

Reverse Osmosis

Reverse osmosis is a water separation process. In the sub nano meter range. Or angstrom range.

RO acts as a micro sieve for water molecules. Water is forced as a pure solvent via tiny holes. (a 1/10,000th of a micron)

Reverse osmosis is also known as HF [hyper filtration]. No chemicals, a physical process. The solute is taken from the solvent.

Water filters may screen grit. (1 to 5 mm). Some filters screen sand. (0.1 to 1 mm). Finer filters can screen silt. (0.01 to 0.1 mm).

Below 1 micron [sub micron] filters screen turbidity and bacteria. (0.1 to 1 micron). UF [ultra filtration] using hollow fibres can filter the smallest bacteria. (0.01 to 0.1 micron). NF [nano filtration] use membranes to filter viral organisms. (0.001 to 0.01 micron). HF [hyper filtration] can separate larger ions and molecules from smaller ones. (0.0001 micron pore size)

The use of reverse osmosis allows for ion level filtration. Water, small ions and gases can just squeeze through. Larger molecules find it very hard to pass through an RO membrane. Reverse osmosis filters also use active carbon. Carbon is also a [molecular sieve](#) that can screen for gases.

Much larger ions, molecules, virus and bacteria pose more harm than matter smaller than water molecules. So it is easy for reverse osmosis to block toxic heavy metals and virus. Also ions larger than hydrogen and oxygen that make up water. Such as sodium and chloride. So reverse osmosis can easily screen out dissolved salt in water.

Some dissolved ions closer in size to water molecules can pass through. Minerals such as calcium carbonates made up of calcium, carbon and oxygen. The excess are screened out, like sodium chloride, but a small healthy level are left in.

All cells in the human body use the similar process of cellular osmosis. Osmotic membranes are found on every living cell wall. They control the transport of water via all plant and animal cells.

The scale of the width of an eye of a needle, to a large air balloon can be 1 mm to 10 metres. 1 to 10,000. Same as water molecules to bacteria. As reverse osmosis pore holes are to bacteria. By mass many bacteria are trillions of times the size of water molecules.

Reverse Osmosis Membrane Element inside a Pressure Vessel

