



Septic Systems

On-Site Wastewater Treatment Systems

It's Your Property - Know Your Options!

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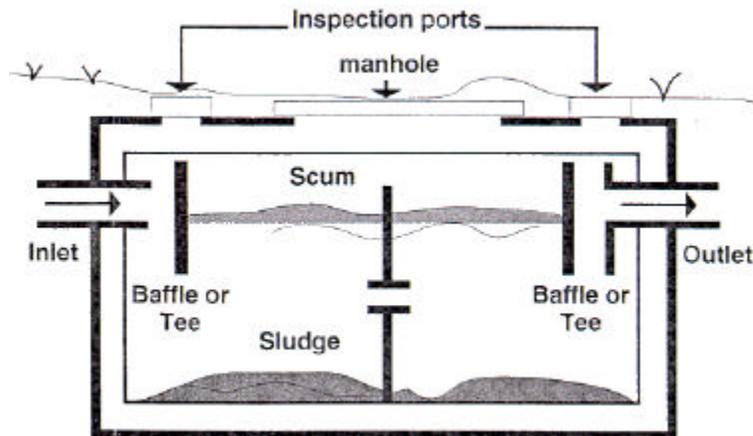
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(Cross section of a two-compartment septic tank)

SO... NOW YOU OWN A SEPTIC TANK

Nearly 25 million homes, which is almost 25 percent of the U.S. population depend on a private sewage treatment and disposal system known as a septic system.. Fifty percent of the population in North Carolina and 38 percent of the people living in Alaska use these systems.

One of the major differences between owning an urban or suburban home in the city and owning a rural home, is that in a rural home you must become more self-sufficient and self-reliant. Waste disposal (trash and wastewater) is one of the primary concerns of a rural homeowner. This includes how you treat the sewage coming out of the house, so it can be recycled back in to the environment safely.

The most common way to dispose of wastewater in rural homes is through the use of a septic tank. About 95 percent of the onsite disposal systems in the U.S. are septic tank systems, which basically consists of two parts: a treatment section and a disposal/recycling portion. There are many different kinds of septic systems, but the most common are "conventional or standard systems consisting of a tank and an underground pipe and gravel drainfield and the other common systems are Aerobic Treatment Units.

**based on 1990 census data*

MAINTENANCE AND MANAGEMENT

Different types of on-site wastewater treatment systems require different maintenance procedures. However, all systems need maintenance: Your's will fail if you do not maintain it. Follow the maintenance instructions provided for the equipment installed for your system. Just like you maintain your car, septic systems should be treated as an "appliance" which required basic maintenance to work properly.

SEPTIC INSPECTIONS

When a property is sold, the lending institution or new buyer require a septic system inspection. Although Texas does not require inspections by law, this information is vital to the lender and homeowner. It is in your best interest to have an experienced on-site professional perform the inspection. There are only 2 National Certification programs: the National Association of Wastewater Professionals (NAWT) and the Natl. Sanitation Foundation (NSF). For referrals, check with your county or T.O.W.A. and ask if nationally certified.

WHAT TO PUT IN

- Put all wastewater from your home into the septic tank. This includes all sink, bath, shower, dishwasher, and toilet flushings. Any of these waters can contain disease causing germs or environmental pollutants.
- MILD Soaps, detergents, bleaches, drain cleaners and other MILD household cleaning materials very seldom affect the operation of the system. However, use these materials in MODERATION.
- Use potentially system-damaging commercial bathroom cleaners in moderation. Many people prefer to clean their toilets, sinks, showers, and tubs with a mild detergent or baking soda.

