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Different purification methods

The secret is to recommend the correct unit for the application.

H2O's five-step approach:

1. Establish what the water to be treated, is to be used for.
2. Establish what contaminants the customer wants to have removed.
3. Establish what is in the water before treatment.
4. Advise of the various technologies and recommend the most cost-effective solution to meet the customer's need.
5. Allow the customer to decide what system he prefers.

The technologies available:

GAC – Granular Activated Carbon

For years, now GAC (Granular Activated Carbon) has been the most commonly used media for domestic and industrial water filtration. GAC will reduce chlorine levels in water, thereby removing taste and odour problems, as well as reducing levels of organic compounds and organically based industrial chemicals.

GAC works by absorbing these contaminants onto its active sites, a physical process that effectively results in a short media lifespan. GAC also has the disadvantage of not being able to contain or inhibit the growth of bacteria, i.e. it is not bacteriostatic.

GAC is universally recognized and widely used as an effective adsorbent for a wide variety of organic contaminants such as herbicides, pesticides, industrial chemicals and trihalomethanes. Carbon is extremely porous and provides a large surface area for contaminants to collect. GAC is made from a variety of materials including bituminous coal, walnut shells, coconut shells, lignite or peat. The type of activated carbon and gradation required is determined by the size of the largest molecule to be removed.

GAC filtration is effective for some contaminants and not effective for others. It does not remove microbes, sodium, nitrates, fluoride and hardness minerals.

As authorities must treat water for pathogenic (disease causing) bacteria, the likelihood of these bacteria being introduced into a GAC filter from public drinking water is remote. GAC filtration should only be used on water that has been tested and found to be bacteria free or effectively treated for pathogenic bacteria.

Eventually, a GAC filter loses its ability to remove contaminants because it becomes clogged with material. In the case of taste and odour, the time to change the filter is easy to detect as it no longer performs at an adequate level

KDF – Kinetic Degradation Fluxion Water Purification

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KDF (Kinetic Degradation Fluxion) has revolutionized the water filtration industry because of the simple fact that no other water treatment medium encompasses such a wide range of properties that can effectively deal with a correspondingly wide range of current water pollution problems. KDF media provides extended life, lower total cost, decreased maintenance, control of micro-organisms and improved performance.

KDF is a high purity copper-zinc based mineral alloy that works on a reduction/oxidation principle. KDF reduces contamination in water using reduction/oxidation – the electro-chemical potential of pure dissimilar metals. The reduction reaction means that the KDF media simply exchanges electrons with contaminants. The give and take of electrons change many contaminants into harmless components, such as chlorine to chloride. Other contaminants, such as lead and other heavy metals, bond to the KDF media. The end result is totally eliminating or greatly reducing a wide variety of contaminants.

KDF is approved by the American and European water authorities and has passed tests and standards set by accredited laboratories.

KDF can be used on its own or in combination with other forms of water filtration. In the latter case, KDF acts to protect such other forms of filtration, extending their effective life.

KDF has also been approved for use both on its own and with Granular Activated Carbon. KDF can control bacteria, algae and fungus growth within Granulated Activated Carbon. When used with Granular Activated Carbon, KDF is placed before the carbon. In this position the KDF protects the carbon by removing any contaminants such as chlorine, aluminum and heavy metals (lead & iron), which allows the carbon to work more effectively on organic chemicals and to work for longer periods.

KDF is also used in a number of pre-treatment, primary treatment and waste water treatment applications

Ceramic cartridges for added bacterial removal

Ceramic cartridges are designed to remove suspended solids and microscopic pathogens (disease causing). In addition, these systems will remove chlorine, trihalomethanes, lead and iron.

Reverse Osmosis

Reverse Osmosis is a water treatment process that removes undesirable contaminants from water by using pressure to force water molecules through a semi-permeable membrane resulting in impurities being flushed away and high-quality water being collected. Reverse Osmosis may also be called hyper-filtration or ultra-filtration.

The Reverse Osmosis process utilizes a semi-permeable membrane with microscopic pores to remove and reject a wide spectrum of impurities from water, using only water pressure. These impurities affect the taste and quality of drinking water. This process is a slow-drip method that collects the filtered water in a storage tank and flushes the impurities down the drain.

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Reverse Osmosis' effectiveness is dependent on the initial level of contamination and water pressure. Reverse Osmosis has the following commercial application:

- Used to desalinate sea water for drinking.
- Used to produce high-quality water for kidney dialysis
- Critical to industry for the production of ultra-pure water used for sensitive processes e.g. microchip manufacturing.
- Used to reduce heavy metals and other contaminants from wastewater so that it can be recycled or re-used.

The advantages of Reverse Osmosis in domestic applications include:

Reduces unpleasant taste, clarity and odours as well as chlorine. Removes large particles such as dirt and rust. Removes the dissolved solids including heavy metals, organic and inorganic substances such as herbicides, pesticides, sodium, lead, arsenic, nitrates, asbestos, calcium, magnesium, sodium and many others.

Beneficial minerals such and calcium and magnesium should be present in your water.

Reverse Osmosis is a proven technology that has been used successfully in domestic and commercial applications. It requires regular maintenance and monitoring to perform satisfactorily over an extended period of time.

Reverse Osmosis is a slow process that uses a lot of water. It recovers only ± 15% of the water entering the system with the remainder being discharged as waste water, which generally is not practical for household systems to re-utilise.

Distillation

Distillation is a water treatment that removes bacteria, additives and contaminants.

A water distiller mirrors nature by turning water into a vapour and then condensing the vapour back into pure water.

By boiling the water, unwanted contaminants are destroyed and left as a residue at the bottom of the stainless steel boiling chamber. These are easily removed by wiping out the chamber with a damp cloth after use and cleaning with crystals once a week.

The small percentage of impurities such as VOCs that may have survived the distillation process are then filtered out through a final charcoal filter as the water enters the collection container, leaving you and your family with pure drinking water.

Drinking distilled water

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Distilled water is water that had essentially all the dissolved substances within it removed – by evaporating it and condensing it back into liquid form. Since about 99 percent of all dissolved matter in water is minerals, distilled water is essentially water that has had all its minerals removed. The information presented here on distilled water also applies to water that has been demineralised by other methods and is known as purified, demineralised or de-ionised water.

As with fluoridation, there are lots of pro and con arguments about distilled water. The argument in favour of drinking it says that the minerals present in water clog up your bodily functions. This theory is partly based on the notion that since calcium (the primary mineral in water) helps to form bones and to harden things in general, it must harden other things in your body as well. Literally dozens of books written by well-meaning doctors, nutritionists and practitioners of holistic medicine claim that essentially all disease is caused by minerals in water – so that by drinking distilled water you will be reinvigorated, your arthritis or hardened arteries will disappear, and so on. These well-meaning authors actually know very little about water chemistry, and the “evidence” they present is heavily biased and without credibility.

An argument against drinking distilled water is that you lose primary source of necessary minerals in your diet, and further, that because the water has lost its own minerals, it attracts and grabs minerals within your body, causing a mineral deficit. This argument has some plausibility. Though we get most of our minerals from fruits and vegetables, and mineral shortages in our bodies are unlikely if a normal diet of mixed foods is eaten, water that has a high mineral content definitely contributes to good health.