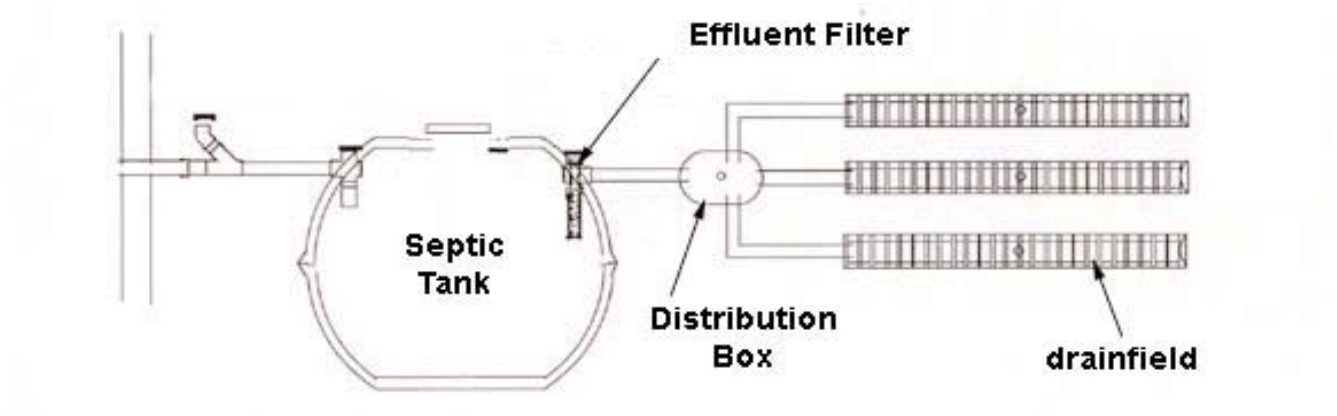

# Technical Sales Information

A septic system is technically known as an **Onsite Sewage System**. Urban areas generally collect residential household sewage and through an array of pipes, manholes, lift stations, transport this sewage to a sewage treatment plant. This plant filters out debris and provides oxygen to help biologically decompose the sewage. In some cases there is a system in place for recycling sewage otherwise it ends up in the landfill.




An onsite sewage system for rural housholds has basic components, each having their own function to transport or treat sewage. The first component; the septic tank is known as primary treatment and is available in a vast array of shapes, sizes and materials. The septic tanks sole purpose is to separate solids and liquids and is always 9/10's full.

TANK SHAPE: The shape DOES NOT MATTER as long as the capacity is sized right and the distance from the inlet to the outlet (sewage travel) is 4 feet. There is a myth that long tanks are best, once again, if the sewage travel is greater than four feet other things come into play, such as the speed the sewage goes through the tank (sewage velocity) which also has a bering on the mechanical separation of solids and liquids. Here is the trade off: the shorter the sewage travel the wider the tank and therefore a lower velocity. The lower velocity allows greater mechanical separation.....shape does not matter.

TANK SIZE does matter. The time the sewage remains in the septic tank is called retention time. It has been generally accepted that the required retention time is three days. This makes the sizing of a tank easy. Take the daily flow of household sewage for a three bedroom home (300 gallons) and multiply by three and you get the correct working capacity for the tank. Since a tank always has a 10% air space, the actual tank capacity is 10% more than the stated capacity of the septic tank. A 1000 gallon septic tank actually has a total capacity of 1100 gallons.

The daily flow is based upon the number of household bedrooms:

**Minimum Design Flow gal/day (tank size)**

1 and 2 bedroom unit up to 1,600 sq. ft. 250 gal/day (750 gal)
3 bedroom unit up to 1,885 sq. ft. 300 gal/day (900 gal)
4 bedroom unit up to 2,530 sq. ft. 375 gal/day (1125 gal)
5 bedroom unit up to 3,175 sq. ft. 450 gal/day (1350 gal)
6 bedroom unit up to 3,820 sq. ft. 550 gal/day (2200 gal)

One other thing to note is that although most engineering designs are made in US gallons, because most of the pumps are manufactured in the US; tank capacities in Canada are in Canadian gallons.