WHAT TO KEEP OUT

- Do not use in-sink garbage disposals excessively or discard too much grease.
- Do not use the toilet as a trash can (ex. cleaning tissues, cigarette butts, diapers).
- Chemical additives are not necessary for a septic tank (some are harmful).
- If you have a water softener, do not send the back-flush water into your on-site wastewater treatment system.
- Do not pump the condensate drain from an air conditioning unit or commercial icemaker into the on-site system. This extra water can overload the system.
- Do not use chemical de-cloggers

HOW TO TELL IF CONTAMINANTS ARE REACHING THE WATER

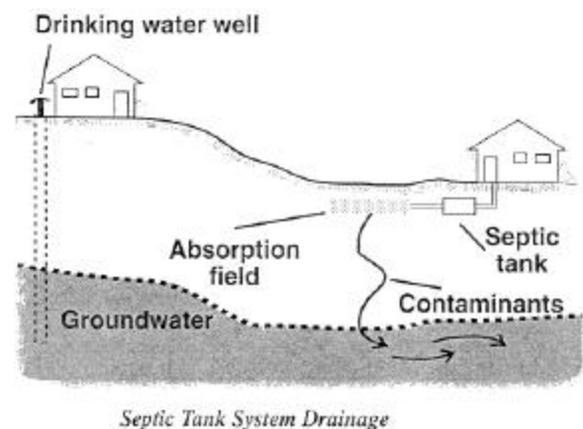
Look for these symptoms to determine if waste is reaching your surface water:

Excessive weed or algae growth in the water near your shore. Nutrients leaking from septic tank systems could be a major cause of this type of growth.

Unpleasant odors, soggy soil, or liquid waste flow over the land surface. These symptoms often indicate failure of the system and the need for repairing, expanding, or replacing the absorption field.

Health department test results indicate the presence of biological contamination. These tests may show the presence of harmful bacteria in the water. Although wastes from septic tanks are not the only source of these contaminants, they are likely suspects.

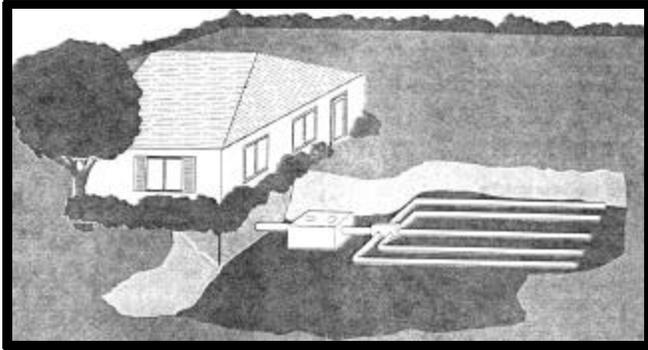
Indicator dye put into your septic tank reaches nearby ditches, streams, or lakes. Special dyes are available from your local health department that may help to find the problems that otherwise are difficult to notice. This method can help verify the other symptoms listed above. A conventional septic system consists of a septic tank, a distribution box and a drain field, all connected by pipes called conveyance lines.



GENERAL TIPS

- Do not treat an on-site wastewater treatment system as if it were a normal centralized sewer system (Items flushed down the toilet do not disappear).
- Have the septic tank cleaned before sludge accumulates near to the bottom of the tank's outlet device.
- Establish a regular schedule of cleaning the septic tank, every 2 to 3 years.
- Do not build driveways, storage buildings or other structures over the treatment works or its disposal field
- Do not drive heavy equipment over the components of a wastewater treatment system.
- Flooding of the absorption field with excessive water will keep the soil from naturally cleaning the wastewater, leading to groundwater pollution.
- Do not come into contact with liquid from the on-site wastewater treatment system unless it has been disinfected.
- Do not allow electrical services to be interrupted to an on-site wastewater treatment system that has mechanical components or alarms.
- Maintain a grass cover over the drain field.
- Divert any rainwater coming off of driveways, other hard surfaces and the roof, away from the drain field.
- Excessive wastewater flows can overload the on-site wastewater treatment system.
- Leaking faucets and toilets need to be fixed. Low-flow devices will help reduce the wastewater volume.
- Do not pump the condensate drain from an air conditioning unit or commercial icemaker into the on-site system. This extra water can overload the system.
- To achieve an average flow change your personal habits that send too much water continually or on a single day, or install a system that can manage more wastewater.

SEPTIC TANK / DRAIN FIELD



(Conventional Septic System)

Conventional septic systems have traditionally been the most commonly used technology for treating wastewater. These systems use gravity to treat and distribute wastewater in the soil. They have the lowest cost and require the least amount of maintenance, which is generally limited to periodic pumping of the septic tank.

