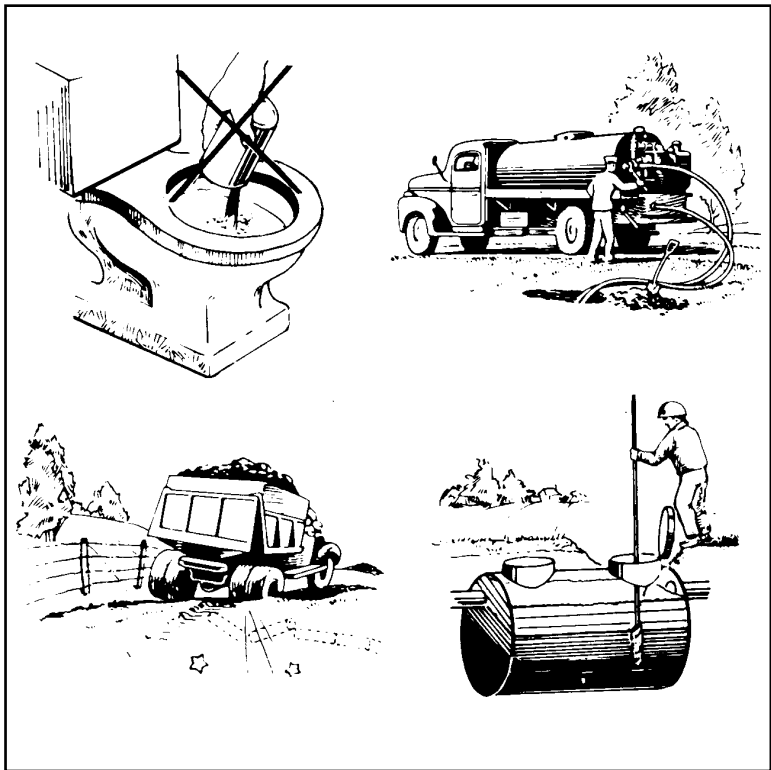


Septic System Care

Essentials of Using and Maintaining
Your Septic Tank Sewage Disposal System



**STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ENERGY**



This publication conforms to the New Jersey Department of Environmental Protection's standards for Individual Subsurface Sewage Disposal Systems (N.J.A.C. 7:9A-1 et seq.).

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Septic System Care

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SEPTIC SYSTEM CARE

INTRODUCTION

This publication contains comprehensive information on the proper use and maintenance of your septic tank sewage disposal system. It is intended primarily for homeowners, but real estate professionals; small businesses; builders; health departments; consultants; government officials at the local, regional, and state levels; and everyone involved with using, designing, and maintaining septic disposal systems should find this information valuable.

HOW A SEPTIC SYSTEM WORKS

The typical septic tank sewage disposal system (Figure 1) is designed to capture solids from household wastewater inside a watertight, underground receptacle called the septic tank. The solids are broken down by the bacteria in the tank, which thrive in the absence of oxygen. Such decomposition in the absence of air causes septic conditions, which led to the naming of the tank.

Treatment of wastewater from the home in a septic system consists of the following steps. The flow of sewage is slowed in its passage through the septic tank so that heavier solids settle to the bottom and accumulate as sludge. Lighter particles and grease rise to the surface, forming a floating scum layer that is retained in the tank. The partially treated sewage, or effluent, flowing from the tank still contains large numbers of harmful bacteria and organic matter in a finely divided state or in solution. The last step of treatment is final disposal of the effluent in the soil. Partially treated water (effluent) flows from the tank to the soil absorption field (disposal bed or field). This field is made up of long, perforated or open-jointed pipes buried in shallow, gravel-filled trenches. Thus, the main function of the septic tank sewage disposal system is to condition household wastewater, including water from the laundry and the bath, the kitchen sink, and body wastes, to more readily percolate into the soil.

A CLOSER LOOK AT THE SEPTIC TANK

Figure 2 gives a cross-sectional view of the typical septic tank. Septic tanks are required to be large enough to hold the sewage for approximately two days before it is discharged to the soil absorption field. Its size depends on the number of bedrooms in your home. For a three-bedroom home, the design flow is 500 gallons per day and a 1,000-gallon-capacity septic tank is required. For a four-bedroom home, the design flow is 650 gallons and a 1,250-gallon tank is required.

Figure 1. A Typical Septic Tank Sewage Disposal System.

