

Water Filters

What are water filters?

Water filters are devices that can improve the overall taste, smell and appearance of drinking water and can remove some chemical substances. Used mainly for drinking and cooking purposes, filters are the most inexpensive and most easily available method of water purification. However, purification using filters is not 100 per cent.

In general, water filters remove only specific types of substances and are labelled for what they will remove, such as chlorine or lead. Water filters do not remove microorganisms; and, are intended for use with water that is known to be microbiologically safe. No single water filter can be used to remove all types of substances from water.

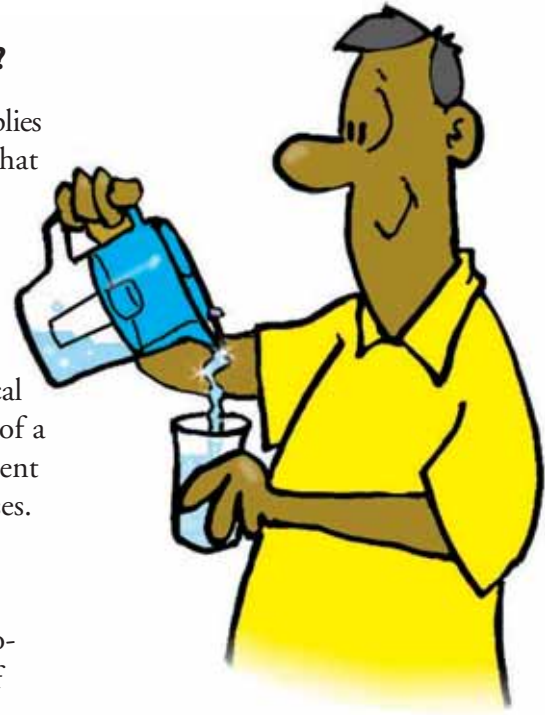
There are many types of water filter models on the market. Different drinking water treatment systems have their own advantages and disadvantages and must be investigated individually to identify the unit or combination of units best suited for your household.

Do I need a water filter?

If your municipality or utility supplies your drinking water, it is likely that you do not need a water filter. Municipally supplied water is treated to meet health and aesthetic (taste and odour) requirements and is subject to routine testing for microbiological contamination. In this case, use of a water filter for additional treatment is essentially for aesthetic purposes.

If your drinking water is from a private supply (such as a well) it may not be safe from microbiological, chemical, or other types of contamination. Drinking water taken from private sources should be tested periodically to determine if treatment is required; and, if so, for what contaminants.

While municipally treated water leaves the plant meeting all health and aesthetic standards, it should be noted that if your home has lead pipes or solder or if your water utility has lead pipes, you may have lead in your drinking water. If you aren't sure and you live in an older neighbourhood or older home, you can have your drinking water tested for lead.



If your water does contain lead, you can remove water that has sat in your pipes overnight by running the cold water until it feels cold, or you can use a water filter that has been certified to remove lead.

Will a water filter disinfect my water?

No. Filters should be used only with municipally treated water that is safe to drink or routinely tested well water that is microbiologically safe.

What types of water filters are there?

There are three principal types of filters:

1. **Particle Filters** - These filters operate on one basic principle: they use a membrane to screen out or trap particles based on their size. These filters are rated according to the pore size of the membrane, which is measured in microns,—the lower the number of microns (i.e. the smaller the pore size) the more effective the filter. For example, while a filter that removes particles down to 5 microns in size produces clean water, one that stops particles 0.5 microns in size, produces cleaner water.

Two common particle filters are fibre and ceramic:

- Fibre filters are made out of cellulose, rayon, or another type of fibre. These filters have larger pores that prevent large particles such as dirt from crossing their tight fibre layer, but will allow dissolved contaminants such as lead and mercury to pass through.
- Ceramic filters, like fibre filters, trap asbestos fibres, some bacteria and parasites (though not enough to disinfect the water), and other particles in its small ceramic pores. They will not remove dissolved chemical contaminants such as sodium.

