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Home & Environment

Keep the 'Dirty Dozen' Out of Your Onsite Sewage System (Septic Tank)

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Many homeowners rely on onsite sewage systems (septic tanks and absorption fields). And every year, many of these systems fail because their owners put substances into them that the system was never meant to handle — these failures can be costly.

This publication should help Hoosiers make better decisions about what should and should not be disposed of in an onsite sewage system. We'll look at a dozen items you should always keep out of your onsite sewage system. But first, it may be worth describing how such systems work.

If you have an onsite sewage system, you are managing a treatment plant that breaks down and disposes of hazardous waste from the home. It is important to protect both yourself and the public. While an onsite sewage system appears simple — a tank in the ground with a pipe coming from it to dispose of wastewater — it is a complex system that relies on many factors, including how you use it.

At its most basic, a functioning onsite sewage system continues the digestive process that began in the human gut. Inside a septic tank, the products of human digestion separate into three layers.

The first layer is an indigestible sludge that sinks to the bottom of a tank. A second layer of fats, oils, and grease float to the top of a tank. The third layer is the organic-rich liquid effluent, which is between the sludge layer and the layer of fats, oils and grease.

You must have all these materials removed periodically. In a properly sized septic tank, human and water waste should remain in the tank for at least two days of treatment before the effluent moves into the absorption field. In a properly designed and installed system, the effluent (the middle layer) leaves the tank and spreads evenly across an adsorption field for final treatment. In the absorption field the effluent passes through at least 24 inches of aerated, oxygen-rich soil to filter out harmful constituents and allow aerobic microorganisms to consume the remaining organic matter and pathogens.

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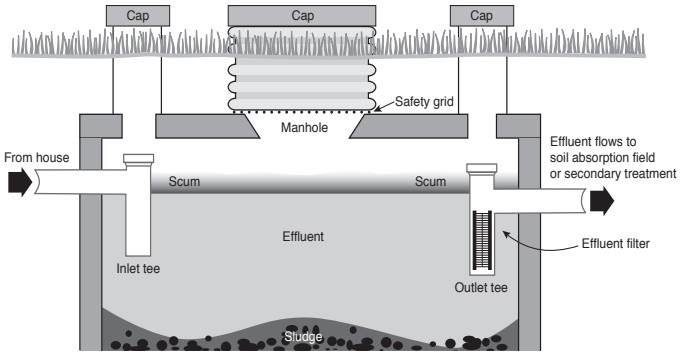

This illustration shows a cross-section of a typical septic tank.

With the right kind of treatment, onsite sewage systems return safe byproducts to the environment and recycles water. But this seemingly simple system can easily go awry. Just as a central wastewater treatment plant requires careful management to be successful, so does an onsite sewage system.

One of the best ways to maintain the maximum effectiveness of your onsite system is to avoid placing substances in the tank that will negatively affect the waste treatment process.

The only things that should go into a septic tank are: human waste from the toilet, wastewater from the tub or shower, wastewater from the laundry process, and some limited kitchen waste.

Scientists who study onsite system design and performance have observed that certain products can interfere with the system's function. Here are the dirty dozen that you should always keep out of your system to keep it running properly.

1. Personal Care Products

The microorganisms in a septic tank cannot readily break down bath and body oils. Consequently, these products become part of the fat, oil, and grease that floats on top of the effluent in a tank. If you use a lot of bath oils, you will need to have your septic tank cleaned more frequently than designed.

Other items to look for are cosmetic products that contain microbeads. Microbeads are tiny balls of plastic (10 micrometers to 5 millimeters in diameter). Microbeads are often used in exfoliating skin products and toothpaste.

The concern is that many outlet filters in sewage systems cannot adequately trap these tiny plastic balls. They can then move out of the tank and into the soil absorption field. Because many microbeads are not degradable, they will eventually clog the soil pores that are so vital to moving effluent through the aerated soil for final treatment. Fortunately, microbeads have been banned for rinse-off cosmetics in the United States since July 2017.

2. Cooking Fats, Oils, and Flour

It is very difficult for an onsite sewage system to adequately process fats and cooking oils. Likewise, they have a hard time processing large quantities of flour and other baking components. The typical home onsite sewage system may be inadequate to deal with a large volume of cooking and baking.