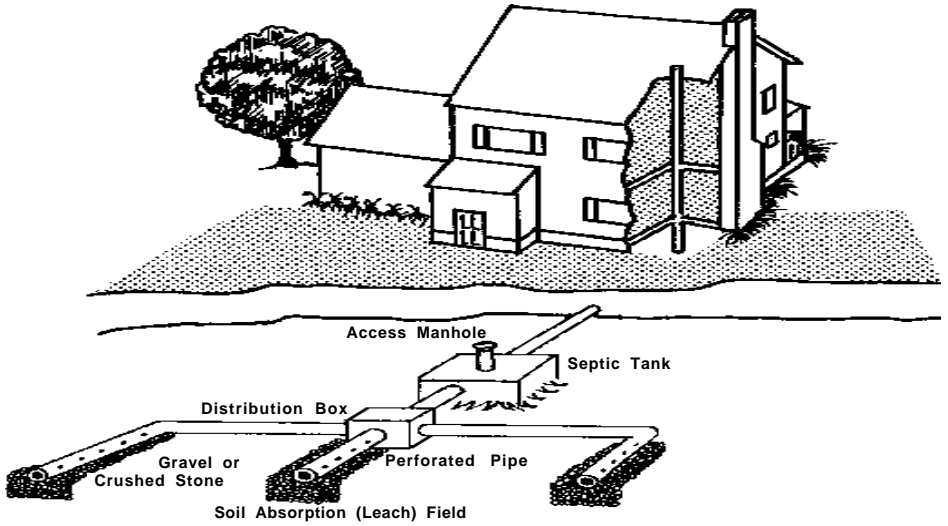
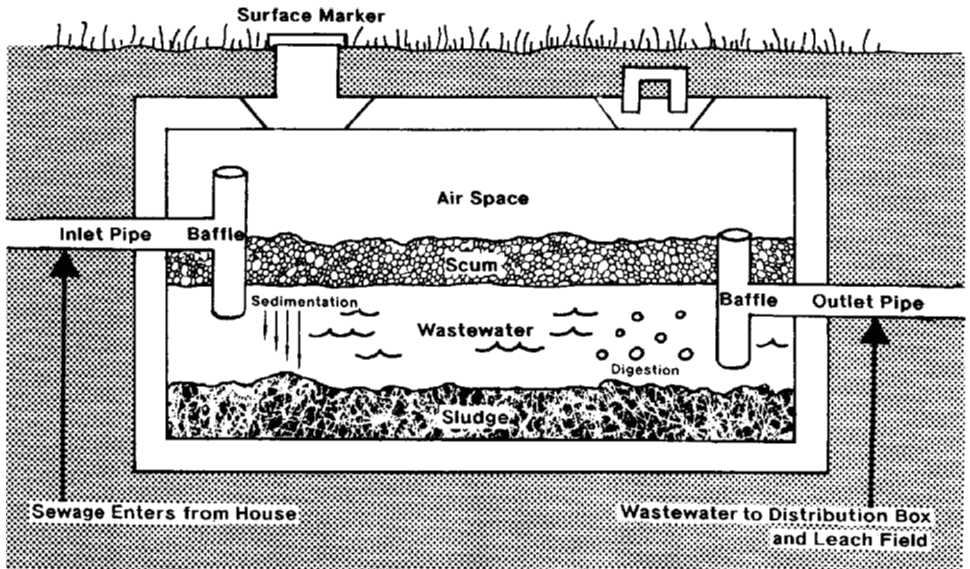


Figure 2. The Septic Tank (Cross-sectional View).



Solids are always accumulating in an operating septic tank, because the rate of anaerobic (without oxygen) decomposition is much slower than the rate at which sewage is added to the septic tank. It is important to recognize that some of the material in the sewage is inert and will never decompose.

The fats, greases, hair, and other materials that are less dense than water are collectively known as scum. The scum will float to the surface within the septic tank and be retained within the tank by the baffles at both the inlet and outlet ends of the septic tank. If the baffles become damaged, the scum will be discharged to the soil absorption field, and the field will ultimately malfunction.

An operating septic tank always contains settled solids at the bottom, floating scum at the liquid surface, and a relatively clear liquid in the middle. It is the clear liquid that is discharged to the disposal bed or trench when wastes are generated by the household.

When a septic tank isn't pumped out when it reaches its capacity to retain solids and scum, the solids and scum will be carried out of the septic tank to the disposal field, and the disposal field will clog to a point where it will no longer function properly.

