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GET TO KNOW YOUR

SEPTIC TANK

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WHAT DOES AN ONSITE SEWAGE TREATMENT SYSTEM DO?

An "onsite" sewage treatment system completely treats sewage on the property where the sewage has originated. This system has two parts: sewage tank and soil treatment system. The sewage tank separates out the large solids, and the soil treatment system removes the fine solids and destroys accompanying bacteria. The only maintenance required by a properly operating system is the occasional removal of accumulated solids from the sewage tank. A sewage tank may be a septic tank or an aerobic tank (with an air agitator). In both, the large solids are separated and partially decomposed by bacteria. The liquid discharged from these sewage tanks is called effluent. This effluent contains disease-causing bacteria and nutrients. Minnesota law prohibits discharging this effluent onto the ground surface or into surface waters, except in rare instances when a permit must be granted by the Minnesota Pollution Control Agency (MPCA).

The Septic Tank

The most common type of sewage tank in Minnesota is the septic tank. Raw sewage flows into the septic tank where the solids separate from the liquid. Solids such as soap scum and fat float to the top and form a scum layer. Heavier solids settle to the bottom where they are partially decomposed by bacteria. The non-decomposed solids remain as the bottom sludge layer. The solids which are trapped in the septic tank must be removed by pumping before they build up to a level where they will wash out into the soil treatment system and plug the soil pores. The frequency of cleaning is determined by each household, but 24 months is a good estimate for a typical home without a garbage disposal. The septic tank should be watertight, corrosion proof and constructed according to the proper dimensions. A shallow tank with adequate access is easy to maintain. Except in the rare instances when a permit is granted by the MPCA for surface discharge, sewage tank effluent must be discharged into a soil treatment system. Most soils are excellent for treatment, but some soils cannot perform this task.

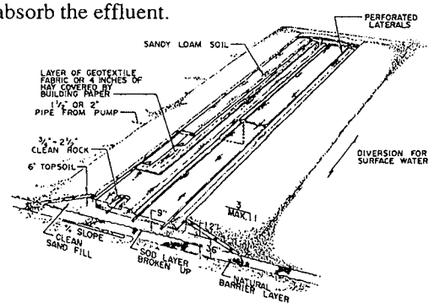
Septic Tank Capacities, in gallons

Number of Bedrooms	Minimum Liquid Capacity	Liquid capacity with garbage disposal
2 or less	750	1125
3 or 4	1000	1500
4 or 6	1500	2250
7, 8 or 9	2000	3000
over 9		------

TYPES OF SOIL TREATMENT SYSTEMS

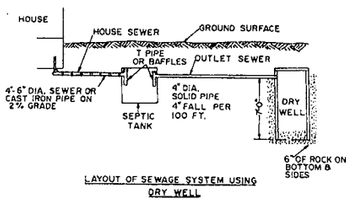
Three types of soil treatment systems can be used:

1. **Drainfield trenches**—The most common soil treatment system uses drainfield trenches. This system does the best job of treating sewage. Drainfield trenches use evaporation and plant life to help treat the sewage in summer months. This system does not require extensive disturbance of terrain (a lawn and probably most of the trees can remain for the owner's enjoyment). Layout is very flexible.
2. **Seepage bed**—This system does not require as large a lawn area as do drainfield trenches, but it has a smaller sidewall absorption area. This means that in designing a system the size is more than 50 percent larger than a trench system. It cannot be located on slopes greater than 6 percent, and it is susceptible to overloading from surface water. It is less efficient than a drainfield trench system. Also, contractors often smear or seal the bed bottom during construction, destroying the bed's ability to absorb the effluent.



3. **Mound** — This is an elevated bed system with pressure distribution. These systems are used to overcome soil limitations on the site. These limitations could include: rapid percolation rates, slow percolation rates, high groundwater or shallow bed rock. These systems have been used for a number of years in Minnesota and if properly designed and constructed actually have some treatment advantages over an in-ground gravity system.

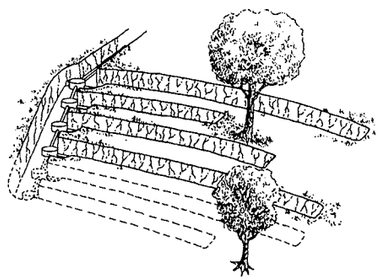
Seepage pit (dry well, cesspool) —This is no longer considered a soil treatment system. The effluent is placed too deep for proper treatment, and there is no evaporation for use by plants. In addition, the system often contributes to well water contamination.



LAYOUT OF SEWAGE SYSTEM USING DRY WELL

DRAINFIELD TRENCHES WITH DROP BOXES

A system of drainfield trenches connected with drop boxes is the most effective gravity soil treatment system for sewage tank effluent. They are more effective and trouble-free than a distribution box system. The drop boxes distribute the effluent to drainfield trenches in sequence, using only as much of the sewage treatment system as needed at the time. Sewage tank effluent flows into the first drop box, which supplies effluent to the trench system. One outlet of this drop box is connected to the distribution pipe of the first trench. Another outlet carries the effluent to the drop box for the next trench when the first trench is being used at maximum capacity. The bottom of the outlet pipe leading to the drop box of the second trench should be at the same level as the top of the rock in the first trench.



