

Septic Systems: The Basics

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An informational brochure to present the basics of on-site sewage disposal systems, and their proper care and maintenance.

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The care and feeding of your on-site septic system

Septic systems are very much like automobiles. They need periodic inspections and proper maintenance to continue working properly and cannot be improperly used without the owner having adverse consequences such as repair or replacement bills.

You should have your septic system inspected every 1 to 2 years by a professional, and have your septic tank pumped when necessary. This interval ranges from 2 to 5 years, depending on the rate that solids accumulate in your tank. At the time of inspection or pumping, the baffles should be checked to ensure they are in good condition since the last check-up. If you have an effluent filter, it should also be inspected, as effluent filters require periodic cleaning. Failure to keep the effluent filter clean may result in a backup of wastewater in the home due to filter clogging. Septic systems that have mechanical parts, such as a pump, should be inspected at least once a year, or more frequently, as recommended by the manufacturer. The absorption field should be checked for sogginess or ponding, which indicates improper drainage, a clogged system, or excessive water use.

What to put in, what to keep out

- Direct all wastewater from your home into the septic tank. This includes all sink, bath, shower, toilet, washing machine and dishwasher wastewaters. Any of these waters can contain disease-causing microorganisms or environmental pollutants.
- Keep roof drains, basement sump pump drains, and other rainwater or surface water drainage systems away from the absorption field. Flooding of the absorption field with excessive water will keep the soil from naturally cleansing the wastewater, which can lead to groundwater and / or nearby surface water pollution.
- Do not use caustic drain openers for a clogged drain. Instead use boiling water or a drain snake to open clogs.
- Do not use septic tank additives, commercial septic tank cleansers, yeast, sugar, etc. These products are not necessary and some may be harmful to your system.
- Use commercial bathroom cleaners and laundry detergents in moderation. Many people prefer to clean their toilets, sinks, showers, and tubs with a mild detergent or baking soda.
- Do not allow water softener backwash to enter your septic tank.
- Avoid dumping grease or fats down your kitchen drain. They solidify and the accumulation may contribute to blockages in your system.
- Your septic system is not a trash can. Do not put disposable diapers, sanitary napkins, tampons, condoms, paper towels, plastics, cat litter, or cigarettes into your septic system. These items quickly fill your septic tank with solids, decrease the efficiency, and will require that you pump out the septic tank more frequently. They may also clog the sewer line to the septic system causing wastewater to back up into your home.
- Keep latex paint, varnishes thinners, waste oil, pesticides, or other hazardous chemicals out of your system. Even in small amounts, these items can destroy the biological digestion taking place within your septic system.

More tips to promote septic system health.

- Conserve water to avoid overloading the septic system. Be sure to repair any leaky faucets or toilets. Try using low-flow fixtures. Space laundry washing throughout the week.
- Check with your local health department branch office before installing a garbage disposal unit to make sure that your septic system can accommodate this additional waste.
- Plant only grass over and near your septic system. Roots from nearby trees or shrubs may clog and damage the absorption field.
- Learn the location of your septic system. Do not drive or park over any portion of your system. This can compact the soil and crush your system.

Why the need for on-site septic systems?

More than 25 million homes, encompassing almost 25 percent of the United States population, dispose of domestic wastewater through on-site sewage disposal systems. The most common method to treat and dispose of wastewater in rural homes is through the use of an on-site disposal system, and the majority of on-site disposal systems in the U.S. are septic systems.

Proper filtration and treatment of human waste water prevents the contamination of the groundwater and ultimately prevents the contamination of drinking water obtained through water wells. Untreated human wastewater contains pathogenic, enteric bacteria and viruses capable of causing symptoms ranging from mild flu-like symptoms to severe diarrhea, vomiting, dehydration, and in some cases, may ultimately lead to the death of individuals having an impaired or underdeveloped immune system.