HOME BUYERS SHOULD INSPECT SEPTIC SYSTEM

You as a home buyer should satisfy yourself that your sewage disposal system is properly designed, installed, and maintained to serve the anticipated number of occupants of the house. You should also be sure that the system is located where it is not likely to endanger water supply systems, and that the soil absorption system is capable of disposing of liquid wastes under year-round weather conditions. Much current and historical information is available at your local health department.

A number of engineering firms specialize in inspecting septic systems. The "yellow pages" or a referral from the local or county health department is a good place to start. The inspection should include all the items discussed on page 15 of this manual.

When septic disposal systems are improperly designed or maintained, liquid wastes may overflow to the ground surface, or the plumbing in the home may back up. These overflows not only create offensive odors, they are also a health hazard, because sewage may contain organisms that cause dysentery, infectious hepatitis, typhoid and paratyphoid, or other infectious diseases. In addition, ponded sewage creates breeding places for some kinds of mosquitoes and other insects.

It is important to remember that a septic disposal system that does not function properly frequently becomes a health hazard to you and your neighborhood. To obtain satisfactory service, you must know something about the use and maintenance of your own septic system.

ESSENTIALS OF PROPER USE

- * DON'T DISPOSE OF INERT, TOXIC, OR NONBIODEGRADABLE SUBSTANCES IN YOUR SYSTEM**

- * AVOID SURGES OR HIGH WATER FLOWS TO YOUR SYSTEM**

- * REDUCE WATER FLOWS TO YOUR SYSTEM -- CONSERVE WATER !**

- * DON'T PLANT TREES OR OTHER VEGETATION NEAR YOUR SYSTEM**

- * DON'T DRIVE VEHICLES OR HEAVY EQUIPMENT OVER THE SYSTEM**

- * CONSULT YOUR HEALTH DEPARTMENT FOR MORE INFORMATION**

ESSENTIALS OF PROPER USE

DON'T DISPOSE OF INERT, TOXIC, OR NONBIODEGRADABLE SUBSTANCES IN YOUR SYSTEM !

Inert and nonbiodegradable substances, such as plastic in disposable diapers, sand or clay from cat box litter, filters from cigarettes, bulky wastes, sanitary napkins, tampons, paper towels, dental floss, and facial tissues, should not be disposed of in your septic system. These items quickly fill your septic tank, decrease its efficiency, and cause the additional expense of having to pump your tank more frequently.

Special care should be taken to avoid putting any liquid fat or grease down the kitchen sink drain. Fats and greases solidify and accumulations may contribute to blockage within the system.

Similarly, the use of garbage disposal units in your kitchen sink should be avoided, as disposers increase the amounts of solids to the septic tank, which necessitates more frequent pumping. Many communities in the United States have laws that ban their use because they contribute to water pollution and sewage treatment problems.

Keep toxic and hazardous chemicals out of your septic system. Small amounts of paints, varnishes, thinners, waste oils, photographic solutions, pesticides, and any other organic chemicals should be disposed of in an appropriate manner or during hazardous waste collection days. Waste oil from your automobile should be brought to your nearest service station for recycling. Consult your local health department for proper disposal of large quantities of these and other hazardous chemicals. Normal use of household cleaners, disinfectants, drain cleaners, and bleaches will do little harm to your system.

AVOID SURGES OR HIGH WATER FLOWS TO YOUR SYSTEM

It is important to avoid large increases in flow to the septic tank, such as those created by simultaneous emptying of bathtub, washing machine, dishwasher, and shower. This behavior causes excessive mixing of the contents of the septic tank. When the contents of the septic tank are agitated, abnormally high amounts of solids and scum will be carried over to the soil absorption field. This could cause premature failure of the soil absorption field and an unnecessary repair bill.

REDUCE WATER FLOW TO YOUR SYSTEM - CONSERVE WATER!

Extra water going into your septic system increases the hydraulic load on the absorption field, reducing its ability to drain away wastewaters. This condition occurs naturally during periods of heavy rainfall or melting snows, which cause saturated soil conditions and high water tables. It can also occur when human activities interfere with groundwater flow. One means of reducing water flow to your system is through household water conservation.

Water-saving devices offer an inexpensive and lasting approach to conserving water in your home or business. These include water-saving showerheads rated at 3 gallons per minute or less, water-saving toilets that use 3.5 gallons per flush versus the standard 5 gallons per flush, and low-flow faucet aerators for your sinks. These devices can be installed without major disruptions in your water using habits; consequently, they are acceptable to most consumers.

