

Onsite Wastewater Treatment & Disposal-System Maintenance

At one time an onsite waste water system was little more than a concrete tank and a pump that would take all the waste created in a house and send it out into the woods never to be thought of again. However, with more and more concern over protection of our precious ground water supplies this type of system is being replaced by more complex and environmentally friendly systems. Newer systems actually help reduce the amount of harmful bacteria in the liquid before it enters the groundwater. This provides a cost effective and efficient method of wastewater treatment for those who have chosen to trade the hustle and bustle of city life for the more relaxed rural pace.

This pamphlet was created specifically for homeowners who may be unfamiliar with how an onsite wastewater treatment system (OWTS) works. It is important to note that these systems are called Onsite Wastewater Treatment Systems and not just disposal systems. For the most part the old “Pump and Dump” systems are no longer being permitted because they do not treat the wastewater adequately. The newer systems, discussed in this document, provide treatment to the wastewater both before and after it is released from the septic tank.

The Saskatchewan Onsite Wastewater Disposal Guide

is available online at

<http://www.saskatchewan.ca/residents/environment-public-health-and-safety/environmental-health/plumbing-sewage>

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How an Onsite Wastewater Treatment System Works

The septic system depends on natural processes to treat waste: gravity separates solids and liquids; soils filter the wastewater by absorbing contaminants; and bacteria break down biodegradable materials. Grass roots also play a role by taking up liquid and using nutrients. In fact, a septic system is like a small underground ecosystem. Like any ecosystem, it has limits. If it gets drowned with too much water - or if it gets clogged up because of misuse or poor maintenance - or if it is poisoned with

contaminants it is not designed to handle - a septic system can present a serious health threat to homeowners and their neighbors. Waste, including nitrates, bacteria and phosphates can contaminate the underground water used for household wells or municipal water supplies. It can enter lakes and streams, or bubble up on the ground surface. But a properly designed, operated and maintained system can function very effectively for a long time.

A traditional onsite wastewater treatment system has three main components:

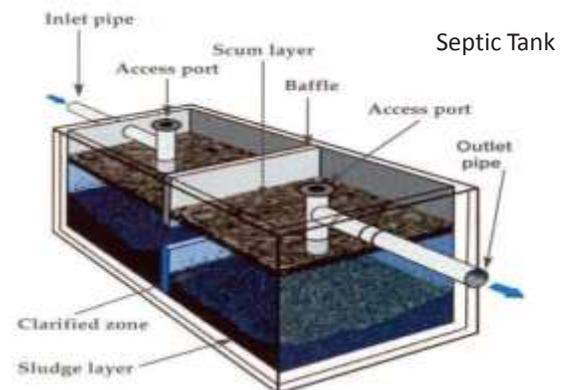
1. Septic tank

A septic tank is a large concrete or fiber-glass tank, divided into two compartments, with access ports at the top for inspection and service. Gravity will separate the waste into three layers:

- i. heavy materials, which settle to the bottom where they are broken down into sludge by naturally occurring bacteria
- ii. light soaps, greases, fats and similar materials, which rise to the top and form a scum layer, and;
- iii. liquids with some suspended solids.

Waste water from sinks, appliances and toilets flows from the house into the first compartment and pushes an equal amount of liquid from that first compartment into the second one -- In a gravity system, a siphon periodically activates and discharges liquid out of the second chamber and into the pipes leading to the leaching bed. For

a pressure distribution system, the second chamber will be periodically pumped to the distribution system. If the tank is properly operated and pumped out regularly, only the liquid effluent leaves the tank.



NOTE: Toxic gases, including methane and hydrogen sulfide, are produced by the natural treatment processes in septic tanks. These gases can kill in minutes. Extreme care should be taken when inspecting your tank, even when just looking in. Never enter a septic tank or try to inspect the tank alone. Contact a qualified professional to perform these duties.

2. Distribution System

A distribution system is a series of pipes leading from the septic tank to the leaching bed. It may include a distribution chamber to direct waste water evenly to all areas of the leaching bed. Traditionally these systems used gravity, but some sites use pumps to move effluent uphill from the septic tank.

Other systems also use pumps to distribute the waste water evenly over the leaching bed area and provide increased treatment capacity and system longevity.

3. Leaching Bed

A typical leaching bed is an arrangement of connected pipes with holes along the sides and bottom, surrounded by stone, gravel, or a chamber and properly draining soil or other filtering material. Liquid leaving the septic tank travels down the pipe, seeping through holes into the gravel and soil filtering materials. Oxygen-using bacteria breakdown "waste particles" and natural organisms form a "biomat" (a layer of organic material. If it becomes too thick, it can prevent proper drainage). In the soil filter (an extremely important component of the septic system) chemical, physical and bacteriological reactions remove most of the remaining solids and bacteria before the treated effluent meets the underground water table.