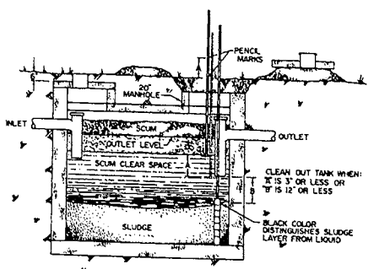
The bottoms of the trenches must be level throughout their lengths, so they usually should follow ground contours. Trenches should not be dug close enough to trees to cause serious root damage. However, trees usually need not be removed from the drainfield. Tree roots will not plug the drainfield trenches, and trees will use the effluent.

Shallow trenches do a much better job of treating sewage than do deep ones. Six inches of soil backfill over the trench rock is enough to prevent freezing, even during Minnesota winters.

However, you must have good grass cover and must allow snow to accumulate naturally. Snow cover compacted by pedestrians, pets and snowmobiles may allow frost to penetrate to the drainfield trenches.

CARE AND FEEDING OF YOUR SEPTIC SYSTEM

- A "starter" is not needed for bacterial action to begin in a septic tank. Many bacteria are present in the materials deposited into the tank and will thrive under the growth conditions present.
- Additives should not be used, since they are of no benefit and some may do great harm. Additives that cause the accumulated sludge in the tank bottom to increase in volume will result in the sludge being flushed out into the drainfield, plugging soil pores. Other additives, particularly degreasers, may be carcinogens (cancer-causing) or suspected carcinogens that will flow directly into the groundwater along with the treated sewage.
- Discharge all sewage wastes from the home into the septic tank. Don't run laundry wastes directly into the drainfield, since soap or detergent scums will quickly clog the soil pores, causing failure.
- Normal amounts of household detergents, bleaches, drain cleaners, toilet bowl deodorizers, and other household chemicals can be used and won't harm the bacterial action in the septic tank. Do not use excessive amounts of any household chemicals.
- Don't deposit coffee grounds, cooking fats, wet-strength towels, disposable diapers, facial tissues, cigarette butts, and similar nondecomposable materials into the house sewer. None of these materials will decompose, and they will cause a rapid accumulation of solids in the septic tank.
- Avoid dumping grease down the drain. It may plug sewer pipes or build up in the septic tank and plug the inlet. Keep a separate container for waste grease and throw it out with the trash.
- Remove the sludge and scum by pumping every 1 to 3 years for a 1,000-gallon tank serving a 3-bedroom home having 4 occupants (and with no garbage disposal).
- When your septic tank is cleaned, you must remove the manhole cover or the tank cover to facilitate cleaning and to be sure that all solids have been pumped out. A septic tank cannot be cleaned adequately by pumping out liquids through a 4-inch inspection pipe. This process



MEASURE SCUM AND SLUDGE ACCUMULATIONS IN THE SEPTIC TANK

usually results in the scum layer plugging the outlet baffle. So be sure that the tank is open when you have it cleaned. At this time, the baffles also can be inspected and replaced if necessary.

- If you must use a garbage disposal, you will need to remove septic tank solids every year or more often. Ground garbage frequently will find its way out of the septic tank and clog the soil treatment system.
- Use a good quality toilet tissue that breaks up easily when wet. To determine suitable quality toilet tissue, place a portion in a fruit jar half full of water. Shake the jar and if the tissue breaks up easily, the product is suitable. High wet-strength toilet tissues are less desirable. The color of the toilet tissue has no effect on the septic system.
- Each septic system has a certain capacity. When this capacity is reached or exceeded, there will be problems with the system accepting as much sewage as you want to discharge into it. When the sewage approaches its discharge capacity, be conservative with your use of water. Each gallon of water that flows into the drain must be treated and disposed. Repair all leaky plumbing fixtures and, if possible, reduce the amount of water used for bathing, doing laundry, and flushing the toilet.
- Reducing toilet wastes is the single most effective way to reduce sewage flows. The flush toilet accounts for about 40 percent of sewage wastes from an average home. Many flush toilets use 5 to 6 gallons per flush. Flush toilets that use less than a quart of water per flush are available.
- Routinely check the toilet float valve to be sure it isn't sticking and the water isn't running continuously. Be sure the toilet is not flushed unnecessarily. Don't use the toilet to dispose of housecleaning water or cigarette butts.
- Determine how much water your automatic washer uses per cycle. Front-loading washers and suds savers typically use less water than top-loading machines. If your sewage system is approaching its maximum capacity, try to spread the washing out during the week to avoid overloading the sewage system on a single day.
- Keep a container of drinking water in the refrigerator. Then it will not be necessary to run the faucet for a period of time to obtain cold water.
- Baths and showers can use appreciable amounts of water. Shower heads that limit the flow rate to 2 gallons of water per minute are available. Filling the tub not quite so full and limiting the length of showers could result in appreciable water savings.
- Water softener recharge wastes will not harm septic tank action, but the additional water must be treated and disposed of by the soil treatment system. If the softener wastewater creates an overload to the sewage system, the wastewater can be discharged to the ground surface, since it contains no pathogens. The wastewater should be discharged in a location where it does not cause a nuisance or damage valuable vegetation.
- Detergents can cause problems with septic systems. It is difficult to estimate the amount of cleaning power required for a load of laundry, so people usually use too much. Be wary of inexpensive washing products, which may contain excessive quantities of filler or carrier, some of which can be extremely detrimental to the sewage system. The best solution is to use liquid laundry detergents, since they are less likely to have carriers or fillers that are detrimental to a septic system.
- **Never go down into a septic tank. The gases present may poison or asphyxiate you. Only trained professionals should enter a septic tank.**

