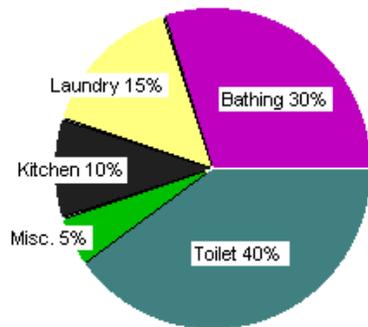


SEPTIC SYSTEMS

A Homeowners Guide to Operation & Maintenance

This document outlines the principles of septic system operation and explains the maintenance procedures necessary to ensure long life of a standard system. If neglected, the septic system can fail, leading to potential health hazards. If properly operated and maintained, the system can provide many years of trouble-free service.

The standard household septic system is a two-part sewage treatment and disposal system buried in the ground. It consists of a septic tank and a treatment/disposal field, commonly called a drainfield.



What Does Household Sewage Consist of?

Household sewage is a combination of wastewater from several sources, including sinks, showers, washing machines, garbage grinders, and dishwashers. As shown in Figure 1, the largest source of sewage is the toilet.

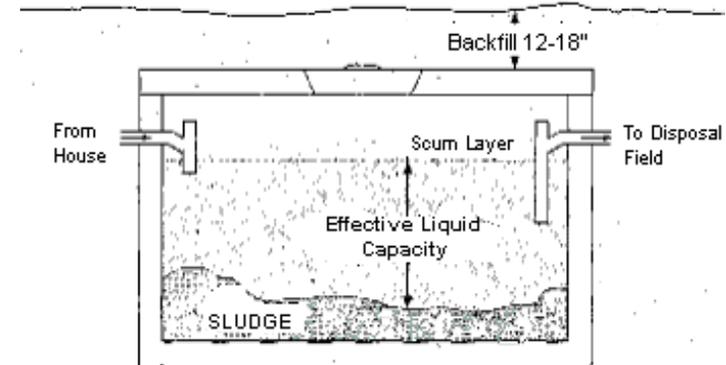
The Septic Tank

The function of the tank is to allow separation of the solids from the raw sewage so that the remaining liquid (effluent) can be absorbed into the soil without clogging the soil. Within the tank, illustrated in Figure 2, three important processes take place:

- The heavier solid particles in the sewage settle to the bottom of the tank, forming a layer of sludge.
- Lighter materials, including fats and grease, float to the surface, forming a scum layer.

- Bacteria called anaerobes, living in the septic tank without oxygen, slowly digest up to 50 percent of the solids, converting them into gases and liquids, and thereby reducing sludge build up.

Schematic of a Typical Septic Tank



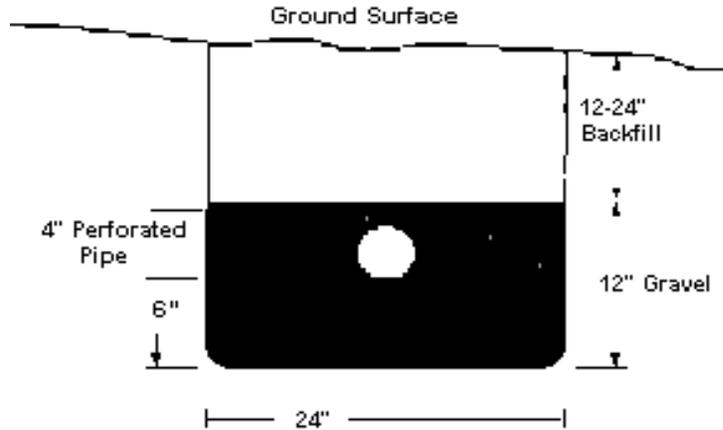
As the tank fills with sludge and grease, efficiency of treatment decreases. It must be periodically removed by pumping out the septic tank contents, which will be discussed in a later section.