How to Properly Maintain Your Onsite Wastewater Disposal System

The first step in maintaining your system is to locate all the key components. For new homeowners this should be easy but for homebuyers of existing homes here are a few hints. Try and locate the permit either through the previous homeowners or the local health region. The permit should have a detailed site plan on it. If this is not available, even a professional may have trouble locating the system. In some cases the access (manhole) to your septic tank may be buried. One way to start looking is to go in the basement and determine the direction the sewer pipe goes out through the wall. Back outside, a contractor can use a probe inserted into the soil to locate the buried piping. Once the system components are found, be sure to sketch a map and keep it on hand to save time on future service visits.

Once you have located your system you must perform regular maintenance to ensure that the system will function properly. The septic tank should be cleaned when half of the initial liquid capacity is occupied by solids. Some tanks may need cleaning at two years or sooner. Every two years is a reasonable schedule for an average household.

It is not necessary to leave solids in the septic tank to "start" it again. The tank should always be completely emptied. However, scrubbing and flushing the tank until it is visibly clean may delay the re-establishment of its normal operation.

Additives:

While many products on the market claim to help septic systems work better, the truth is there is no magic potion to cure an ailing system. Some proprietary products that claim to “clean” septic tanks contain chemicals that may cause the scum and sludge to be discharged from the tank to the leaching bed. In essence, they change a simple maintenance item (regular pumping of tank) into a major system failure (clogged media/branch).

There are two types of septic system additives: biological (bacteria, enzymes and yeast) and chemical. At best, an additive is benign; it provides little to no benefit and it costs you some money. At worst, it can damage concrete and clog the soil; and products that contain solvents can contaminate the groundwater. The general consensus among septic system experts is that septic system additives are unnecessary, possibly harmful, and should not be used. The naturally occurring bacterial population in your tank does not need to be augmented for proper operation of your system. The best results come from a balanced and well-maintained system that is not overloaded or abused.

As a general rule, only three things should go into the septic tank: human wastes, toilet paper and waste from bathing fixtures and kitchen sinks. A simple rule of thumb, do not dispose of anything in your septic system that can just as easily be put in the trash. Remember diapers, sanitary napkins, cigarette butts, tampons, condoms, kitty litter are not biodegradable and thus will remain in your septic tank and cause more frequent pump-outs and possible system failure.

Physical Care:

Unless specifically designed for vehicle traffic, no portion of your septic system should be driven on. If your tank is in an area subject to traffic, install a barricade to prevent damage to the tank and/or risers.

In order to protect from freezing, the site should be kept covered during the winter months with at least 0.5 m of snow or straw bales when snow cover is inadequate. Grass cover should be established over the entire site. Shrubs or trees should not be planted on the top of site areas to prevent root interference/clogging.

Tenants:

If you rent your property, please make your tenants aware that your property is served by a septic system. You have a considerable investment in your septic system, don't take a chance on needing an expensive absorption field replacement.

What not to flush:

What you put into your septic system greatly affects its ability to do its job. The system is not designed to be a garbage can and solids will accumulate in the tank and, if not pumped out regularly, damage the system. In the kitchen, do not use a garburator. Avoid washing food scraps, coffee grinds, and other food items down the drain. Grease and cooking oil should also not be sent to the system.

In the washroom, do not flush plastics, paper towels, facial tissues, tampons, sanitary napkins, cigarette butts, dental floss, disposable diapers, condoms, kitty litter, etc. The only things that should be flushed are wastewater and toilet paper.

When used as directed by the manufacturer, many household cleaning products will not significantly affect the operation of the septic

tank. The exception is drain cleaners, where a small volume can significantly degrade your systems performance.

Modern Appliances That May Affect Your Septic Tank

Garbage Disposals

Garbage disposals can increase the amount of solids in the tank up to 50 percent and should not be used. Eliminating a garbage disposal can greatly reduce the amount of grease and solids that enter the drainfield. Because a garbage disposal grinds kitchen scraps into small pieces, once they reach the septic tank, they are suspended in the water. Some of these materials are broken down by bacterial action, but most of the grindings must be pumped out of the tank. As a result, use of a garbage disposal will significantly increase the amount of sludge and scum in your septic tank. Therefore, many provinces, including Saskatchewan, require a larger minimum size septic tank if there will be a garbage disposal unit in operation in the house.

Hot Tubs/Whirlpools

Hot tubs and whirlpools have become more common today in the home as a source of relaxation and therapy. While the soothing, swirling waters of a spa may be good for a homeowner, unfortunately, the large amounts of water that drain from the hot tub are not good for your septic system. Emptying large quantities of water from a hot tub into your septic system can overload a system and stir the solids in the tank, pushing them into the drainfield, eventually causing it to fail. Hot tub water should instead be cooled and then drained onto turf or landscaped areas of your property well away from the septic tank, drainfield, and house in accordance with local regulations.

Waste Heat Recovery Units

Waste heat recovery units are devices that are usually installed on the house drain stack. They heat the incoming potable water by removing heat from the wastewater. This effectively cools the waste leaving the home. As septic systems rely on bacteriological activity, which needs warm temperatures for maximum efficiency, these types of devices are not recommended. It is also expected that these types of systems will increase the possibility that a field will freeze in the winter.