A conventional septic system consists of a septic tank, a distribution box and a drain field, all connected by pipes, called conveyance lines.

Your septic system treats your household wastewater by temporarily holding it in the septic tank where heavy solids and lighter scum are allowed to separate from the wastewater. This separation process is known as primary treatment. The solids stored in the tank are decomposed by bacteria and later removed along with the lighter scum by a septic tank professional.

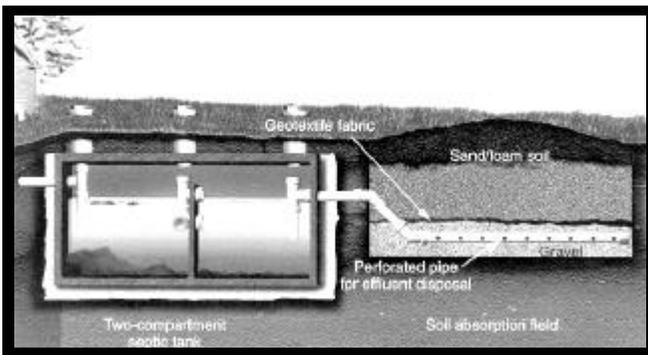
After the partially treated wastewater leaves the tank, it flows into a distribution box, which separates this flow evenly into a network of drain field trenches. Drainage holes at the bottom of each line allow the wastewater to drain into gravel trenches for temporary storage. Then the waste matter slowly seeps into the subsurface soil where it is further treated and purified (secondary treatment). A properly functioning septic system does not pollute the groundwater.

Advantage:

- They are usually the most inexpensive.

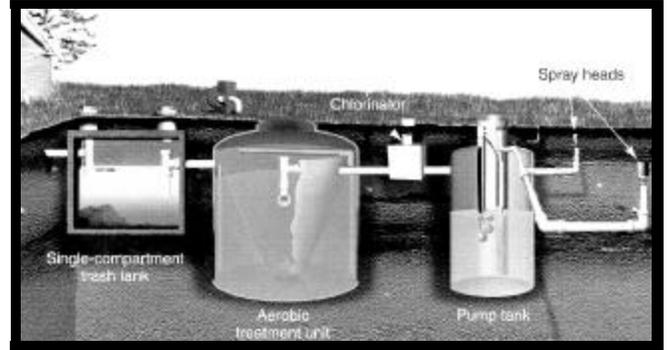
Disadvantage:

- They cannot be installed in clay, soil, rock, or any soils that become saturated during wet periods of the year, or soils with a high water table.



(Septic tank and soil absorption field)

AEROBIC TREATMENT UNIT



(Aerobic Treatment Unit)

Aerobic units treat wastewater for homes and small businesses using the same process, only scaled down, as our municipal wastewater treatment systems use. They remove 85 to 95 percent of the organic material and solids from the wastewater, producing effluent as clean as that from municipal wastewater treatment plants, and cleaner than that from conventional septic tanks.

4 Main Components of the Process:

- **Pretreatment tank or "trash tank"** that removes materials that microorganisms (microbs) cannot break down.
- **Aeration chamber**, which aerobic microbes decompose waste into the water.
- **Settling chamber**, commonly called a clarifier, which provides a place where the microbes that have been treated in the wastewater to settle out of the water.
- **Land application system**, which distributes the wastewater into the soil for final treatment and disposal/reuse.

Advantages:

- The system can be delivered pre-built and only has to dig 1 hole, reducing prep time.
- Fiberglass tanks are easily carried to installation site.

Challenges:

- Must be water tight to prevent ground water from entering

Design

First determine the amount of daily wastewater flow from the home or small business. The Texas Natural Resource Conservation Commission maintains a list of Class I aerobic treatment units approved for sale in Texas, which have been tested and certified according to National Sanitation Foundation International Standard 40 policies for wastewater treatment devices.

Second, choose a Class I aerobic unit with a rated treatment capacity of more than the amount of flow expected from the residence. (See Table 1 on page 4)

Tip: The size of systems for restaurants and other facilities with strong wastes should be calculated by using both the quantity and organic strength of the facility's wastewater. Base the system size on the greater of these two factors.

