

Drinking Water Treatment



There are many options to treat contaminated water. Each option addresses different problems, making the choice of a treatment system important. Some common treatment options are water softening, disinfection and filtration. While not an exhaustive list, the tables below can give readers a starting point for performing additional research.

Water Softening

Water softeners use biological and physical processes to treat the water.

Type	Material Removed [3]	Pros [3]	Cons [3]	Approximate Cost [1]
Ion Exchange Column	Calcium, magnesium, barium, radium, dissolved iron, manganese	Many systems recharge themselves	Treated water has a higher level of sodium	\$400-\$3,000
Distillation	Lead, nitrate, sodium chloride, pesticides, organic compounds	Available in counter-top and whole house units	Flat or bland tasting water Slow, requires a lot of water Must be cleaned frequently Consumes significant electricity	\$50-\$4,000

Type	Material Removed [3]	Pros [3]	Cons [3]	Approximate Cost [1]
Reverse Osmosis	Radium, sulfate, calcium, magnesium, potassium, nitrate, fluoride, phosphorous, some pesticides, some organic compounds	Available in under sink and whole house units	Expensive Uses large amounts of water	\$1,000-\$11,000

Filtration

Filtering removes suspended material and some organic compounds from water. It doesn't remove bacteria, nitrates, or lead. Filtration is best used as a secondary water treatment method. There are 3 main filtration systems that can be purchased for your home- activated carbon, mechanical, and green sand.

Type	Material Removed [3]	Pros	Cons	Approximate Cost
Mechanical	Sand, silt, clay, organic matter	Can be installed on individual faucets	Doesn't remove dissolved or fine particles [3]	\$50-\$500 [4]
Activated Carbon	VOCs, pesticides, radon gas, hydrogen sulfide, mercury, residual chlorine	Great at catching small particles because of surface area [6] Eliminates odors and tastes [6]	Can become breeding grounds for bacteria Difficult to know when to replace [6]	\$180-\$550

Type	Material Removed [3]	Pros	Cons	Approximate Cost
		Can remove <i>giardia</i> and <i>cryptosporidium</i> [3]		
Green Sand (manganese dioxide filter media)	Iron, manganese, hydrogen sulfide	Requires a lower backwash flow rate than solid manganese media [2] Prevents rotten egg smell [3]	Build up must be removed by backwashing twice a week. [3]	\$1,000-\$2,000

Type	Material Removed [3]	Pros [3]	Cons [3]	Cost
			reduces effectiveness Becomes less effective with time	
Ozonation	Bacteria, some viruses, some pesticides	Doesn't produce any taste or odor Can remove iron, sulfur, and manganese if followed by filtration	Expensive No residual effect	\$1,000-\$5,000

Disinfection

The purpose of disinfection is to kill pathogens.

Type	Material Removed [3]	Pros [3]	Cons [3]	Cost
Chlorination	Bacteria, some viruses	Continues to disinfect after treatment If followed by filtration, it can remove hydrogen sulfide, dissolved iron and manganese	Can impart a disagreeable taste Possible formation of trihalomethanes	\$500-\$1500
UV Radiation	Bacteria, some viruses	Widely effective if UV has high enough power	Ineffective against cysts and worms Cloudy water	\$350-\$1500

References

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