The Treatment and Disposal Field---A Living System

The treatment/disposal field generally consists of a network of perforated pipes laid in gravel-filled trenches, as shown in Figure 3. After partial treatment in the septic tank, the sewage effluent flows into a distribution box or a series of drop boxes, to be distributed out through the perforated pipe and into the gravel-filled trenches. The voids between the pieces of gravel act as storage space for surges and the gravel itself acts as a media upon which aerobic bacteria and other organisms grow as they feed on the sewage.

Disease-causing bacteria are filtered out and destroyed by bacteria that live in the soil around the drainfield trenches. Other pollutants like phosphorus become bonded to soil particles. While these mechanisms remove and destroy most of the pollutants, some trace constituents such as nitrates may reach ground water tables. To minimize the effects, it is important to properly site, construct, and maintain your system.

Disposal Field Diagram Cross-Section



Finding Your Septic System

In order to take proper care of a septic system the homeowner must know where it is located. If the septic tank's access manhole is at ground level, it should be easy to locate. The access for many older septic tanks is buried somewhere under the lawn or out in your field. To locate the septic tank, look under the house or in the basement to find where and in what direction the sewer pipe exits the foundation. Septic tank locations are sometimes indicated by stunted grass growth, and/or mounded or depressed areas, which differ from the rest of the yard or field. Any likely spot can be probed with a metal rod. A tank installed under current rules should be at least five feet from the house foundation. There is no maximum distance requirement.

If the tank cannot be located by one of the clues above, ask someone who may have seen the system installed or pumped, like a neighbor, the builder, or a previous owner. The local environmental health office has official permit records showing the location of most septic systems that have been permitted and installed since 1974. The more recent the installation, the more likely we are to have a good record. The installation records of increasingly older systems may not have enough details to determine the exact location. You may want to have a licensed septic tank pumper or installer assist you. Once the tank

has been located it should be permanently marked with a stake or flagstone, or its location should be recorded in your records.

Septic Tank Pumping

Don't wait until your system shows signs of failure to have your septic tank pumped. If you wait too long, solids may flow to the disposal field and clog it, causing sewage to surface on the ground. The clogging caused by solids passing to the disposal field may not occur immediately, but it will over time. When it does fail, the entire field will usually have to be replaced for which you must obtain a permit from the Environmental Health office.

The septic tank should be checked each year after the third year of use for solids accumulation. When you take the lid off the septic tank it will appear "full" because both the inlet and outlet are towards the top of the tank. When the sludge and scum take up more than 35 percent of the liquid volume of the tank, it needs to be pumped. If you use a garbage grinder, the tank will need more frequent pumping than it otherwise would. You must call a licensed pumper to do the work. Proper pumping equipment will clean out scum, sludge, and all liquid. The pumpings must be disposed at an approved treatment facility. It is not necessary to leave any of the sludge in the tank as "seed." Incoming sewage contains all the bacteria needed for proper operation. While the tank is empty, check the condition of the inlet and outlet baffles. If they are deteriorated or missing they will need to be replaced.

You can consult the Yellow Pages of your telephone directory to locate a pumping service. A licensed pumper is assigned an official license number from the DEQ. The license number should be given to you upon request.

Only human wastes and white toilet paper should enter the septic tank. Biological and chemical additives are not needed to aid the septic tank decomposition process. The use of enzymes and other additives has not been shown to be of significant value. While their use may not harm the system, some may pose environmental hazards to the disposal field area or ground water. They do not take the place of regular maintenance.

Predicting System Failure

Septic systems generally give little warning that they are about to fail. However, the following symptoms often indicate that the system is failing:

- Sewage odor near the septic tank, or disposal trenches.
- Fixtures and toilets backing up or draining more slowly.
- Sewage on the ground or over the disposal trenches as indicated by wet spongy ground or ponding of grayish black liquid.