(Continued on page 4)

(Continued from page 3)

Guidelines For Maintenance of an ATU

- Keep electricity going to the aerobic treatment unit.
- Maintain the spray heads in the system.
- If an alarm sounds, call your maintenance provider. Also, reduce nonessential water use in the home until the system is fixed.
- Maintain a landscape cover in the spray field.
- Most disinfection systems use chlorine tablets. Disinfection is very important; without it, untreated wastewater will spray on the ground.
- If the wastewater smells bad when it is being distributed, ask the maintenance provider to evaluate all system components.
- Sending too little waste into the system can also affect it. (Ex. Vacationing for two weeks lowers the microbe population by reducing the food supply entering the system. Returning home and washing 10 loads of laundry can flush out what population is left with all the laundry water). After a period of low system activity, the microbe population needs time to rebuild so it can function well.
- If the aerobic unit uses a spray distribution or subsurface drip distribution system, you need to keep a maintenance contract in force.

Water Flow Rate

Number of bedrooms	Square footage of house	Flow rate from house (with water saving devices) gal/day	Flow rate from house (without water saving devices) gal/day
1 or 2	less than 1,500	180	225
3	less than 2,500	240	300
4	less than 3,500	300	375
5	less than 4,500	360	450
6	less than 5,500	420	525

Table 1. Wastewater flow rates for single-family residence of various sizes.

How to Keep the ATU Working

The maintenance provider should perform these tasks:

- Monitor the trash tank to determine the amount of solids accumulating in the tank. Have the tank pumped on a schedule similar to a septic tank pumping an interval of every 2 to 3 years.
- Periodically remove some of the solids in the aeration chamber.
- Check the air pump to make sure the air flow rate entering the aeration chamber is constant.
- As maintenance is usually done when the homeowner is not home, they should utilize punch cards or some other record method to show when they have checked units.

GETTING A PERMIT

Selecting the appropriate system for the site conditions is critical to the system's success. If you select the wrong system or design, it is installed improperly, or is improperly operated or maintained, the system can fail, which can result in pollution of your property, that of others, and you can also be fined.

9 Steps in the Process:

- Step 1: The site and soil are evaluated
- Step 2: Choose a sewage treatment system
- Step 3: Create a design plan for the system
- Step 4: Submit application and planning materials to the permit authority
- Step 5: Permit authority reviews the application and planning materials
- Step 6: Permit authority grants an authorization to construct
- Step 7: Build the system
- Step 8: Permitting authority inspects the system
- Step 9: Permitting authority issues a notice of approval or license to operate

Obtaining a Permit

Before building, altering, extending, or operating an on-site sewage facility, a person must have a permit and have approved plans from the TNRCC or its authorized agent.

Enforcement and Penalties

Texas House Bill 1875, passed in 1987, which gives regional and local enforcement with approval of the TNRCC. A homeowner can be subject to criminal penalties for not following proper procedures or for using a failed septic system. The licenses or registrations of certified installers, apprentices, site evaluators and designated representatives may be suspended or revoked for:

- Violating OSSF laws or regulations
- Submitting false documents or information
- Other causes such as fraud or deceit
- Failing to use reasonable or professional judgment in performing their duties

For Further Information, Contact:

*To check if your installer is a TOWA member, visit: www.txowa.org or call 512-494-1125



Texas On-Site Wastewater Association • <http://www.txowa.org>
 Texas Agricultural Extension Service • <http://www.agpublications.tamu.edu>
 Texas State Soil and Water Conservation Society • <http://www.tx-swcs.org>
 Texas On-Site Wastewater Treatment Research Council • <http://www.towtrc.tamu.edu>
 Texas Natural Resource Conservation Commission • <http://www.tnrcc.state.tx.us>
 USDA Water Quality Demonstration Projects • <http://www.agry.purdue.edu>
 National On-Site Wastewater Recycling Association • <http://www.nowra.org>
 American Decentralized Wastewater Association • <http://www.adwwa.org>