2. **Activated Carbon (AC) Filters** -

Activated carbon filtration is most effective in removing organic contaminants from water. Because organic chemicals are often responsible for taste, odour, and colour problems, activated carbon filtration can generally be used to improve aesthetically objectionable water that is treated to attract certain contaminants. When water passes through this type of filter, the carbon particles attract and remove contaminants (including dissolved substances such as hydrogen sulphide, heavy metals such as lead, mercury and copper and chlorine).

There are two types of activated carbon filters – Granular and Solid Block:

- Granular activated carbon (GAC) filters use a cartridge packed with granules of activated carbon. When water passes through the filter, the filter's numerous carbon granules trap particles and remove substances dissolved in the water (such as chlorine, heavy metals and harmful organic compounds).
- Solid-Block Activated Carbon filters have activated carbon not in the form of small granules, but instead is composed of activated



carbon particles that have been compressed into a dense material through which water travels. With very small pores and a larger surface area for the carbon to absorb particles, there is a better chance of trapping contaminants such as pesticides, chlorine, lead, and asbestos than there is with other filters.

Note: While some filters contain bacteriostatic materials (which prevent the growth of bacteria), these filters can still eventually start trapping bacteria, allowing it to grow on the filter. For this reason, it is essential to flush the filter daily with cold, treated, potable water to remove any bacterial residue. Remember to follow the manufacturer's instructions and replace the filter as recommended.

3. **Resin Filters** - Resin filters consist of a module that contains resins that can remove contaminants such as lead and other heavy metals, as well as minerals that cause deposits in kettles and coffee makers. These contaminants have an electrical charge and are removed by attaching to an opposite charge found on the resin. Resin filters can be combined with activated carbon filters to remove a wide range of particles and dissolved substances.

What are the benefits of water filters?

Filters can improve the taste, odour, and appearance of drinking water. They can also remove chemical contaminants (such as organic chemicals and heavy metals), and they can help remove hardness caused by minerals.

Will my water bill increase if I use a water filter?

No, water usage does not increase with a water filter. Costs associated with the use of water filters will pertain to the type and quality of filter chosen, the amount of water that is filtered, and the rate at which the filters must be replaced. In fact, storing water in the refrigerator (such as in a pitcher type water filter) instead of running the tap to get cold water to drink, may help reduce your water consumption.

Where to buy a water filter

Basic water filters can be found in hardware, department or grocery stores. Water equipment dealers sell some of the more sophisticated activated carbon filters. These dealers are listed under "Water" or "Water Companies" in the Yellow Pages™.

Types of water filter systems

Water filter systems can be divided into two main groups: point-of-use devices and point-of-entry devices.

Point-of-use devices are usually small units intended to treat water for drinking and cooking purposes. They are either installed on single or multiple taps or can be pitcher units, where water is filtered through the top as the pitcher is filled. Faucet-mounted filters are attached to the water faucet in the kitchen. In-line carbon filters are installed below the kitchen sink on the cold water supply line. Line-bypass activated carbon filters also filter water from the cold water supply line, but are connected to a separate faucet at the sink.

Point-of-entry devices are installed on the main water supply and treat all the water entering the home. They are based on the same principles as point-of-use filters but are designed larger so that they can treat large amounts of water. Because they are larger and because they need to be plumbed into a home's plumbing system, point-of-entry systems also cost more to buy and install.

How much does a water filter cost?

The prices of water filters vary greatly, mostly depending on the size of the filter. Activated carbon filters can range in cost from a few dollars to several hundred dollars. Faucet-mount filters usually range in price from \$20 to \$60. Pitcher filters are usually the least expensive, retailing for under \$25.

Concerns about water filters

Will water filters completely clean and purify my drinking water?

Water filters cannot microbiologically disinfect drinking water. Water filters can remove certain chemicals and improve the taste, odour, and appearance of water.