Water Softeners

Some freshwater purification systems, including water softeners, needlessly pump hundreds of gallons of water into the septic system all at once. This can agitate the solids and allow excess to flow into the drainfield. Consult a plumbing professional about alternative routing for such freshwater treatment systems. Water softeners remove hardness by using a salt to initiate an ion exchange. The backwash to regenerate the softener flushes pounds of this used salt into the septic system. There is some concern that these excess salts can affect the digestion in the septic tank or reduce the permeability in the soil.

Tips to Minimize Water Use

- ❑ Water conservation is very important for septic systems because continual saturation of the soil in the drainfield affect the quality of the soil and its ability to naturally remove toxics, bacteria, viruses, and other pollutants from the wastewater. Following these simple steps will go along way in reducing the amount of water you use.
- ❑ Check to make sure your toilet's reservoir is not leaking into the bowl. Add five drops of liquid food colouring to the reservoir before bed. If the dye is in the bowl the next morning, the reservoir is leaking and repairs are needed.
- ❑ A small drip from a faucet adds many gallons of unnecessary water to your system every day. To see how much a leak adds to your water usage, place a cup under the drip for 10 minutes. Multiply the amount of water in the cup by 144 (the number of minutes in 24 hours, divided by 10). This is the total amount of clean water traveling to your septic system each day from the leak.
- ❑ Washing machines - by selecting the proper load size, you'll reduce water waste. Washing small loads of laundry on the large-load cycle wastes precious water and energy. If you can't select load size, run only full loads of laundry. A new Energy Star front loading clothes washer uses up to 35 percent less energy and up to 60% less water than a standard model.
- ❑ A septic tank must be watertight. Water entering from the surface runoff or groundwater will reduce the storage capacity for wastewater. Wastewater leaking from the tank can threaten groundwater quality. The tank should be installed in accordance with the manufacturers' instructions.
- ❑ Water purification systems (water softeners, purifiers etc.) can add hundreds of gallons of water to the septic tank. This can agitate the solids, which will plug filters and cause problems with your septic disposal system.
- ❑ Garbage disposal systems add unwanted grease and solids to the tank causing more frequent pump-outs.

Install low flow toilets and aerators on all taps in the house.

Signs of Trouble

There are several signs that indicate trouble with a septic system. Here are some of the major ones, with possible causes. If you notice any of these problems contact a professional OWTS contractor.

Toilets and sinks start to drain slowly:

- » Septic tank may be too full and need to be pumped out.
- » Plumbing vents may not be properly connected.
- » System may be partially blocked.

Extra plant growth over leaching bed area:

- » Too many suspended solids/nutrients may be entering the leaching bed, either because septic tank is too full or because wastewater flows from the house are too high, so solids are not getting a chance to settle in the septic tank.

Foul odours outside:

- » Wastewaters may be breaking out to the surface.
- » Plumbing vents may not be properly connected.
- » Cover of septic tank may not be properly sealed or covered with earth.

Foul odours inside:

- » Wastewater may be backing up into the home.
- » Plumbing traps may not be properly installed.
- » Electrical conduits for septic system pump chamber may not be properly sealed.
- » Pipe leading from house to septic tank may be broken, allowing wastewater to leak around foundations.

Wastewater backing up into home:

- » Leaching bed may be damaged or full.
- » Pipe beyond septic tank, or in distribution system may be blocked.
- » Pipe leading to septic tank may be blocked.

Effluent breaking out to ground surface:

- » Soil cover over pipes may not be deep enough.
- » Pipes may not be sloped properly.
- » Part of the leaching bed or distribution system may have settled or been lifted by frost heave so gravity cannot drain pipes properly.
- » Distribution system may be damaged.
- » Pipes and/or soils in leaching bed may be full and not able to drain properly.

It is recommended that persons buying or selling rural properties with private sewage systems make themselves aware of the requirements. One method of verifying that a system has been approved and installed under authority of a permit is with a Certificate of Approval. Under Section 12(1) of the Plumbing and Drainage Regulations a homeowner or permit holder may request a Certificate of Approval from the approving agency, which for private sewage systems is the Health Region.

A Certificate of Approval may be issued when a private sewage works is found to be satisfactory on final inspection. The regions maintain records of permits taken out and dates that the private sewage system was inspected. When requested, a file search is conducted for the property and, if a permit is found that indicates the system was inspected and approved, regardless of the date the system was installed, a Certificate of Approval is issued. It is important to note that a system that a Certificate of Approval will not be issued for unapproved systems or systems that were approved but not inspected.

In this manner, a new homeowner can be assured that they have purchased a property and private sewage system that met the standards at the time of construction.

Regional Health Offices

<http://www.saskatchewan.ca/residents/health/understanding-the-health-care-system/saskatchewan-health-regions/regional-public-health-inspectors>

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