

wellcare[®] information for you about

VOLATILE ORGANIC COMPOUNDS (VOCs) & WELL WATER

What are Volatile Organic Compounds?

Volatile Organic Compounds (VOCs) are a class of chemical compounds that share two main properties:

1. they evaporate easily from water into the air; and
2. they contain carbon.

Low concentrations of most VOCs in water can produce a sweet and pleasant or foul and unpleasant odor that is easily detected.

VOCs are associated with products such as but not limited to gasoline, plastics, adhesives, dry-cleaning fluids, refrigerants, and paints. Biological sources of VOCs are from the degradation of organic matter in feed and manure. Crude oil tanking can also release VOCs into the atmosphere.

When spilled or improperly disposed of, VOCs may be released into the environment. Any portion that does not evaporate may leach into the soil and can be carried into groundwater by rain, water, and snow melt.

Factors that influence the likelihood of contamination include:

- proximity of the well to the source of contamination;
- the amount of VOCs that are spilled or discarded;
- depth of the well (shallow wells are affected by surface spills more quickly and more severely than deep wells);
- local geology (groundwater that is protected by thick, dense, impermeable soils is less vulnerable to contamination); and
- time (groundwater moves slowly, so it can take months or years after a spill before contamination reaches wells).

What are the health effects of Volatile Organic Compounds?

The harmful effects of VOCs vary considerably. At high levels, some VOCs may damage the central nervous and immune systems, the kidneys, or the liver. They may cause irritation to eyes, mucous membranes, skin, and throat. Some VOCs are known or suspected carcinogens.

The U.S. Environmental Protection Agency (EPA) has established maximum contaminant levels (MCLs) for the following VOCs:

Volatile Organic Compound	Maximum Contaminant Level (MCL) (mg/L or ppm)
Benzene	0.005
Benzo(a)pyrene (PAHs)	0.0002
Carbon tetrachloride	0.005
Chlorobenzene	0.1
o-Dichlorobenzene	0.6
p-Dichlorobenzene	0.075
1,2-Dichloroethane	0.005
1,1-Dichloroethylene	0.007
cis-1,2-Dichloroethylene	0.07
trans-1,2-Dichloroethylene	0.1
Dichloromethane	0.005
1,2-Dichloropropane	0.005
Di(2-ethylhexyl) adipate	0.4
Di(2-ethylhexyl) phthalate	0.006
Dioxin (2,3,7,8-TCDD)	0.00000003
Ethylbenzene	0.7
Ethylene dibromide	0.00005
Hexachlorocyclopentadiene	0.05
Methyl Tertiary Butyl Ether (MTBE)	0.020 – 0.040 ¹
Polychlorinated biphenyls (PCBs)	0.0005
Pentachlorophenol	0.001
Styrene	0.1
Tetrachloroethylene	0.005
Toluene	1
1,2,4-Trichlorobenzene	0.07
1,1,1-Trichloroethane	0.2
1,1,2-Trichloroethane	0.005
Trichloroethylene	0.005
Vinyl chloride	0.002
Xylenes (total)	10

¹EPA has not set a national standard for MTBE, check with your local state or environmental agency for guidance.

How do I test for Volatile Organic Compounds?

You should test your well water for VOCs if it is in close proximity to a gasoline service station or other fuel tanks (500 to 1000 feet), if a spill has occurred on or near your property, or if your water has the taste or odor of gasoline or solvents. Contact your state or local health department for a list of state-certified laboratories in your area or use our [interactive map on our website](#). If you need assistance locating a laboratory in your area, contact our wellcare® Hotline at 888-395-1033.

What are the treatments for Volatile Organic Compounds in drinking water?

Keep in mind that VOCs may still enter your body through skin absorption or through inhalation of water vapor, so treatment may be recommended even at lower levels. Contact a certified water treatment professional in your area for guidance. To search for a certified water treatment professional in your area use Water Quality Association's [website](#).

Three types of treatments may be used to remove or reduce VOC levels in drinking water, either alone or in combination with one another. These are Granular activated carbon (GAC) filters, Distillation, and Packed tower aeration (PTA).

Granular activated carbon (GAC) filters may be used to reduce VOC levels in drinking water. Treatment success depends on a number of factors, including:

1. the type and amount of contaminant;
2. the rate of water usage; and
3. the type of carbon being used.

Carbon filters should be replaced according to the manufacturer's instructions, and water should be tested after a treatment system is in place to ensure the system is working properly. Filtration systems may either be installed at the faucet (for point-of-use treatment), or where water enters the home (point-of-entry treatment). Point-of-entry systems provide safe water for bathing and laundry, as well as for cooking and drinking, and are therefore preferred for treatment of VOCs.

Distillers can remove VOCs using gas vents, fractional columns, and/or GAC filters. A combination of these methods is typically more effective for removing or reducing VOC levels than one of these methods alone. To maintain distillation equipment, empty the boiling chamber at least once a week, and more often if the distiller is used constantly.

Packed tower aeration (PTA) combines air with water to turn contaminants into vapor, which is either released into the atmosphere or treated and released. Pumps and blower motors should be serviced, and air filters replaced, as needed, to ensure these systems operate effectively.

These technologies may have a wide range of effectiveness. Additional water tests may be necessary to determine the best water treatment to use. Look for treatment systems that are certified by NSF or Water Quality Association (WQA) when possible. You can find certified products on [WQA](#) or [NSF](#) websites. Always maintain treatment systems per the manufacturer or water treatment professional's recommendations and test your water after installation and annually thereafter to confirm effectiveness.

For More Information on VOCs & Well Water

Your local well contractor, health department, cooperative extension service, and state environmental or natural resources department can provide more information about VOCs in your area. If you need help locating these resources, contact the wellcare® Hotline at 888-395-1033 for assistance.



Information to help maintain and protect your water well system:

wellcare® is a program of the [Water Systems Council \(WSC\)](#). WSC is the only national organization solely focused on protecting the health and water supply of an estimated 23 million households nationwide who depend on private wells (according to the U.S. EPA).

This publication is one of more than 100 wellcare® information sheets available FREE at www.watersystemscouncil.org.

Well owners and others with questions about wells and well water can contact the wellcare® Hotline at 1-888-395-1033 or visit www.wellcarehotline.org to fill out a contact form or chat with us live!

JOIN THE WELLCARE® WELL OWNERS NETWORK!

By joining the FREE wellcare® Well Owners Network, you will receive regular information on how to maintain your well and protect your well water.

Contact us at 1-888-395-1033 or visit www.wellcarehotline.org to join!