3. Solid Waste

When a professional opens a septic tank lid to clean it, you almost always can see a number of objects floating on top of the fats, oils, and grease. Sometimes these items are humorous, but they are filling the septic tank, which means it would require more frequent cleaning and could even fail.

Garbage disposal residue is a source of real concern. By its nature, a garbage disposal adds undigested material to a septic tank. At least human waste enters a septic tank partially decomposed, but solid waste does not. The undigested material will challenge even the most ambitious colony of microorganisms. Using a garbage disposal shortens the interval between septic tank cleanings by approximately 30 percent. A disposal will create an unnecessary extra expense and strain on the system.

Many other solid waste items can affect an onsite sewage system's ability to function. Common items include cigarette butts, cat litter, coffee grounds, cotton swabs, disposable diapers, personal wipes (whether flushable or not), paper, and feminine hygiene products. Solid waste does not degrade in a septic tank and must eventually be removed as part of the cleaning process. A septic tank is not a trash can, and any solid waste that enters the tank will remain there until it is removed.

You should even choose your toilet paper carefully. We recommend using single-ply toilet paper rather than two-ply, because most toilet paper becomes sludge, so the less you use, the better for your system.

4. Dishwashers and Soap

Most people use low quantities of dishwashing products, so they do not generally present a problem. However, liquid dishwashing soaps are more septic system-friendly than powdered soaps. Although using dishwashers is usually not a concern, it is important to schedule dishwashing for times that avoid other high-water-use household activities to reduce stress on the onsite sewage system.

In the event of a sewage system failure, the surfactants found in many dishwashing products can affect water quality if the system releases the effluent to a surface waterway. Another issue arises with soaps that are particularly effective on grease; they may disturb the balance between fats, oils, and greases in the tank and the effluent.

The dishwashing products that make grease more soluble will pass the effluent into the absorption field with little, if any, degradation by microorganisms. Instead of grease getting separated and stored in a septic tank, where is will be removed by cleaning, the grease will pass on into the absorption field, which can create more difficult conditions for the microorganism to treat the effluent aerobically.

5. Laundry Products

Bleach does an excellent job of cleaning clothes. Bleach is also a highly effective germ killer, which means it kills the microorganisms that make an onsite system work. If you use bleach at reasonable levels on a limited basis, the anaerobic microorganisms in a septic tank should be able to recover. However, using bleach excessively or using bleach without diluting it can seriously reduce the bacteria in a septic tank. Too much bleach can lead to a "dead" tank that does not treat waste, but merely collects it, which can lead to septic system failure.

You should also be aware of fabric softeners you add to the washing machine (and don't flush dryer sheets either). Fabric softener can dissolve the sludge at the bottom of the tank. When it does, that organic matter remains in the effluent, which means more organic matter must be treated in the absorption field. When excess organic matter accumulates, it forms a biomat on the bottom and sides of the absorption trench, which prevents effluent from entering the soil. This can lead to premature system failure.

Powder laundry detergent contains an inert solid carrier that is not broken down during the washing process. The solid inert material leaves the washing machine along with the wastewater and slides to the bottom of the septic tank, adding more sludge. Because microorganisms do not consume sludge, using powder laundry detergent will require more frequent sludge removal. If you do not have sludge removed in a timely manner, the system can fail.

6. Disinfectant Cleaners

Like bleach, cleaners (especially cleaners the EPA identifies as disinfectants) are toxic to anaerobic microorganisms and can reduce septic tank effectiveness.

Cleaning products like household ammonia are great sanitizers and should cause no lasting harm if used within labeled concentrations. But take care when you dispose of extra quantities beyond what is actually used for cleaning. Dumping a dose of disinfectants down the drain all at once can be harmful. The good news is that microorganisms can bounce back due to the periodic renewal of sewage flowing into a septic tank.

Another product to avoid is an "every flush" toilet bowl cleaner. These products release a shot of chemicals that kill sewage-eating organisms each time you flush. The microorganism population can probably recover, but they can be a concern with a stressed onsite sewage system that is close to failure. Similarly, spray shower cleaners are very efficient for cleaning, but they can harm septic tank organisms.

