

# ARIZONA COOPERATIVE EXTENSION

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## Water Facts: Number 6 Reverse osmosis units

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Reverse osmosis (RO) is an excellent way to remove certain unwanted contaminants from your drinking water. Reverse osmosis treatment of your water can reduce health risks from contaminants such as lead or nitrates. It also can improve the taste and appearance of your water.

The basic part of an RO unit is the semi-permeable membrane, made of either cellulose acetate or thin film composite material. The membrane is placed between two screens and wrapped around a tube much like a roll of paper towels.

Normal household water pressure forces water through the membrane. Occasionally, a pump must be added to increase household water pressure and enhance membrane efficiency. The membrane rejects most of the dissolved substances in the water and allows only purified water to pass through. Purified water then enters a storage container and the rejected water goes down the drain as waste.

If the water quality problem in your home is inorganic contaminants, then reverse osmosis is an excellent treatment method. Many RO units can remove 90% or more of certain inorganic chemicals.

These inorganic chemicals include: fluoride, sulfate, nitrate, total dissolved solids, iron, copper, lead, mercury, arsenic, cadmium, silver and zinc. Reverse osmosis can even remove some microbiological contaminants, including Giardia cysts.

Unfortunately, reverse osmosis cannot remove organic chemicals such as, pesticides and solvents. Reverse osmosis cannot remove dissolved gases, such as radon and trihalomethanes, either.

Many RO units consist of several different stages to remove both organic and inorganic substances. The parts of this system can include a prefilter, the reverse osmosis membrane, a storage container for the treated water, and an activated carbon postfilter.

- The prefilter removes silt and particles. It can also remove chlorine to protect the life of the membrane.
- Next in the reverse osmosis system is the membrane, which removes the many inorganic substances described above.
- The storage tank then holds the treated water for future use. The process is usually too slow to provide purified water on demand. A typical under-the-sink unit may yield only 3-5 gallons of treated water each day.
- Finally, the activated carbon postfilter rids the water of gases and organic chemicals that the membrane cannot remove.

The ability to remove many dissolved substances efficiently, yet produce a good tasting finished water, is one advantage of reverse osmosis.

Another advantage is that RO does not add any other chemical to your water. It merely separates the dissolved substances from the incoming water.

Reverse osmosis has several disadvantages that make it impractical for treating all of the water entering your home. The primary disadvantage is the amount of water wasted by the process. For each gallon of water produced, between 2-20 gallons of water are lost as waste.

Reverse osmosis units can be expensive. Cost of a unit along with installation may run from several hundred to one thousand dollars or more.

The RO membranes are subject to decay and require periodic replacement. As they decay, the quality of the treated water becomes poorer. Hard water can shorten the life span of the RO membrane. A water softener might be necessary to keep the membrane working at its best.

Reverse osmosis units should not be used to treat water that contains harmful microorganisms. Small holes in a worn membrane can allow microorganisms to pass through with the treated water.

A well maintained reverse osmosis system can provide your household with good quality water for all your drinking and cooking purposes, as long as you recognize its limitations.

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