Other hints for conserving water include:

- * Stop leaks. Food coloring can be used in the toilet tank to detect leaks into the bowl. Leaking faucets should be promptly repaired or replaced.
- * Don't do two or three loads of laundry in one day; space out the washing and bathing over the week. Operate washer with full loads.
- * Avoid connecting the sump pump or roof drainage to your septic system. Likewise, never allow footing drains, which are used to prevent wet basements, to be connected.
- * If you have a water softener, don't allow the salt recharge solution to enter your system. The salt can damage certain soil structures in your drainage field. Clayey soils are especially susceptible.
- * Educate family members, especially children, about water-saving practices.

DON'T PLANT TREES OR OTHER VEGETATION NEAR YOUR SYSTEM

Trees and other woody vegetation have extensive root systems that can damage the soil absorption field. Over the years tree roots can move 30-40 feet from the base of the tree, grow into the lateral pipes and break, disrupt, or clog the system. Grass is the best type of vegetative cover for the disposal field.

DON'T DRIVE VEHICLES OR HEAVY EQUIPMENT OVER THE SYSTEM

Do not drive vehicles or park heavy equipment or boats over the septic system. The weight of these units may cause physical damage to the components of the system. Likewise the area above the system should not be paved over. Creating an impermeable surface over the disposal field will significantly reduce exchange of gases between disposal field and the air.

CONSULT YOUR HEALTH DEPARTMENT FOR MORE INFORMATION

- * when experiencing any trouble with your septic system,
- * when planning extensions to your soil absorption field,
- * when planning additions to your home.

ESSENTIALS OF PROPER MAINTENANCE

One major advantage of a septic tank disposal system is that it has no moving parts and, therefore, needs no weekly or monthly routine maintenance. A well-designed, installed, and maintained concrete, fiberglass, or plastic septic tank could last up to 50 years. Because of corrosion problems, steel tanks can be expected to last no more than 10 years. You should understand that the septic system is not a public sewerage system, and, in the absence of a local management authority, its maintenance is your responsibility.

LOCATE AND DIAGRAM YOUR SEPTIC TANK AND DISPOSAL FIELD

Septic tanks and soil absorption systems frequently are damaged when heavy trucks or other equipment drive over them. An accurate diagram of the system enables the homeowner to keep heavy vehicles away from the critical area. A line of cast iron pipe instead of plastic pipe should be installed under any necessary crossings for heavy vehicles.

To facilitate cleaning and maintenance, you should have a diagram of your septic tank system showing the location of the house, the septic tank manholes for ease in pumping it out, the piping, and the soil absorption system. You might also place a marker on the ground above the septic tank, as it is expensive to hire someone to locate the pumpout port. You may want to consider fitting your tank with an access riser, which allows easy access directly from the surface. Figure 3 below contains space for diagramming your lot and the location of the septic tank and disposal field. This information should be kept on the premises, regardless of a change in occupancy. Serious injuries have occurred when abandoned septic tanks caved in.

Figure 3. Diagram of Your Septic Tank Sewage Disposal System.

Measure and record distances to the cover of your septic tank and to the corners of your leaching field. Mark number of feet from fixed points, such as the corner of your house.

PUMP OUT YOUR SEPTIC TANK REGULARLY

ESSENTIALS OF PROPER MAINTENANCE

*** LOCATE AND DIAGRAM YOUR SEPTIC TANK AND DISPOSAL FIELD**

*** PUMP OUT YOUR SEPTIC TANK REGULARLY**

*** REMOVE AS MUCH OF THE SOLIDS AS POSSIBLE**

*** AVOID BIOLOGICAL ADDITIVES**

*** DON'T USE SEPTIC SYSTEM CLEANERS THAT CONTAIN BANNED TOXIC SUBSTANCES**

Failure to pump out your septic tank regularly is the most frequent cause of damage to soil absorption systems. When the tank is not cleaned, solids build up until they are carried into the underground soil absorption system, where they block the flow of the liquid into the soil. When this happens, the soil absorption system must be rebuilt -- a costly undertaking. The precautions of periodic inspection and cleaning of the tank prevent this needless expense and work. The Septic Tank Sewage Disposal System Record Form (back cover) can be used to keep a permanent record of all work done on the system.

