

OurwaterQuality

Filtration a stage in water purification

Water can be “filtered” and still not be “purified” of contaminants. Technically speaking, filtration is the physical and mechanical removal of suspended solids from water. In current parlance, water filtration is used synonymously with purification, but the latter is usually a sequence of several processes to remove contaminants.

It should not be inferred that when water has been “filtered” that *all* suspended solids have been removed. Sterilization is of less concern for municipal systems as the water is microbiologically safe when it enters the closed loop of the household plumbing infrastructure.

For private wells, removal of sediment in water is often the first stage of treatment. The physical filtration process is determined by the pore size of the filtration medium. A simple way to find out what particle-size filtration is required is to run a “sediment test” with three different particle-size filters in

succession. The ideal balance is the largest filter size that removes sediment and allows an adequate flow rate. Centrifugal sand separators can reduce sediment to as fine as 74 microns or micrometers. Some specialized media, which require backwashing, can reduce the sediment size down to 3-5 microns (nominal size). But most well owners use replaceable cartridge filters, which come in 2.5-inch and 4-inch diameters and 10- and 20-inch lengths. The most common filter pore sizes are 50, 20, 10, 5 and 1 microns. The smaller the filter pore size, the higher the removal capability. Particle filtration is generally considered practical down to about 1 micron, but it will not remove metal ions in water.

More advanced physical filtration methods use membranes and water pressure and include, in increasing removal capability, microfiltration, ultrafiltration, nanofiltration and reverse osmosis. RO removes particles as fine as 0.001 microns and is capable of removing

dissolved metal ions and aqueous salts. Treatment technique selection depends upon the target constituents and their particle sizes. The overall success of these systems (including reverse osmosis) is attributable to the use of the proper sequence of purification techniques (including carbon filtration) to fulfil specific objectives. Ultrafiltration, using hollow microfiber strands in combination with carbon filtration, may be used to effectively remove algae, bacteria, viruses, the protozoan parasites Giardia and Cryptosporidium, and silt and clay above their rated size but will not remove hardness minerals or contaminants such as iron, manganese, and sulfur.

Think about your water chemistry, your objectives and your budget before determining whether the filtration system you are considering actually delivers the level of water purification you require. The methodologies of water filtration, and the limitations of the various techniques, are relatively well-known, but the term



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“filtration” is highly over-used. Filtration should not be considered a panacea in water treatment but rather as a stage in the water-purification process. Nor does filtration necessarily yield water purity equivalent to “bottled water quality,” which is itself a vague and misleading term.

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