How a septic system works

A typical septic system contains two major components: a septic tank and the absorption field. The septic tank is usually made of concrete, fiberglass, or plastic, is typically buried, and should be watertight. The primary purpose of the septic tank is to separate the solids and liquids and to promote partial breakdown of contaminants by microorganisms naturally present in the wastewater. The solids, known as sludge, collect on the bottom of the tank, while the scum, which is fats, oils and greases, floats on top of the liquid. The sludge and scum remain in the tank, and should be pumped out, periodically, by a licensed septage hauler. All septic tanks have baffles at the outlet to insure proper flow by allowing only the liquid waste which is confined between the scum layer and the sludge layer to enter the absorption field. (See figure 1). Most septic tanks are single compartment; however, in some instances, a two-compartment tank, or two single compartment tanks in series, are required.

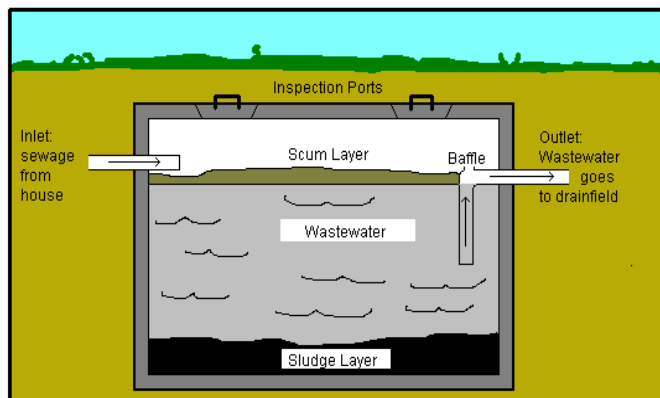


Figure 1: Cutaway view of septic tank, showing the outlet baffle.

While typically designed to hold a minimum of 1000 to 1500 gallons of sewage, the size of the tank may vary depending of the number of bedrooms in the dwelling. The number of compartments required in the tank is affected by the presence of a garbage disposal and/or a sewage grinder pump.

Solids that are allowed to pass from the septic tank may clog the absorption field. Keeping solids out of the absorption field not only prevents clogging, but also reduces potentially expensive repair or replacement costs, and helps ensure the ability of the soil to effectively treat the septic tank effluent. An effective safeguard in keeping solids out of the absorption field, and thus extending the life of the absorption system, is the use of an effluent filter on the outlet of the septic tank.

Effluent filters require periodic cleaning, in order to maintain proper flow of sewage effluent from the septic tank to the absorption system. To clean your filter, simply remove the filter cartridge from the outlet baffle or case, and hose the cartridge off, being careful to rinse septage material back into the septic tank (Figure 2 on the right). What you put in your septic system, and how much, will dictate the maintenance interval. Always refer to the manufacturers' recommendations regarding the maintenance of your effluent filter.



Figure 2: Hosing an effluent filter off into the septic tank

The wastewater (effluent) coming out of the septic tank may contain many potentially disease-causing microorganisms and pollutants. The effluent is passed on to the absorption field, or bed, through a connecting pipe, or in some cases a distribution box. The absorption field is also known as the soil drainfield, the disposal field, or the leach field. The absorption field contains a series of underground perforated pipes that are usually connected in a closed loop system (indicated in Figure 3 below).

The effluent is distributed through the perforated pipes, exits through the holes in the pipes, and trickles through the rock or stone where it is stored until absorbed by the soil. The absorption field, which is located in the unsaturated zone of the soil, treats the wastewater through physical, chemical, and biological processes. The soil also acts as a natural buffer to filter out many of the harmful bacteria, viruses, and excessive nutrients, effectively treating the wastewater as it passes through the unsaturated zone before it reaches the groundwater, or saturated zone of the soil. The location of the saturated zone in the soil profile varies from season to season, and from year to year.

Environmental Health Specialists design sewage disposal systems based on site evaluations. These evaluations reveal the highest elevation that the zone of saturation has reached in the soil profile. Sewage disposal systems are designed to allow adequate isolation between the bottom of the absorption field stone, and the highest indicated elevation of the saturated zone. This helps to minimize the risk of groundwater contamination by the sewage effluent, because the isolation allows for effective treatment of the effluent, as it passes through the unsaturated zone.



Figure 3:
An example of the closed loop system found in an absorption bed.