Drinking Water Devices
How Technologies Compare

Reverse Osmosis (RO)

A process that reverses, by the application of pressure, the flow of water in a natural process of osmosis so that water passes from a more concentrated solution to a more dilute solution through a semi-permeable membrane. Most reverse osmosis systems incorporate pre- and post-filters along with the membrane itself.

Removes all minerals, including those which are essential to good health. Expensive to operate, RO Systems do not remove all bacteria and chemicals. Much water is wasted (3-6 gallons) to make only one gallon of water which is stored in a reservoir. The use of an activated carbon filter along with an RO is recommended.

Distillation

These systems heat water to the boiling point and then collect the water vapor as it condenses, leaving many of the contaminants behind, particularly the heavy metals. Some contaminants which convert readily into gases, such as volatile organic chemicals (VOCs), may be carried over with the water vapor.

Removes all minerals, including those which are beneficial to good health. Many chemicals are also vaporized; thus, Distillation does not remove all of the chemicals. Distillation also uses a lot of electricity, making it an expensive water treatment process.

Ultraviolet Treatment

This treatment uses ultraviolet light to disinfect water or reduce the amount of heterotrophic (non-harmful) bacteria. The effectiveness depends on the power of lamp used and the turbidity of the treated water (shadowing effect).

Water softeners

Most water softening devices use a cation exchange resin, regenerated with sodium chloride or potassium chloride, to reduce the amount of hardness (calcium, magnesium) in the water. The hardness ions in the water are replaced with sodium or potassium ions.

Softeners are neither filters nor purifiers and are used only to change the water hardness. It is recommended that water softeners be bypassed when installing a water filter. (Not For Use In Treating Drinking Water)

Ceramic filters/Polyfibres

Mechanical filtration only; does not remove volatile organic chemicals, trihalomethanes (THMs), or lead. Polyfibres are subject to bacteriological growth on their surface resulting in slow filtration.

Granular activated carbon filters (GAC)

Water drips through a pitcher by gravity. These filters typically have a lower capacity (i.e. can filter fewer liters) than other types of systems. Water passes around the carbon instead of through it, trapping dirt, rust, sand, and silt and removing the taste and odor of chlorine and other odors. Water can channel around carbon granules, thus avoiding filtration.

Very often Silver Nitrate (known to be a toxic substance) is added to a GAC filter (Bacteriostatic Filters) to inhibit the growth of bacteria; however, its effectiveness is questionable. The addition of Silver does not improve the ability of the unit to physically remove bacteria or other contaminants, especially chemicals. The Federal Trade Commission reported “studies on the effectiveness of bacteriostatic filters have shown unpromising results as to their ability to control bacterial growth”.

Carbon block filter (extruded/sintered)

Considered to be the most effective method for reducing a wide range of contaminants of health concern. The carbon is compacted into a dense structure causing every molecule of water to be forced through microscopic pores of carbon, effectively reducing the pollutants, which may be present in the water. Does not remove essential trace minerals or add salt or silver to the water.

Carbon block filters use mechanical filtration and adsorption to filter water. Adsorption describes the physical process which occurs when liquids, gases, and dissolved or suspended matter adhere to the surface of, or in the pores of, adsorbent medium. The ratio of mechanical straining (filter porosity) and adsorption is much better with sintered block filters.