



Septic Tank 101

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The following Primer is intended to provide cottage owners with some general information on how a septic tank works and how best to maintain it in working order.

Size of Tank

Your septic tank was likely properly designed to meet the needs of your cottage when it was first built and the tank was installed. If you expand the number of toilets and sinks or install a dishwasher or washing machine or shower you may push your tank past its ideal working capacity.

A septic system is designed to treat a set volume of waste water. Every time water goes down the drain into your septic tank, the same amount of liquid leaves the tank and enters the leaching bed. If too much waste water enters the tank, from extra guests, heavy water use - too much waste is forced out, too soon. Untreated waste water escapes, including solids that can clog up pipes and/or enter the leaching bed.

The following chart provides a guideline on the size of tank required to handle various sizes of cottages/users (number of bedrooms and number of water using fixtures).

Number of Bedrooms	Required tank size if less than 25 fixture units*	Required tank size if more than 25 fixture units*
2	2700 litres / 600 gallons	4000 litres / 900 gallons
3	3600 litres / 800 gallons	4500 litres / 1000 gallons
4	4500 litres / 1000 gallons	6000 litres / 1320 gallons
5	4500 litres / 1000 gallons	7000 litres / 1500 gallons
6	5000 litres / 1100 gallons	7500 litres / 1650 gallons
7	6000 litres / 1320 gallons	8000 litres / 1800 gallons

***Definition of fixture units**

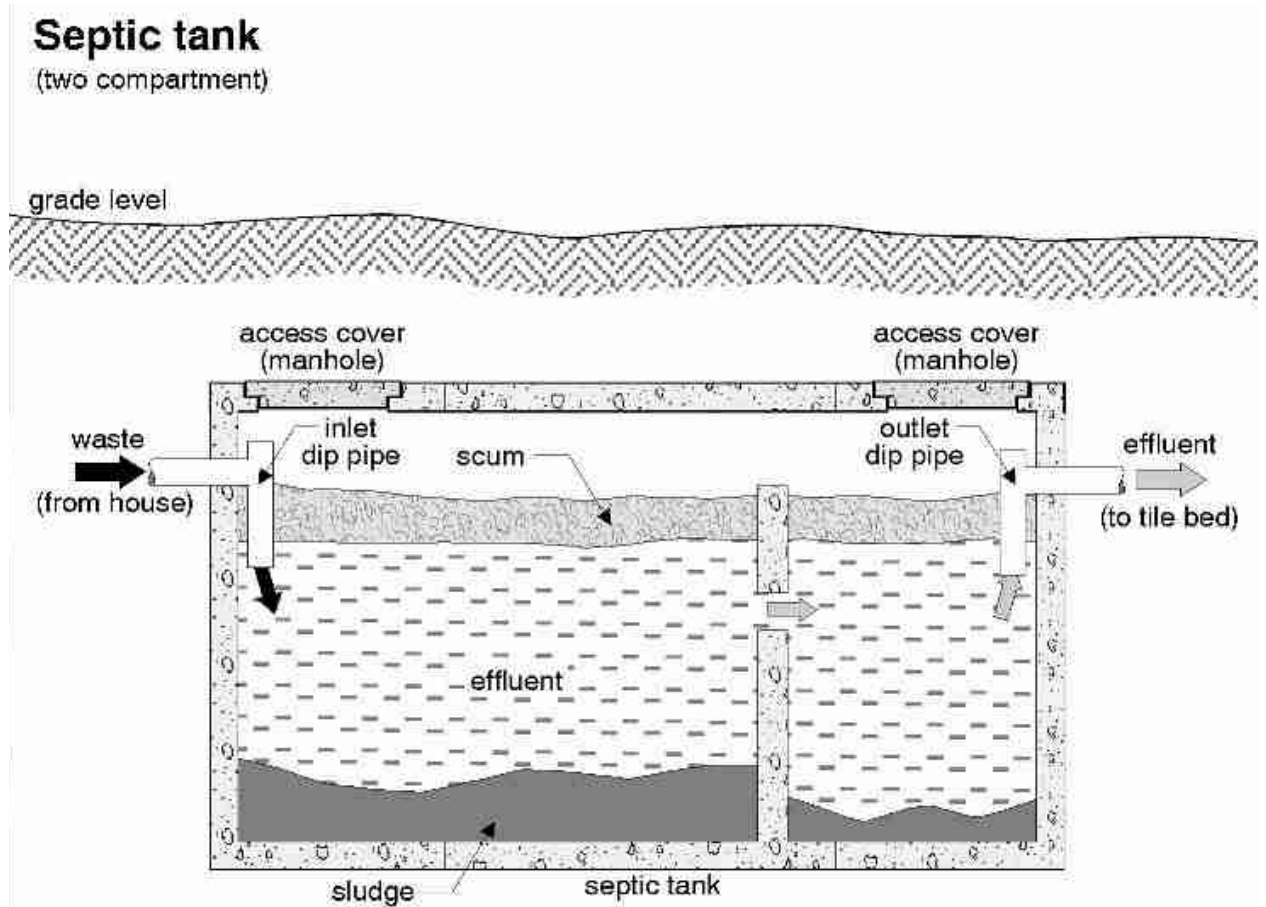
- Toilet
- Sink (per compartment)
- Bath tub (with or without shower)
- Shower stall
- Dishwasher (separate discharge from sink)
- Washing machine or laundry tubs
- Hot tubs and whirlpools evaluated individually

Source: Muskoka Water Web

If you have a tank that is under sized for your current situation you should be extra careful on how much water you put down the drain. Install water saving showerheads, faucets, toilet dams, etc.