The frequency of cleaning depends on the size of the septic tank and the number of people it serves. Tanks should be inspected at intervals of no more than every 2 years to determine rates of scum and sludge accumulation. With ordinary use and care, a septic tank usually requires cleaning every 3 to 5 years. However, in many cases septic tanks can be satisfactorily operated for a longer period. You as a homeowner can make measurements and decide when the tank needs cleaning.

CAUTION: DANGEROUS TOXIC GASES. Fatalities have occurred during septic tank maintenance and repair, because toxic gases build up in the tank. Never allow anyone to go down into a septic tank. Even when simply peering in the tank, exercise extreme caution.

Table 1 gives a fast estimate of the pumping frequencies according to septic tank capacity and household size. The frequencies were calculated to provide a minimum of 24 hours of wastewater retention assuming 50% digestion/decomposition of the retained solids.

Table 1. Estimated Septic Tank Pumping Frequencies in Years
(for year-round residences).⁽³⁾

Tank size (gal)	Household size (number of people)						
	1	2	3	4	5	6	7
500	5.8	2.6	1.5	1.0	0.7	0.4	0.3
750	9.1	4.2	2.6	1.8	1.3	1.0	0.7
900	11.0	5.2	3.3	2.3	1.7	1.3	1.0
1000	12.4	5.9	3.7	2.6	2.0	1.5	1.2
1250	15.6	7.5	4.8	3.4	2.6	2.0	1.7
1500	18.9	9.1	5.9	4.2	3.3	2.6	2.1
1750	22.1	10.7	6.9	5.0	3.9	3.1	2.6
2000	25.4	12.4	8.0	5.9	4.5	3.7	3.1

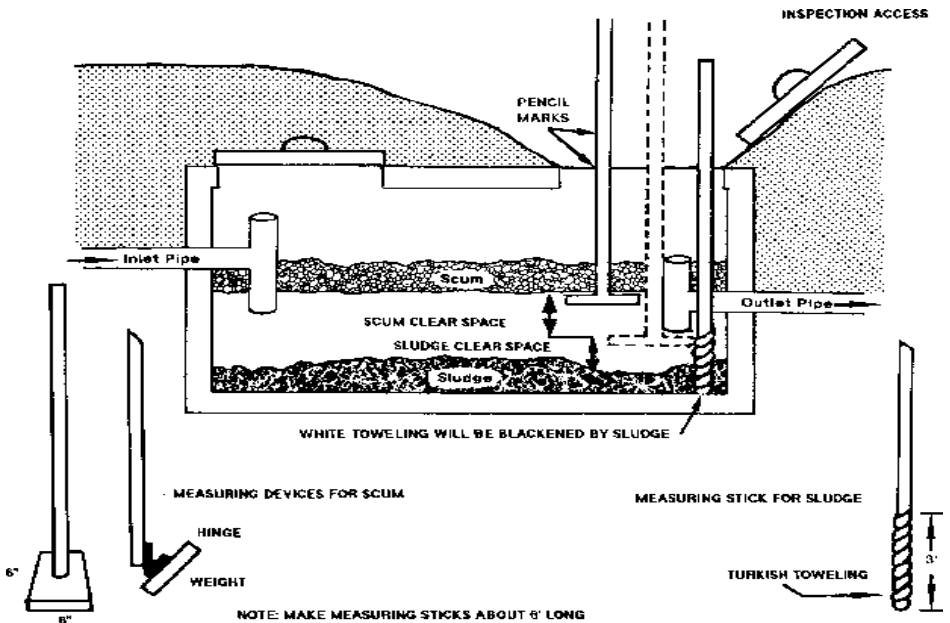
Pump more frequently if garbage disposal unit is installed.

PROCEDURE FOR DETERMINING SLUDGE AND SCUM LAYER DEPTHS IN THE SEPTIC TANK

Inspecting the septic tank is not one of the joys of home ownership, but you can do it yourself and save by following these guidelines: All septic tanks have three distinct layers: scum, liquid, and sludge. Guidelines on when to pump are based on the thickness, or depth, of these three layers. To determine scum accumulation, use a 6-inch-square piece of wood attached to the bottom of a long stick. (See Figure 4, Devices for Measuring Sludge and Scum in the Septic Tank in the Septic Tank.) Push this measuring device through the scum layer into the liquid layer. If the stick is carefully moved down and up, resistance on the "foot" should increase when it passes through the scum layer and strikes the water surface, thus locating the bottom of the layer.

