

Our **waterQuality**

Ask questions about water-purification systems

Water purification is an inherently wasteful process and many treatment methods require additional water to produce the desired result. The ultimate example is reverse osmosis (RO), in which reject water is typically routed to a drain. Reject water can also be used for purposes such as irrigation or construction. Large-volume commercial ROs typically reject about one gallon of water for each gallon of purified water. Under-counter, household ROs driven by a permeate pump reject about four gallons for every gallon of water produced. "Bargain," department-store ROs without permeate pumps can waste as much as 20-25 gallons of water per gallon produced, depending upon how full the storage tank is and how much pressure (and water) are required to top off the tank.

There is no such thing as a waste-free RO, but the process is used to produce most drinking water. The term "bottled water" is used almost synonymously with the term "reverse osmosis." The process is second only to the impractical and energy-intensive distillation process in producing quality water and RO provides the greatest protection against most (but not all) contaminants, including many of the newly publicized (but not newly discovered) "pharmacological" contaminants.

Another process known for using water is ion exchange (or "softening"), which requires backwashing or running a brine fluid to remove contaminants adsorbed on the media, whose selection depends on the suite of contaminants present. Potassium chloride or sodium chloride brine goes to the drain, or French drain in the case of private wells. Yet there are some contaminants, especially those which pose potential health risks, for which there is no better removal method. It is the lesser of evils: living with the contaminant or using salt and backwashing for removal. Vast amounts of research money are going into developing salt-free, non-backwashing, water-softening alternatives, but the



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technology has not been developed.

When you hear of a system that is salt-free, it is not a softener but is probably better described as an "anti-scalant." The term "salt-free" is seductive but is often a diversion to keep you from asking whether or not the system wastes water by backwashing. The only truly "green" anti-scalants have a non-electrical control head which is simply an "in" and "out" port. These systems operate in an upflow mode and are typically preceded by a carbon filter on municipal water and by a sediment filter on wells. The latest trend in carbon filtration is to use activated carbon produced from coconut shells in a process that does not emit greenhouse gases.

Ask informed questions about whether truly sustainable options are available or appropriate for removal of specific contaminants revealed in water testing. When you read of a system being "green" or "sustainable," the first questions you should ask are: Does it backwash? How frequently? How much water is used in every backwash? Additional queries should include the amount of salt used (if any) and whether the backwash, or drain water, contains harmful contaminants and whether or not it is properly, and legally, disposed. Inquire about the possibility of using sustainable options, but know that your choices should depend on water-chemistry-specific technology and not what someone is offering to sell you.

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