Reasons for System Failure

If the sewage effluent cannot be absorbed into the soil in the disposal field, sewage will back up and overflow onto the surface of the ground or inside the dwelling. Causes of this problem include:

- **High Water Table**-During wet periods the groundwater table rises. When the water table rises into the disposal field, sewage may be forced up to the ground surface. This is the result of improper disposal field location and may be improved by relocating the disposal field into an area of drier soil or by artificial drainage around the system.
- **Soil Clogging**-If sludge or scum from the septic tank flows into the disposal field, the soil will become clogged. A new disposal field must be installed when this happens. The problem can be avoided by monitoring the solids content of your septic tank and pumping it when needed.
- **Using Excessive Water**-If the soil in the area of the disposal field is continuously wet or flooded due to either a high winter water table or excessive sewage flows, a biological mat and mineral deposits will form on the trench sidewalls, clogging the soil. Reducing the volume of sewage from the dwelling can help prevent this type of failure. Using the methods mentioned at the end of this booklet can reduce home water use.
- **Roots**- the roots of certain trees and shrubs planted over the disposal field area can enter and block pipes. Removal of these plants is usually required. Avoid planting willow, cottonwood, poplar, and dogwood trees in the area of the disposal field.

Protecting Your Septic System

To protect your system against premature failure, follow these simple procedures:

- Check the solids buildup in the septic tank regularly. Sludge build-up varies with each family. Larger families generate more waste. Do not wait until failure symptoms show up to have the tank pumped.
- Minimize water use in the home. Excess water will decrease the effectiveness of the septic tank and lead to flooding of the disposal field. Do not connect basement sumps, roof drains or footing drains into the septic system. Use water saving plumbing fixtures where possible (faucet aerators, low-flow showers, low-flow toilets, etc.) and run dishwashers and washing machines with full loads. Fix leaky faucets and toilets promptly.
- Small amounts of the following materials may be acceptable, but, whenever possible, don't dispose of these substances in the septic system:
 1. **Coarse Organic Matter**- Vegetable trimmings, ground garbage, sanitary napkins, coffee grounds, and cat litter will clog the septic tank with sludge and will require more frequent tank pumping. Use of a garbage disposal can shorten disposal field life. Home composting is an excellent alternative means of disposing of vegetable food waste.
 2. **Fats and Grease**- Cooking oil, bacon grease, etc., can overflow the tank baffles and clog the disposal trenches.
 3. **Chemicals**- Pesticides, excessive use of disinfectants, RV additives, motor oil, acids, medicines, paint and, paint thinners, etc. can kill the bacteria that decompose organic matter in the tank, causing increased sludge build-up. More frequent pumping of the tank will be required to keep the system operating.
- Follow current code when siting and installing any new disposal field. Improper location or construction may result in early system failure.

- Keep heavy vehicles off the drainfield area. Their weight could crush pipes and compact the soil, and will likely lead to extensive repairs.
- Don't plant deep-rooted or water-seeking trees or shrubs over or near the disposal trenches. Their roots may clog pipes.
- Do plant grass turf or other shallow-rooted plants over the disposal field. Proper vegetation helps take moisture from the ground and the system. However, use care in landscaping so you don't cut or dig too deeply into the disposal field area.
- Don't put plastic or excessive fill material over your disposal field. Don't pave or put roadways over it either. The bacteria in the soil that decompose the sewage need to breathe in order to live.
- Vegetable gardening is not recommended for the disposal area. Deep rototilling may damage the disposal trenches. Also, there is a possibility that root crops such as carrots and potatoes could become contaminated.
- Do keep a maintenance record of your septic system. Include a plot plan showing the location of the septic tank, disposal trenches, distribution box, or at least the first drop box.

All work must be inspected and approved by Environmental Health prior to backfilling.

If Repairs are Needed

Should any of the symptoms that indicate system failure appear, do the following:

- Contact the Environmental Health Office. It may be that repairs are not warranted or that minor repairs or improvements will take care of the problem. In most cases you will need to apply for a repair permit and replace the disposal field.
- Once you have made application for a repair permit, a sanitarian will inspect your system and site. The area he or she designates for a replacement disposal field and the system specifications will depend primarily on soil conditions, the size of the parcel, and distances from buildings, wells, property lines, and other items that require a setback. You will be required to provide one or more test pits for a thorough examination of soil conditions. Following the sanitarian's field visit, you will be given materials to assist in preparation of plans for the system. When you return the plans to the office and they are approved, they will issue a permit for the needed work. Work may not begin on the system until the permit has been issued.