Finally, there is a rising concern about the continual use of antibacterial soaps. Certainly, the population of microorganisms in a septic tank can bounce back, but why introduce another potential stress to an onsite system?

7. Drain Cleaners

Drain cleaners designed to dissolve grease and break through clogged plumbing are potentially very corrosive to pipes and toxic to septic tank microorganisms. When used according to label directions, drain cleaners should not cause lasting harm to the septic treatment process. In the short term, however, even a relatively small amount of crystal drain cleaner can be quite harmful to organisms in a tank. Fortunately, the microorganism population can be rebuilt in relatively short order, but excessive and frequent use of drain cleaners is a cause for concern.

8. Organic Solvents

It might seem unlikely that someone would dispose of paint thinner, gasoline, charcoal lighter fluid, antifreeze, or pesticide in an onsite sewage system. But many newer homes have a sink in the garage connected to a septic tank. If you don't think about how an onsite sewage system works, you might think you can efficiently dispose of solvents down the drain. Nothing is further from the truth. These items are very toxic to the organisms that provide the treatment in an onsite sewage system. In addition, septic systems do not break down organic solvents, which can be a serious source of contamination in the area around the home.

9. Paint

Oil and water do not mix, so it seems intuitive that you shouldn't wash oil-based paint down the drain. Latex paint, on the other hand, is water soluble, so people often wash it down the drain during the cleaning process. Because you can clean brushes with water, it seems plausible to dispose of extra paint by washing it down the drain and into a septic tank.

Like other non-digestible products, septic tank microorganisms cannot break down paint — whether oil-based or latex. Paint residue floats in the fats, oils, and grease layer in the tank. Paint can also clump into balls. Excessive paint can require more frequent cleanings, and in some cases, it can cause failure because it clogs outlets. Instead of disposing of paint down the drain, always take paint to a hazardous waste facility that is capable of safe disposal.

10. Heavy Metals

Most of the heavy metals found in an onsite sewage system are derived from older plumbing. This is particularly true for copper pipes and lead solder. Replacing older pipes is a good solution.

Heavy metal may also be present in a number of household products. Lead-based paint is one possibility. While lead paint is no longer used, some painted surfaces may remain in older structures, and paint chips may find their way into a septic system.

Many cosmetics and shampoos contain heavy metals. The heavy metals in these products are a minor component, so are deemed safe in the United States. Other nations have banned the use of heavy metals in cosmetics. As a consequence, alternatives may be available.

The good news for onsite sewage systems is that heavy metals are, for the most part, in the sludge, and can be removed and treated elsewhere. The soil absorption field will trap any heavy metals that remain in the effluent. Heavy metals are of greatest concern if a septic system fails and deposits raw effluent into a surface waterway.

11. Pharmaceuticals

Never flush any unused or expired medications down the toilet. Even when people take medications, some of it winds up in an onsite sewage system. Water quality studies show that medications can be very persistent in the environment. Dumping full-strength, unused medicine into a septic system only exacerbates the problem.

Individuals going through chemotherapy should also be careful, because a majority of the active ingredients in the cancer-fighting drugs will pass through the patient and into the onsite sewage system. These chemicals can kill microorganisms in an onsite sewage system.

12. Illnesses

Vomiting adds undigested food to an onsite sewage system. Much like a garbage disposal, vomit contains undigested food that can overload the microorganisms in a septic tank and cause problems in the rest of the system.

Occasional bouts with the flu and other related issues should be well within the usual limits of the design of an onsite sewage system. However, vomit from a person fighting cancer, however, could be a concern. Not only does this frequently add undigested food, it also exposes microorganisms to toxic chemotherapy drugs.

Summary

Living in a home with an onsite sewage system has its challenges. Like anything else in modern life, however, if you do what has to be done, when it needs to be done, it will all work for the best. If you are not careful about what goes into your onsite sewage system, you will not be pleased with the outcome. Fortunately, by monitoring what you allow to go down the drain or toilet, you will be rewarded with extra years of life from your onsite sewage system.

More publications in the *Home & Environment* series are available from the Purdue Extension Education Store, edustore.com.

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