Mark the stick with a pencil at a convenient reference point when you feel the bottom of the scum layer. With the same stick, locate the bottom of the outlet baffle by feeling for the end, and again mark the stick with a pencil. Then measure the distance between the pencil marks on the stick. This is the scum clear space in Figure 4.

Figure 4. Devices for Measuring Sludge and Scum in the Septic Tank
[adapted from PHS publication No. 526].



To determine the thickness of the sludge layer, wrap an old piece of toweling around the bottom 3 feet of a stick long enough to reach the bottom of the tank. Push the stick to the bottom of the tank (in back of the outlet baffle, if possible, to avoid the scum layer, which will adhere to the toweling), and twirl it between your hands. Mark the stick as your reference point, and let it stay in the tank about a minute. When you withdraw the stick you will find a distinct black layer representing the sludge depth.

The septic tank must be pumped when either of the following conditions is noted:

- a) vertical distance in inches between bottom of scum/grease layer and bottom of outlet baffle is less than 3 inches (scum clear space); or
- b) vertical distance in inches between top of sludge layer and bottom of outlet baffle (sludge clear space) is less than 8 inches.

REMOVE AS MUCH OF THE SOLIDS AS POSSIBLE -- SUGGESTIONS TO THE SEPTIC TANK PUMPER

Removing all the septic tank solids requires more than just pumping the tank. The job should be performed by a qualified pumper having adequate equipment. The liquid level in the septic tank should first be lowered well below the outlet to prevent sludge and scum from overflowing into the leaching system. Some of the liquid is pumped back into the tank under pressure to agitate all the solids into suspension. If the scum layer is hard, the tank should be agitated with air or a long-handled shovel inserted through the manhole to break up the scum. When all the solids become suspended, the remainder of the mixture is pumped out of the septic tank into the pumper tank. The objective is to remove as much of the heavy solids at the bottom of the tank as possible.

It is usually necessary to open the manhole to remove the solids from a septic tank. If the septic tank pumper services the tank through the inspection ports over the inlet and outlet baffles, he may break or dislodge them.

It is not necessary to leave solids in the septic tank to "start" it again. Even a tank that has just been pumped has more than enough microorganisms to keep it active and flourishing. A septic tank pumper who tells you the opposite is either misinformed, does not have adequate equipment to break up the sludge layer, or does not have a large enough pumping tank to remove all the contents of your septic tank in one load. On the other hand, the septic tank should not be washed, scrubbed, or disinfected.

Material removed from a septic tank is called septage and should be disposed of in a safe and sanitary manner. Your local health department should know which local companies do this work satisfactorily and reliably. Consult your health department if you are new to the area.

AVOID BIOLOGICAL ADDITIVES

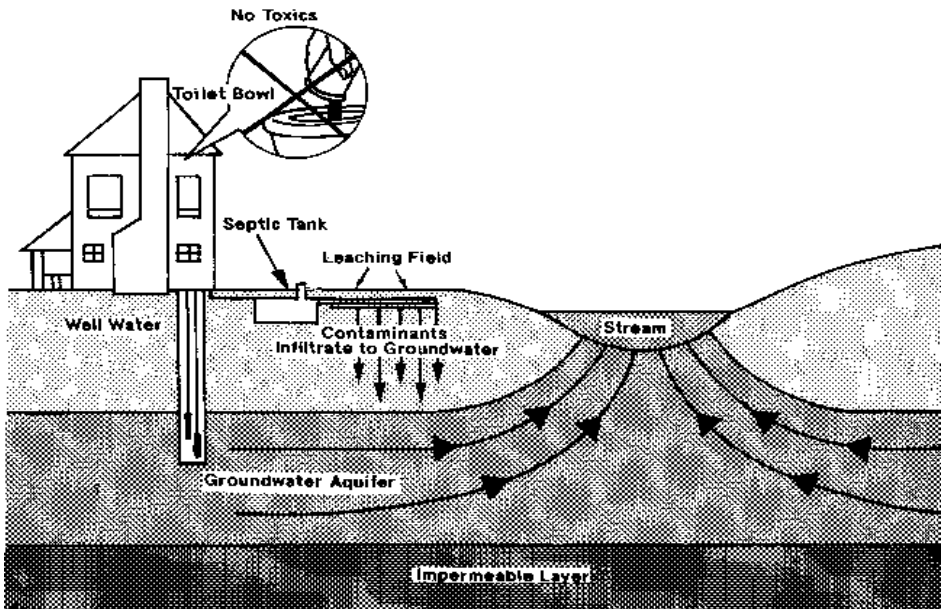
Flushing yeast or store-bought enzymes into your septic system to aid bacteria is like pouring money down the drain. None of these products has been found to have any significant value in improving performance or preventing failures.