One of the drawbacks of filters is that if not used according to the manufacturer's specifications, they will allow previously filtered contaminants to be released into the water. Moreover, the build up of organic matter on the filter can promote bacterial growth in very short periods of time, such as overnight. Studies have shown that levels of bacteria present in water that has passed through an improperly maintained home filtration device may be up to 2,000 times higher than levels in unfiltered water.

What type of maintenance is involved?

The level of maintenance depends on the filter. Always follow the manufacturer's specific instructions for maintenance. For pitcher filters, the activated carbon cartridge generally has to be changed according to usage (the more often you fill the pitcher, the more often the filter cartridge must be replaced). For particle fibre filters and ceramic filters, caution must be taken to avoid bacterial build-up. These filters must be routinely flushed with treated/safe cold water on a regular basis (filters must not be flushed with hot water, as this can damage the structure of the filter).

When changing filter cartridges, great care should be taken to avoid contaminating the water. You should wash your hands before changing the filter and avoid placing the new filter on a contaminated surface. Also, if the filter cartridge is enclosed in a housing or small tank, be sure to disinfect the housing using a mild solution containing unscented bleach and rinse well.

Certification

Although drinking water materials such as water filters are not currently regulated in Canada, Health Canada recommends that all products that come into contact with drinking water be certified to the appropriate health-based performance standard developed by NSF International. In the case of water filters, it is recommended that they be certified as meeting standard NSF/ANSI 53 and/or NSF/ANSI 42 (see note below). In Canada, CSA International, NSF International, QAI, IAPMO and Underwriters Laboratories have been accredited by the Standards Council of Canada to certify drinking water materials as meeting the above-mentioned standards. These standards are widely accepted in North America, as they ensure the removal of specific contaminants, as well as the performance and mechanical integrity of the materials that come into contact with drinking water. Check the filter's packaging or ask your dealer for a listing of the substances that the unit is certified to remove.

Note. NSF Standard 42 treats for aesthetics (taste, colour and smell). It treats chlorine, zinc and particulate matter. It applies to adsorption style units that include carbon and granular activated charcoal filters and covers contaminants that can affect the taste, odour, or colour (non-health effects) of drinking water. ANSI/NSF Standard 53 treats health-related contaminants. It applies to adsorption style units that include carbon and granular activated charcoal filters. It covers contaminants that are established or potential health hazards if present in quantities that exceed recommended levels. Depending on the filter, it can remove lead, mercury and copper.

Where can I get more information about water filters?

You can consult Health Canada's website at www.hc-sc.gc.ca/waterquality, which describes many activities related to Canadian drinking water quality. You can also check the website of NSF International at www.nsf.org for information about health-based performance standards related to drinking water treatment units. The NSF also provides a listing of systems that it has certified.

The website of the Canadian Water Quality Association at www.cwqa.com is also an industry source of information for drinking water treatment units. Your local water utility may also be of assistance.

Canada Mortgage and Housing Corporation acknowledges the contribution of Health Canada to the development of this document. For further questions regarding water treatment and water quality, contact Health Canada at water_eau@hc-sc.gc.ca or call 1-866-225-0709.

To find more About Your House fact sheets plus a wide variety of information products, visit our website at www.cmhc.ca. You can also reach us by telephone at 1-800-668-2642 or by fax at 1-800-245-9274.

Priced Publications

Household Guide to Water Efficiency Order No. 61924

Free Publications

About Your House fact sheets

Your Septic System Order No. 62795

Buying a Toilet Order No. 62935

UV Water Treatment Order No. 62953

Water Distillation Order No. 62898

Water Softeners Order No. 62946

Reverse Osmosis - Water Treatment Order No. 62962

©2002, Canada Mortgage and Housing Corporation
Printed in Canada
Produced by CMHC 19-04-07
Revised 2003, 2005, 2007

Although this information product reflects housing experts' current knowledge, it is provided for general information purposes only. Any reliance or action taken based on the information, materials and techniques described are the responsibility of the user. Readers are advised to consult appropriate professional resources to determine what is safe and suitable in their particular case. Canada Mortgage and Housing Corporation assumes no responsibility for any consequence arising from use of the information, materials and techniques described.