
ENVIRONMENTAL Fact Sheet



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Distillation Treatment of Drinking Water

Distillation is a water treatment process that uses heat energy rather than chemicals to purify drinking water. Volatile organic contaminants are the principal group of contaminants that can not use this process.

Method of Treatment

Distillation is a two-step process. The process begins by boiling water in a chamber to produce steam. In the second step, the steam moves to a second chamber where it is condensed back to liquid water. The water remains in this second chamber until needed. Many drinking water contaminants (but not all) cannot vaporize and thus remain in the first boiling chamber. Depending on the particular distiller the unit may also re-pump the purified water to an outlet.

Target Contaminants

Distillation is effective in **disinfecting** water and in the removal of **inorganic contaminants**. Examples of inorganic minerals removable by distillation include arsenic, lead, manganese, uranium, and most other minerals. Distillation is **not effective** in removing certain **organics** (carbon-based) contaminants from water, particularly industrial solvents or hydrocarbons. These solvents and hydrocarbons have boiling and condensation temperatures similar to that of water, and thus will vaporize from the first chamber and condense in the second chamber, just as water does.

Size and Cost

A small distillation treatment device produces 3-5 gallons per day (gpd). Such devices are often installed on a counter top or under the kitchen sink. Distillation systems cost approximately \$1,000 installed and warranted by others. Operational costs, primarily for electric energy, would likely average around \$150 per year for 3-5 gallons of treated water per day.

A typical family of four uses approximately 200 gallons of water per day for all household uses. A distillation treatment device, producing water for an entire household, is typically not feasible because of both high capital and operational costs. Distillation treatment is normally sized for only point-of-use applications.

Reject Heat

The typical distillation system uses heat to vaporize water. Some of this heat is lost to the surrounding kitchen space. This heat can be annoying during the hot summer months. During the winter, this heat can be a valuable way to heat the home.

Residual Disinfection

The presence of a chemical disinfectant residual in drinking water is valued by some users since it demonstrates that the disinfection was actually accomplished. There is no **residual** disinfection capability in the distillation processes.

Monitoring Water Quality

All treatment systems should be verified for their effectiveness by laboratory testing for the target contaminant(s). Distillation treatment is highly reliable for disinfection and inorganic contaminant removal.

Maintenance of Distillation Devices

The boiling chamber of a distillation device accumulates mineral contaminants with time and needs to be cleaned periodically. The frequency will depend on the level of minerals in the water supply and the amount of water being used. In some cases, the mineral buildup can be dissolved with pure water. In other cases, the mineral buildup needs to be dissolved by dilute acids cleaners in a heated condition. The cleaning frequency averages quarterly.

FOR MORE INFORMATION

Please contact the Drinking Water and Groundwater Bureau and the New Hampshire Water Well Board at (603) 271-2513 or dwgbinfo@des.nh.gov or visit our website at <http://www.des.nh.gov/organization/divisions/water/dwgb/index.htm>. All of the bureau's fact sheets are on-line at <http://www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm>.

Note: This fact sheet is accurate as of September 2009. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.