field emanates through water to disrupt the path of the contaminant as it traverses through the pore structure of the filter media until becoming absorbed by the nano-fibers and removed from the water stream. Since these nano-fibers are attached to a micro-glass structural fiber, the pore size of the non-woven media has been designed such that the capture cross section of the 0.7 microns pore by the charge field is total. Being a depth filter media, the water must pass through approximately 400 pores in the Z direction that are fully permeated by the charge field generated by the nano-fibers. The “electromagnetic field” is such that effectively removes sub-micron particles, heavy metals - copper, tin, iron, lead, aluminum, and, in addition, viruses (> 3LRV of MS2 virus at about 27 nm). In addition, the media used in this filtration system also contain a special Powered Activated Carbon (PAC) with an average particle size of only 8 microns: producing remarkably high dynamic absorption as compared to non-wovens containing granular carbon (GAC). This dynamic retention mechanism really makes all the pores of the PAC available for absorption of any remaining chlorine residue, iodine, volatile organic compounds (VOCs), disinfection by-products (DBPs) and humic compounds from water, unlike micro-filter (MF) or ultra-filter (UF) membranes. It is like a very effective NF membrane without the typical drop in pressure of a typical NF membrane.

## **The **ABSOLUTE PURIFIER™**: a series of filters designed to block any and all possible contaminants and pathogens.**

A 10-micron pre-filter, or sediment filter, is normally positioned as the first stage of a multi-stage purification process, in order to remove particulates, dirt and sand from tap water. This sediment filter is followed by a carbon block filter (of 1.5 microns) to take care of Chlorine, odor and taste. At this point one or, in some cases, two series of RO membranes are positioned downstream, each of them having a micron rating of 0.0001 microns!

The two membranes are designed to remove ALL sorts of contaminants (heavy metals such as Arsenic, Lead, Iron, Copper, Barium, Cadmium, Fluoride, Radium, Selenium, Chromium, etc.), pesticides, herbicides, pharmaceuticals, DBPs, and any other chemical whatsoever. In addition, the membranes remove all sorts of pathogens, including the smallest viruses. After the RO membranes the TDS value of the water is around 10 to 20 ppm. Then, a modified De-Ionizer (DI) filtration is designed to remove monovalent ions that might have gone through this multi-stage process. Ultimately, a coconut-based carbon filter gives the last finishing touch to your pure

drinking water. Our Absolute Purifier is complemented with our proprietary Alkaline Chamber where the pure drinking water absorbs healthy minerals and then gets ionized to increase its pH up to 8.5. Our Alkaline Chamber could also be customized to your needs, increasing the pH value, together with a significant boost in its alkalinity (with very negative Oxidation Reduction Power). As the last step of this complex, articulated process of cleaning and regenerating your water, by increasing the minerals dissolved - in quantity and quality: calcium, magnesium, potassium, manganese, sodium - and adding one special electrolysis plate, it is possible to increase the pH to 9 or 9.5, while boosting the alkalinity properties of your water (-200 ORP).