



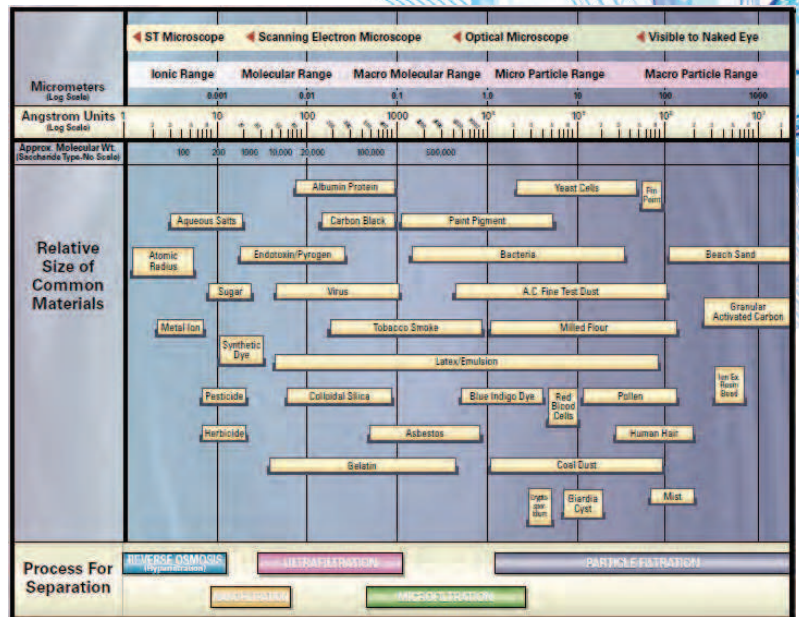
OPTIONS ABOUND IN H₂O TREATMENT

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A few years back I attended a residential water treatment installer's course in Calgary. During one of the mid-morning coffee breaks, where a good portion of the teaching and learning occurs at this type of event, I was quite surprised to discover that half of the people in attendance were either employed by plumbing contractors or were themselves an owner of a residential plumbing business. The other half consisted mainly of water treatment dealers.

As I see it, this represents a shift within the plumbing industry. Plumbers are taking residential water treatment more seriously as a way to augment their core business.

If your plumbing company is part of this trend, I thought it might be useful to provide a ready reference to three standard treatment methods, and a basic overview of how each technology works. In a future issue, we'll have a look at some of the more recent additions to the water treatment arsenal.



STANDARD METHODS OF WATER TREATMENT

1 WATER SOFTENERS (ION EXCHANGE)

There are many ways that water can pose ongoing issues within a home's piping system, but in terms of overall cost, water hardness surely takes the prize. Water is typically considered "hard" when the amount of calcium and magnesium exceeds three grains per gallon (US).

Although there are about as many types of water softeners as there are water treatment manufacturers, the method of ion exchange is basically the same. The units typically consist of three main components: the pressure vessel where the ion exchange process takes place; a separate tank where the brine solution used for regeneration is stored; and a control valve that directs the flow of water during service and the regeneration cycle.

In recent years, control valve manufacturers have been making great strides in optimizing salt efficiency.



HOW ION EXCHANGE WORKS

Inside the pressure vessel are thousands of tiny electrically charged polystyrene beads. These attract positively charged ions called cations. Once the beads are supercharged with positively charged ions from the brine solution, water containing such cations as calcium and magnesium will enter the inlet side of the valve and will kick off the cations from the brine solution in favour of the more attractive hardness minerals.

THE REGENERATION CYCLE

When the hardness minerals have exhausted the resin bed during normal service, the control valve will trigger a backwash, sending the collected impurities down the drain.

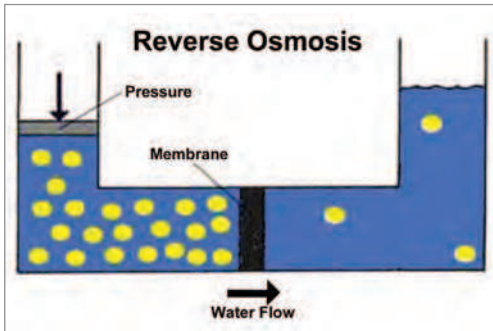
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2 REVERSE OSMOSIS (RO SYSTEMS)

Developed over 40 years ago for large seawater desalting plants and other industrial uses, reverse osmosis technology has since been scaled down for point-of-use residential purposes to improve small quantities of water intended for drinking and cooking.

As its name suggests, reverse osmosis is the reverse of the naturally occurring process of osmosis, which is how water is transported into and out of living cells in nature. By applying pressure on the incoming higher solids/salt content supply side, RO's semipermeable thin film membrane will allow only pure water to pass through to the product side.



This requires a rinse line to move the impurities away from the membrane. This water will be discharged to drain, or it can be redirected for some other purpose – typically back into the water heater or into a rainwater collection system. These pump systems are known in the water treatment industry as a “Zero Waste RO.”

The efficiency of any RO system is dependent upon three variables: total dissolved solids (TDS) of the feed water; the feed water pressure; and the feed water temperature.

The RO feed water must be pretreated in order to prevent membrane damage and/or premature fouling. There are typically two stages for residential RO pretreatment, a polypropylene sediment filter and a carbon filter for chlorine, taste and odour reduction. These should be replaced every six months, or as needed.

DID YOU KNOW?

Reverse osmosis is very temperature dependent. The RO process occurs more slowly at colder water temperatures than at higher temperatures.

3 ULTRAVIOLET DISINFECTION - UV

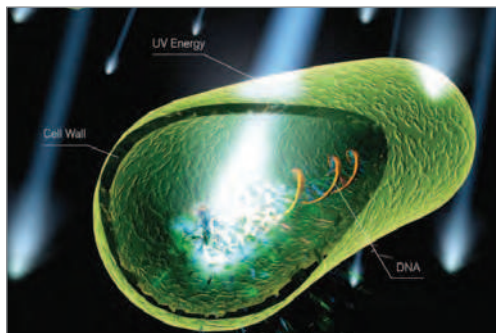
In residential areas that are not supplied by a central, chlorinated municipal water source, other forms of disinfection, such as UV may be necessary. Basically, a UV system physically treats the water by radiating the cells of the microorganism (Cryptosporidium, bacillus, E.coli, to name but a few), causing a molecular rearrangement of its DNA, rendering it unable to self-reproduce and form colonies inside a water supply.

UV disinfection only targets potentially harmful bacteria and viruses. It has no effect on the pH, taste, smell or appearance of the water.



Don't over-do it (or under-do it)

Using a water quality report as a basis for suitable treatment, determine the size and capacity of the system by taking the incoming line size, fixture count and the number of people living in the house into consideration. It shouldn't just be about what the homeowner wants, but also about exactly what they need to improve their water quality.



WHEN SIZING AND INSTALLING A UV SYSTEM:

- Size the system for the peak flow of water to the house. The radiation “dose” of UV light is dependent on the time water spends inside the UV chamber.
- Always install a UV system as the final treatment device, and make sure a five micron sediment filter is installed in front of it.
- When installing UV in a rural residential setting, always chlorinate the well and piped system, and check for dead spots, especially in older homes. To do this, add household bleach to the filter housing (making sure to remove the filter first), turn on every tap one by one until chlorine can be smelled at each tap. Let it sit there for 20 to 30 minutes, and then flush it out until the chlorine smell can no longer be detected.