



Environmental Health Information

Water Treatment Using Carbon Filters

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An uncontaminated aquifer (underground water-bearing rock or sediment) is the best source of well water. When a portion of an aquifer becomes contaminated, long term solutions for obtaining a safe water supply include: removing the source of contamination and cleaning up the aquifer; drilling a new well into an uncontaminated aquifer and properly sealing the old well; or connecting to a public water supply.

In circumstances where this is not feasible or possible, a filter with granular activated carbon (GAC) is one water treatment option available for residents and communities to remove certain chemicals, particularly organic chemicals, from water. GAC filters also can be used to remove chemicals that give objectionable odors or tastes to water such as hydrogen sulfide (rotten eggs odor) or chlorine.

What is granular activated carbon (GAC)?

Granular activated charcoal is made from raw materials (such as coconut shells or coal) that are high in carbon. Heat is used to increase (activate) the surface area of the carbon; this is why these filters are sometimes referred to as “charcoal” filters. The activated carbon removes certain chemicals that are dissolved in water passing through a filter containing GAC by trapping the chemical in the GAC. However, other chemicals, like sodium or nitrate, are not attracted to the carbon and are not removed.

Eventually, the ability of the GAC to bind and remove chemicals is used up and new, or regenerated, GAC is needed.

It is very important that the type and concentration of contaminants, and water use, be known in order to determine the correct size of system. All treatment systems require proper installation, periodic monitoring and maintenance.

[Note: A reverse osmosis (RO) drinking water system may also remove certain organic chemicals. Check your RO system owner’s manual for additional information, or talk to your dealer.]

What kind of GAC filters systems are there?

There are two types of GAC filter systems:

1.) Whole-House Filters or Point of Entry:

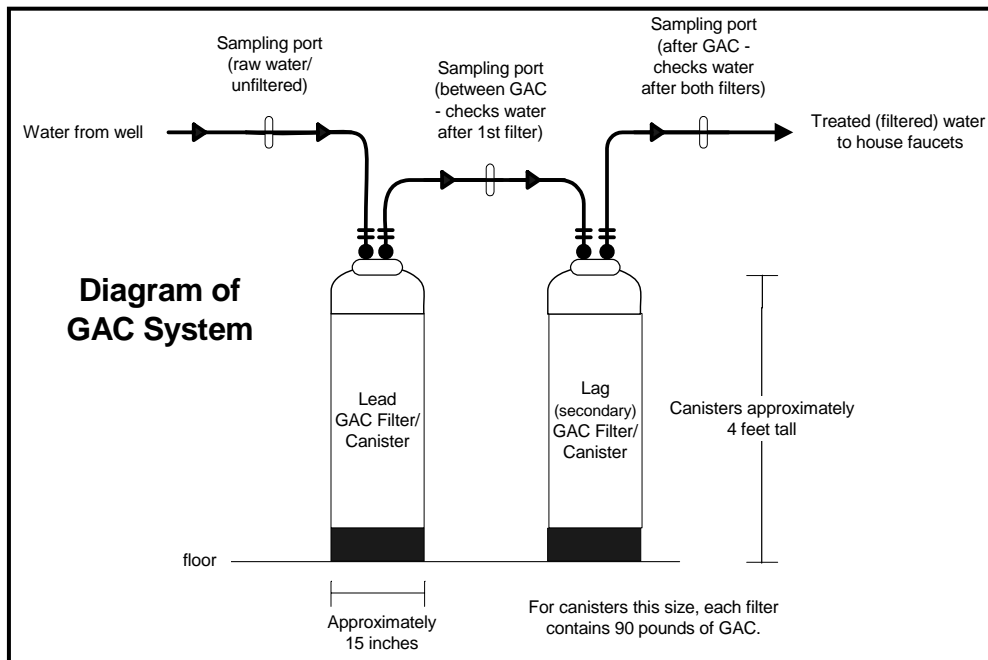
A whole-house filter is installed at a point on the home’s water supply plumbing that will result in treatment of all water that travels to any faucet or fixture in the home (sometimes people will exclude outside faucets). These filters are usually cylindrical in shape. The example shown in the photo is about 4-feet tall and 15 inches in diameter.

These filters are usually installed as a pair, although more may be required in some situations. Two filters arranged in sequence ensure that any chemical that might get past the first filter is trapped by the second. When the first filter is used up, the second filter is moved to the first position and a new filter is placed in the second position.



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Systematic monitoring and a maintenance schedule based on contaminant concentrations and water use are essential in ensuring that the GAC filter functions properly and is changed before its ability to attract the chemical is used up.

[Note: Water conditioning systems (e.g., filtration equipment) must be installed by a licensed, bonded plumbing or water conditioning contractor in cities with more than 5,000 people (although homeowners can install

equipment in homes they own and occupy). In cities of less than 5,000 people, installers or contractors must be bonded but are not required to be licensed. A license shows that a contractor has completed training and can legally work in a specific area/city/county, etc.; a bond ensures the work will be done correctly.]

2.) Point of Use Filters:

A point of use (POU) filter is installed in the water supply pipe just before the faucet where people get water. One example is an under-sink unit; water passes through the carbon filter and travels to a separate water tap, next to the main faucet. Water from the separate tap will be GAC-treated, and water from the main faucet (hot or cold) will be untreated. Other examples of point of use filters are the GAC pitcher filters commonly sold in grocery stores or GAC filters that are a part of a refrigerator's icemaker.

Which type of GAC filter system do I need?

Which system you need depends on the type and amount of contaminants in the water, other chemicals in the water, water use and exposure pathways that need to be eliminated. Exposure pathways are the ways chemicals enter your body. Some chemicals may cause harm if they are ingested, some if they are inhaled, and some if they enter through the skin. Sometimes people are exposed through a combination of exposure pathways.

An under-sink filter protects people from ingesting the chemical -- by treating the drinking or cooking water only from that tap. It will not protect people from inhaling the chemical while showering or bathing, prevent the chemical from being absorbed through the skin, or protect other water faucets. Inhalation is a concern when the chemical easily evaporates from the water into the air.

A whole-house filter system treats all water traveling to any faucet or fixture in the home. It removes the chemical before it can be ingested, breathed in, or absorbed by the skin during washing or bathing.

For either type of filter system, consistent maintenance and periodic filter replacement is essential to ensure effectiveness and prevent bacterial build-up. It is recommended that water treatment systems be tested and certified to national standards by a reputable testing laboratory, such as NSF. The Minnesota Water Quality Association (www.mwqa.com/) also has information about water treatment systems.

If chemical(s) are detected in your well, you should evaluate the options for assuring a safe water supply. Please contact Tannie Eshenaur (651-201-4897 or tannie.eshenaur@health.state.mn.us) at the Minnesota Department of Health for additional information.