

## **Volatile Organic Chemicals in Drinking Water**

Volatile Organic Chemicals, or VOCs, are a group of water contaminants that can be very dangerous if found in drinking water at unsafe levels. They include some of the most common, most toxic, and most widely distributed water contaminants. VOCs are among the most costly water contaminants to detect, and the most difficult and expensive for municipal water systems to remove from water. Currently, there are approximately two dozen VOCs regulated by the government.

### **What Are VOCs?**

There are many thousands of organic chemicals that are volatile and turn into vapor at relatively low temperatures, but the official regulatory category of "VOC" refers only to those that are toxic and occur in drinking water often enough or in high enough concentration to justify regulation. The group includes many different chemical types, from various sources, with a variety of toxic effects, including cancer. VOCs are usually the result of pollution and originate from areas of industrialization, such as factories and processing plants. VOCs come from industrial waste, leaking gasoline storage tanks, seepage from toxic waste dumps, agricultural runoff and accidental chemical spills. Disinfection with chlorine is a major cause of VOCs; trihalomethanes (THMS) were the first VOCs discovered. Although any area is susceptible, industrialized or agricultural areas are more likely to have VOCs. VOCs are production by-products of some foods, drugs, disinfectants, pesticides, paints, plastics, room and water deodorants, mothballs, fumigants, glues, rubber materials, dyes and perfumes. They include benzene, dichlorobenzene, styrene, toluene, vinyl chloride, chloroform and carbon tetrachloride. Industrial solvents and their degradation products, and gasoline compounds are also VOCs. VOCs find their way into the water supply by leaking from the source such as a factory or underground tank, through the ground into the water supply, including rivers, lakes and underground aquifers. If you live in an industrialized area or near a factory or plant, or if your water supply is chlorinated, you should be concerned about VOCs in your drinking water. Any area is susceptible to VOCs.

**Government Regulation** Municipal water treatment plants are required by law to monitor levels of many VOCs in water. The EPA has set specific standards for the maximum contaminant levels, or MCLS, of specified VOCs. However, regulations also require testing for many other VOCs that are not currently regulated. Unfortunately, even minimal testing can overburden the financial resources of many small municipal water systems. Therefore, it is sometimes more cost effective to completely shut down a water source when VOCs are found, than to treat the water.

**Reducing VOCs in Your Drinking Water** If you are concerned about VOCs in your water, first contact your local water utility, if you have one. Ask for a copy of the latest report to the State EPA, including unregulated organics. If you have a private water supply, the EPA does not regulate your water so you will need to have the water tested yourself. VOCs are not readily noticeable by sight or by taste, so water-containing VOCs appears to be normal. Therefore, you'll need to have your water tested to know for certain whether VOCs are present at significant levels. Your county or state health department should be able to provide you with the name of a certified water-testing laboratory in your area. A dedicated water test for VOCs is available from many water-testing laboratories, and a good general test for most common contaminants usually can be conducted for less than \$150. There is a way

to remove VOCs from your water before you drink or cook with it. This can be done simply and cost effectively with a point-of-use (POU) water filtration system certified by NSF International for the reduction of VOCs. NSF is an independent testing agency that sets product standards and certifies the performance of POU systems. Typically the size of a household fire extinguisher, POU systems designed for the consumers are installed under the kitchen sink and the filtered water is served through a dedicated drinking water faucet. Commercial systems are larger in size due to their increased capacity and are typically wall-mounted near the incoming water line. As water travels through the POU system, sediment, particles, bacteria and harmful chemicals are removed by the system's main ingredient (most frequently activated carbon). Activated carbon is an extremely porous material that attracts and holds harmful contaminants in the water through a process known as adsorption. The result is safer, better tasting water. Depending upon the model, POU systems are capable of correcting most water problems, including VOCs, chlorine, lead, and asbestos; and the removal of parasitic cysts such as Cryptosporidium and Giardia. Everpure manufactures drinking water systems for both home and commercial use that are NSF-Certified to remove 95-100 percent of VOCs. In addition to reducing VOCs, those systems also reduce lead. Everpure's unique precoat filtration process reduces or removes off tastes and odors, chlorine, dirt, rust, parasitic protozoan cysts such as Cryptosporidium and Giardia, asbestos fibers, and all particles 1/2 micron and larger in size.

Everpure, Inc., a leading manufacturer of water filtration systems for residential and commercial use, offers a full line of systems to meet all water quality needs.

### Health Effects of Volatile Organic Chemicals

VOCs are dangerous and are known to cause certain cancers, including leukemia, and other diseases. The following are VOCs that are currently regulated by the Environmental Protection Agency and their health effects:

VOC	Health Effect
Benzene	Cancer
Carbon Tetrachloride	Cancer
Dichlorobenzene	Kidney damage
Dichloroethane	Cancer
Dichloroethene	Liver, kidney damage
Trichloroethane	Liver, nerve damage
Trichloroethylene	Cancer
Vinyl Chloride	Cancer
Dibromochloropropane	Cancer
Ethylene Dibromide	Cancer
Dichlorobenzene	Liver, kidney, blood damage
Dichloroethene	Liver, kidney, nerve damage
Dichloropropane	Cancer
Ethylbenzene	Cancer

Pentachlorophenol	Cancer
Styrene	Liver, nerve damage
Toluene	Cancer
Dichloromethane	Cancer
Hexachlorobenzene	Cancer
Trichlorobenzene	Liver, kidney damage
Trichloroethane	Liver, kidney damage Liver, kidney damage

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