What is Reverse Osmosis?

Osmosis

To understand reverse osmosis we must first understand osmosis. During natural osmosis, water flows from a less concentrated solution through a semipermeable membrane to a more concentrated solution until concentrations and pressure on both sides of the membrane are equal. (See Figure 1.)

Reverse Osmosis

Reverse osmosis requires external pressure to reverse natural osmotic flow. Pressure is applied to the more concentrated (feed water) side of the membrane. This forces the feed water through the semipermiable membrane. The impurities are deposited on the membrane surface and sent to drain and the water that passes through the membrane to product is for the most part free of impurities (See Figure 2.)

Reverse Osmosis Membrane

A reverse osmosis membrane has a thin microporous surface that rejects impurities, but allows water to pass through. The membrane rejects bacteria, pyrogens, and 90%-95% of inorganic solids. Polyvalent ions are rejected easier than monovalent ions. Organic solids with a molecular weight greater than 300 are rejected by the membrane, but dissolved gases are not as effectively removed. Reverse osmosis is a percent rejection technology. The purity of the product water depends on the purity of the inlet water. The purity of reverse osmosis product water is typically 95% higher than the purity of the feed water. (See Figure 3.)

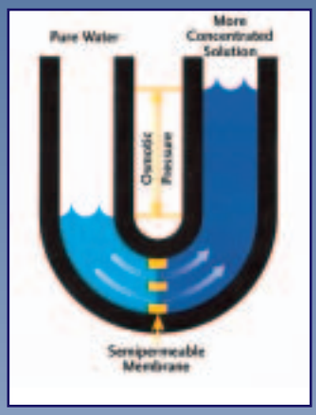

Figure 1: Osmosis

Figure 2: Reverse Osmosis

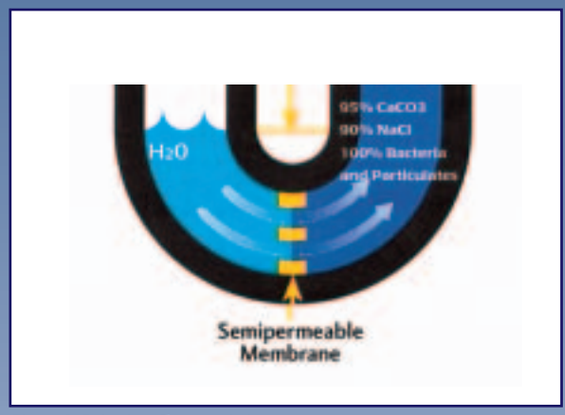

Figure 3: Rejection Characteristics

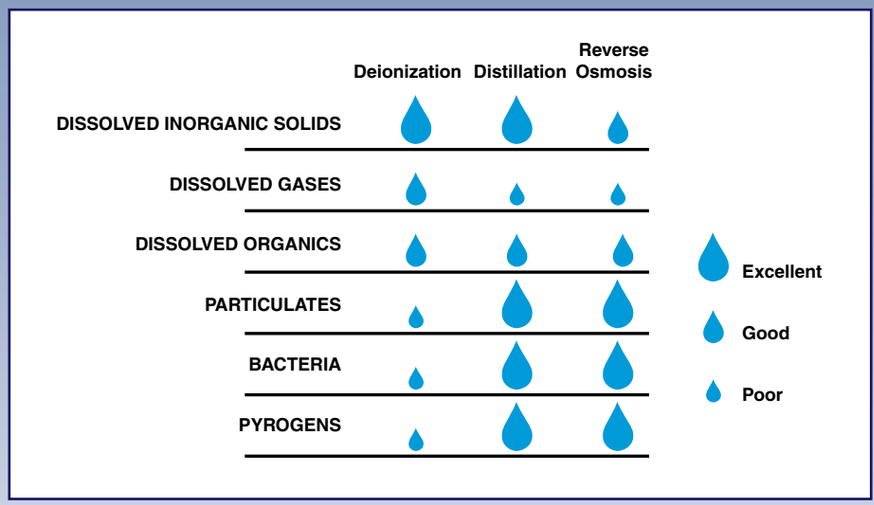

Figure 4