DON'T USE SEPTIC SYSTEM CLEANERS THAT CONTAIN BANNED TOXIC SUBSTANCES

In many instances septic system leach fields clog as a result of failure to pump the septic tank. The cause is grease and solids blockage in the leaching system.

Many organic chemicals are available under various brand names as septic and sewage system cleaners. These chemicals may be toxic and generally are nonbiodegradable. Used to unblock sewage systems, they become significant and unnecessary sources of water pollution and groundwater contamination (see Figure 5). Many of these chemicals have been found in drinking water supplies from groundwater sources.

Figure 5. Avoid disposing of toxic chemicals in your plumbing system. They infiltrate to the groundwater, pollute the aquifer, and may end up in someone's well water.



In New Jersey, under the state Water Pollution Control Act, the sale and use of septic system cleaners containing “restricted chemical materials” is forbidden. The “restricted chemical material” is defined as any chemical material containing in excess of 1% by weight of the following:

**AVOID
BRAND NAME
PRODUCTS
CONTAINING**

Halogenated Hydrocarbons
(aliphatic or aromatic) (including but not limited to)
Trichloroethane
Trichloroethylene
Tetrachloroethylene
Methylene Chloride
(Halogenated) Benzene
Carbon Tetrachloride

Aromatic Hydrocarbon Chemicals
(including but not limited to)
Benzene
Toluene
Naphthalene

Any Phenol Derivative in which a hydroxyl group and two or more halogen atoms are bonded directly to a 6 carbon aromatic ring (including but not limited to)
Trichlorophenol
Pentachlorophenol
Acrolein
Acrylonitrile
Benzidine

IF YOUR SOIL ABSORPTION SYSTEM (DISPOSAL FIELD) FAILS

The homeowner and septic system inspector must be alert for the signs of current or impending septic system failure:

The toilets back up into the house or are very slow to drain. This can indicate that the septic tank needs to be pumped and/or the disposal field is being hydraulically overloaded so that the water is not being drained into the disposal field soil as fast as it is being generated by the household.

Sewage or effluent is seeping into the building or its basement. If the seepage is sewage rather than groundwater, the seepage will have a distinctive odor. The building sewer that connects the toilets and sinks in the home with the septic tank may be broken, causing effluent to leak into the basement or other portions of the building. A shallow water table may also cause poorly treated effluent to enter the building.

Effluent is being discharged to the surface of the ground in the area of the disposal field. This is most noticeable by the presence of the odor of sewage, or by the presence of an abnormally lush vegetative growth even during periods of low rainfall. This can be caused by either an overloading of the septic system because of abnormally high water usage, an under-sized disposal field, a clogging of the disposal field because of solids carry-over from the septic tank, and/or by the presence of a shallow water table.

Water from the homeowner's well has developed an unpleasant taste, the water has a foul odor or an analysis of the well water indicates contamination. If no chemical and bacterial test has been performed recently, this should be done immediately in order to determine the specific nature of the contamination problem. Any chemical analysis of home well water should include a GC/MS Scan for organic chemicals.

In some cases it is easy to determine when the soil absorption system (leach field) is not working. System failure indicates the soil is not adequately absorbing the effluent, and as a result it comes to the surface of the ground. Lush green grass growth may indicate the point of failure, or a black-gray odorous liquid may be visible. This condition should be considered a serious health hazard, and children and pets should be kept away from the location.

FOR MORE DETAILED INFORMATION

Your municipal or county health department is the first place to check for additional information. If those officials can't answer your questions, they can refer you to someone who can. They can also provide you with copies of local and state regulations governing construction of septic tank systems. Other good information sources include:

Small Scale Waste Management Project
University of Wisconsin
1 Agriculture Hall
Madison, WI 53706
(reprints of research projects)

EPA National Small Flows Clearinghouse
258 Stewart St.
Morgantown, WV 26505
(800) 624-8301
(complimentary copies of EPA manuals and technical reports)

USDA Soil Conservation Service office
for address and telephone numbers, see
"Blue Pages" of telephone directory
(soil survey maps).

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