Before buying a lot

Before you buy a lot, know exactly where the boundaries are. Then determine the most desirable location for your home and the best place for the soil treatment system. Remember that steep slopes, ponds, and marshy areas will cause construction and drainage problems. Make soil borings at the proposed sites for the house and soil treatment system. Be particularly concerned about evidence of a high seasonal water table in the soil. A percolation test does not give you the information necessary to determine the water table. The percolation test only has the ability to tell how well the soil will accept water. At some times, the water table can be observed in the boring holes. Other times, the only evidence of a high seasonal water table may be mottled (spotted or streaked) soil that is colored several shades of red and grey. For help in evaluating the soil suitability for a building site and sewage treatment system, contact your local office of the Soil Conservation Service. Before finalizing any purchase contract, check with the local zoning office to see whether you can get a building permit, including a permit to install an onsite sewage treatment system.

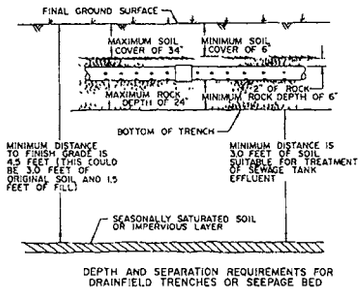
Location of Septic Tank

Item	Minimum Setback Distance
Property Lines	10
Buried pipe distributing water under pressure	10
Building	10
Water supply wells or buried water suction lines	50

Location of Soil Treatment System

Item	Setback Distance
Water supply well less than 50 feet of casing and not encountering 10 feet of impervious material	100
Any water supply well or buried water suction pipe	50
Building	20
Streams, Lakes or other bodies of water (Shoreland Management Act)	50,75,150
Property lines or buried pipe distributing water under pressure	10

Trees: Where disposal trenches are constructed within 10 feet of trees 6 inches or larger in diameter or dense shrubbery, or where it can be reasonably anticipated that such vegetation will be present during the life of the system, at least 12 inches of drainfield rock shall be placed beneath the distribution pipe. (7080.0170, Subp.2.C.8, Page 24)



DEPTH AND SEPARATION REQUIREMENTS FOR DRAINFIELD TRENCHES OR SEEPAGE BED

You cannot install an in-ground soil treatment unit where seasonally saturated soil would be closer than 3 feet to the bottom of the proposed soil treatment system. If such a possibility exists on the entire lot, it will be necessary to haul in clean sand and construct a mound system. You will need a lift pump in a tank located beyond the septic tank if the location of the soil treatment system is higher than the sewage tank outlet.

Extremely coarse soil, such as sand and gravel, cannot filter out the fine solids and bacteria from sewage tank effluent. Finer soil usually is present in the surface layers of soil, or it can be hauled to the site.

Extremely fine soil, such as clay, is an excellent filter, but it may be too tight to allow much sewage to pass through it. In addition, clay soils frequently have high seasonal water tables and therefore are not suitable for a soil treatment system. The most economical sewage treatment system is one in which the sewage can flow by gravity through the sewage tank and into a soil treatment system that is located where the soil is suitable for adequate treatment.

ADDITIONAL INFORMATION

More information is contained in the following Minnesota Extension Service publications. They are available from your county extension office or by writing to Distribution, 3 Coffey Hall, 1420 Eckles Avenue, University of Minnesota, St. Paul, MN 55108. There is a small charge associated with these bulletins.

AG-F0-0583—How to Run a Percolation Test
CD-F0-0797—Locating On-Site Home Sewage Treatment Systems
AG-F0-0817—Evaluating Soil Texture for a House Site

For price information, call the Distribution Center, Minnesota Extension Service: 612/625-8173.

Other sources of information include:

- Minnesota Pollution Control Agency
- Your county extension director
- Your county zoning administrator
- Extension agricultural engineers at the University of Minnesota
- Your local office of the Soil Conservation Service
- Minnesota On-site Sewage Treatment Contractors Association
- Minnesota Department of Natural Resources
- Minnesota Department of Health

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