

Some Jefferson County well water has been found to contain elevated levels of nitrate, a chemical contaminant which cannot be removed by typical household filter systems. Nitrate removal may be accomplished with point-of-use units, which treat the water at a single faucet (kitchen sink or lavatory); or point-of-entry units which treat the incoming water prior to distribution to household fixtures. This brochure provides an overview of the most common treatment technologies to help guide you in the proper selection of treatment methods for your particular water quality situation.

COMPARISON OF THE TWO MOST COMMON TREATMENT SYSTEMS

REVERSE OSMOSIS (RO):

With its lower production rate, a storage tank is usually needed. Since these units don't function well on a demand basis, continuous operation is best, requiring additional storage and occasional re-pressurization. The service life of the system membrane will depend on the nitrate concentration of the water, but is typically 1-3 years.

ANION EXCHANGE (AO):

By operating on a demand basis these units use less energy, have greater reliability and do not require additional storage. It does however produce more waste brine and increases the chloride concentration (saltiness) in the treated water.

MAINTENANCE:

Periodic maintenance will be needed on both systems. Improper maintenance can result in a poorer quality of water coming out of the device than going into it. Routine sampling and monitoring should be practiced to assure that the units are operating correctly.

CONSUMER TIPS:

If you need a water treatment system, these few tips may be of assistance to you.

- Since other problems such as hardness or sediment may affect treatment efficiencies, have your raw water analyzed by a reputable, certified laboratory before purchasing any treatment system. The Colorado Department of Public Health and Environment, as well as numerous private laboratories, can provide this service at a reasonable fee.
- Check the reputation and legitimacy of the company you choose for purchase and/or installation of your system. The Better Business Bureau and consumer groups can assist you in making an informed decision.
- Get customer references. The Water Quality Association (www.wqa.org) also has a certification program for water specialists, sales reps and device installers.
- Research the water treatment units available before you buy, including performance capabilities, warranties, maintenance provisions and general operation. Does the equipment bear a performance validation, such as the National Sanitation Foundation (NSF) seal or Gold Seal of the WQA?
- Beware the salesperson who tries to sell one treatment unit to solve many different water quality problems.
- Insist on a written contract specifying nitrate removal efficiency and have your water analyzed periodically to assure that this standard is being met.

Although these treatment methods can be effective in nitrate removal, if the raw water is heavily mineralized (hard) or contains sediment, pre-treatment may be necessary. Raw water analysis should be performed prior to the installation of any nitrate removal system to determine if the water is suitable for treatment in its raw state.



Nitrate Removal



Environmental Health Services

645 Parfet Street

Lakewood, CO 80215

303-232-6301

jeffco.us/public-health

TREATMENT METHODS	HOW IT WORKS	EFFICIENCY	COST*
<p>REVERSE OSMOSIS (RO)</p> 	<p>Pressure is used to force water through a semi-permeable membrane which permits passage of the water but rejects most substances, including nitrates, which are dissolved in the water. Two basic types of membranes are used; cellulose acetate (CA) membrane and thin-film composite (TFC) membrane.</p>	<p>Efficiency depends primarily on water pressure, pH (acidity) and temperature. TFC membrane units can remove up to 90% of the nitrates. CA membrane units can remove up to 85%.</p>	<p>Small point-of-use units begin at \$350 and range up to \$850. Larger point-of-entry units generally range from \$1,000 to \$5,000. Operating costs are relatively low.</p>
<p>ANION EXCHANGE (AO)</p> 	<p>In a process similar to that which takes place in a water softener, a strong base is used to reduce nitrate levels by replacing the nitrate ions in the water with chloride ions.</p>	<p>Removal efficiency is high, at approximately 98%.</p>	<p>Point-of-use units begin at about \$500. Point-of-entry units range from \$1,500 to \$3,000.</p>
<p>DISTILLATION</p> 	<p>Nitrates and other impurities are removed by heating the water to a vapor then cooling, condensing and collecting the purified water.</p>	<p>Removal efficiency is high, at approximately 98%.</p>	<p>Although used primarily in industry, small point-of-use units are available for \$300-\$1,600. These units have higher operating costs.</p>

*The cost of all of these treatment methods can increase due to the possible need for pre-treatment. The various membranes, resins, and other components can be adversely affected by any of the following: pH, iron, manganese, sulfates, other ions, organics, hardness and suspended solids.