

Activated Carbon Filters:



There are two basic types of water filters: particulate filters and adsorptive/reactive filters. Particulate filters exclude particles by size, and adsorptive/reactive filters contain a material (medium) that either adsorbs or reacts with a contaminant in water. The principles of adsorptive activated carbon *filtration* are the same as those of any other *adsorption* material. The contaminant is attracted to and held (adsorbed) on the surface of the carbon particles. The characteristics of the carbon material (particle and pore size, surface area, surface chemistry, etc.) influence the efficiency of *adsorption*.

Working Principle : The pollutants are removed from water through *adsorption* on the surface of the activated carbon

Capacity/Adequacy : Simple technique using abundant raw material (e.g. petroleum coke, bituminous coal, lignite, wood *products*, coconut shell or peanut shell).

Performance : Efficient for pollutant having high affinity with activated carbon surface (non-polar compounds).

Costs : Relatively low operation costs.

Activated carbon filters are widely used to produce *drinking water* at household and community level (to remove certain *organics*, chlorine or radon from *drinking water*) and to treat industrial or *municipal wastewaters*. It is not efficient for *disinfection* and nitrates removal. *Adsorption* on activated carbon is a simple technology based on materials such as fossil fuels (petroleum coke, lignite...) and even agricultural waste (e.g. coconut shell, wood, etc.).

Advantages :

- Easy to install and maintain
- Can be used at the point-of-entry (semi-centralised drinking water treatment plants, wastewater treatment plants) or at the point-of-use (household/community filters)
- Efficient to remove certain organics, chlorine, radon
- Based on materials available everywhere

Disadvantages :

- Filter has to be replaced regularly
- Skilled labour required, at least occasionally
- Water analysis is required to choose the most adapted type of activated carbon
- Contaminants are separated from water but not destroyed