Septic Tank Profile

The following diagram shows a cross section of a typical two compartment septic tank. The most important lid to locate and be able to access is the one closest to the house (inflow end). This leads to the main chamber of the tank where most solids and scum build up.



There will be three layers of substance in most septic tanks. There will be a floating scum layer at the top, an effluent layer in the middle and a sludge layer at the bottom.

The scum includes oil and grease which, if pushed into the leach field, will clog that component of the septic system.

The sludge layer at the bottom of the tank is made of sunken organic material.

Septic Tank Maintenance

Sewage is broken down by millions of bacteria and enzymes in your septic tank and soil within the leaching bed. That bacteria are harmed or killed by (1) cleaning products that are antibacterial, non-biodegradable, chlorine-based, or have high or low pH (acidic or alkaline products like toilet bowl cleaners) and/or toxic; and (2) hazardous products like varnish, paint, pesticides, and gasoline. There are many materials that can't be digested by your septic system. Fats, grease, and oils don't break down, and form a scum layer at the top of your septic tank. Paper products, coffee grounds, hair, tampons, and other common sewage items inhibit the work

of bacteria and quickly fill tanks. These can clog the system significantly hampering your septic system's effectiveness.

Determining When it is Time for a Pump Out

How often you will need to pump out your septic tank will depend on how much you use it and what you put in it. This could be as short as a few years to many years. The most reliable way to determine if your septic tank is working properly and if it is time for a pump out is to lift the lid(s) on the tank and look inside. Doing this in the spring when you open your cottage is an ideal time for many reasons. Then you will need to measure the depth of the sludge and scum as a percentage of the entire contents of the tank.

One way to do this is to take a long slender stick or pipe of approximately 8' in length (for most applications). Loosely wrap the bottom 2' of the stick with cheesecloth (or paper towel or old cloth) and secure the cheesecloth to the stick at the bottom, middle and top with plastic wire ties, string or mechanics wire. The key is NOT to wrap it tightly around the stick.



To measure the depth of the scum layer, push the stick cheesecloth side down through the scum layer until it just breaks through the layer. Pull the stick up and measure the length on the stick from the bottom of the stick to where on the stick the top of the scum layer was noted. Many times you will see some of the scum layer stuck to the stick to identify the top of the scum layer.



To measure the depth of the sludge layer and the total depth of all of the contents of the tank, slowly lower the stick with the cheesecloth downward into the septic tank until the stick rests on the bottom of the septic tank. When the end of the stick is on the bottom of the tank, take note of where the top of the sludge layer is on the stick.

Slowly and gently move the stick back and forth and side to side about 2" in each direction to allow the solids to flow into the cheesecloth. Slowly draw the stick out of the septic tank. Measure the length of the line of solids that are imbedded into the cheesecloth. This is the depth of the sludge layer.

Add the depth of the sludge layer to the depth of the scum layer and divide it into the depth of all of the contents of the tank to determine the percentage of sludge and scum to the total contents. The septic tank should be pumped out when the total depth of scum plus sludge layers equals one-third of the depth of the total contents of the tank.

Maintenance of Leaching Beds

Effluent from the septic tanks is dispersed into the environment through a series of pipes that make up a leaching bed. It is critical to keep these pipes clean and unobstructed so that fluids are spread evenly into the surrounding soil. Do not plant or allow trees or shrubs within three metres of the tank or bed. Roots will seek out and crack your pipes. Raspberry bushes tend to love leaching beds but their roots systems are a real problem. Plant shallow rooted ground covers including grass and wild flowers on and around the leaching bed. If you see water pooling near the outflow from your septic tank it is an indication that there is a blockage in the leaching pipes and they may need to be replaced.

Septic Systems and Water Quality

Phosphorus is considered to be the nutrient most responsible for killing the natural ecological balance of freshwater lakes by supporting a dense plant population, which deprives the lake of oxygen. Wastewater from homes and cottages contains phosphorus from human waste, food and certain soaps and detergents. Septic systems rely on the interaction of air, microbes and soil in the leaching bed to try to deal with phosphorous and other nutrients and pollutants. Some phosphorous is *adsorbed* onto the surface of soil particles. Some phosphorous is *precipitated*, a process in which minerals such as calcium, iron and aluminum react with the phosphorous solution to form highly insoluble phosphorus. Other methods of phosphate removal include uptake by plants and biological immobilization; however, in the case of on-site disposal systems, these two processes are believed to be insignificant because the disposal field lies underneath the biologically active upper soil region. The soil in the leaching bed can get saturated with phosphorous as can the soil in the adjacent natural soils. If and when that happens phosphorous can leach into the water at the shoreline threatening the ecosystem we all enjoy.

To minimize this risk, cottagers should;

- Avoid using soaps and detergents that contain phosphorous (Trisodium Phosphate (TSP) dishwashing detergents and most industrial cleaners contain high amounts)
- Be mindful of you water use to avoid overloading septic systems (particularly during high cottage use periods – i.e. long weekends with visitors)
- Pump out the septic tank as appropriate (see above)

Sources and Additional Resources

Ontario Onsite Wastewater Association - <http://www.oowa.org>

Federation of Ontario Cottagers - info@foca.on.ca

Muskoka Watershed Council –

www.muskokawatershed.org/programs/best-practices-program/septic-systems

University of Guelph -

http://www.uoguelph.ca/orwc/Resources/documents/care_and_feeding.pdf