There is a consideration that splits many designers of septic systems, and that is tank compartmentation. At first glance one may think that a two compartment tank is a better design. There have been years of study on compartmentation and the research clearly shows that the treatment ability of a tank is based upon the size of the primary compartment. There is no advantage to having a second compartment, in fact a two compartment tank must be pumped out more often, making it a bad environmental choice.

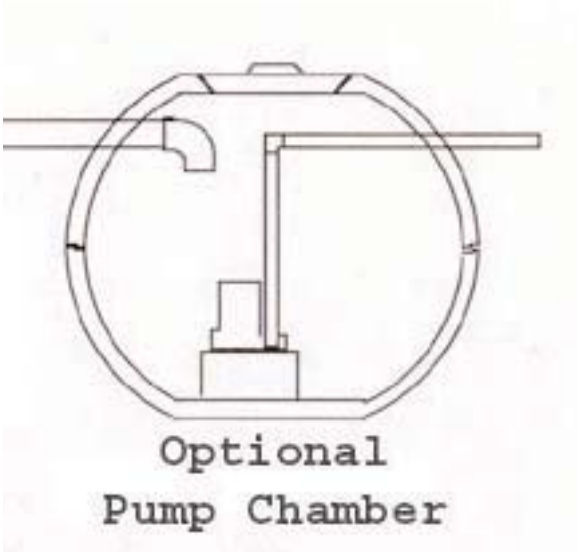
## Single Compartment Tank = Best Value = Green Choice

You would not drive a car around without an air filter and now every new septic tank installation since 2005 requires an effluent filter. This device fits in the outlet of the septic tank and filters out large suspended solids. A septic field would last forever if clear water was put through the system; eventual failure is caused by small solids plugging up the drainfield. Although a novel idea, Turtle Tanks developed their own stainless steel effluent filter in 1996, over a decade ago.

Materials for septic components vary from concrete to fibreglass to polyethylene and each has specific advantages and disadvantages; which is why we offer the spherical configuration in all three. Concrete is the least expensive followed by poly. So here is the deal, every solid material exhibits a plastic characteristic called cold flow. If you measured the thickness of a window at the bottom and the top, you would find the bottom to be thicker because cold flow has let the material bulge at the bottom. If you took a fibreglass canoe and set it on some sawhorses; a month later it would have a big bow in it due to coldflow. Even concrete shows signs of coldflow. So the problem with coldflow is that polyethylene products with a thin wall design will show substantial distortion in the shape due to coldflow. Manufacturers has combated this with designs that have substantial ribbing with the result that the tanks can weigh so much that two men cannot lift them. So our recommendation is to use polyetheylene tanks for shallow burial only.

**Water Table is just below top of tanks.**

Another technical problem with tanks is floatation. Anyone in the septic business for many years will have experienced or seen a tank float up from high water table. It is not a pretty sight! A concrete Turtle Tank will not float in a high water table...even if empty. This is is one of the specific selling features of concrete Turtle Tanks since traditional concrete square tanks will float. Here is an installation by a beach in Summerland BC, Canada that required tanks to be installed in a high water table beside Okanagan Lake.

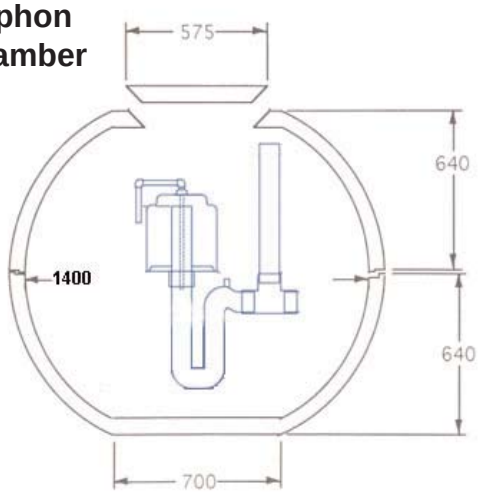



The next component of a septic system may be the optional PUMP CHAMBER or LIFT STATION.
In the event the effluent must be elevated to the drainfield there must be a pump system to force the effluent from a smaller storage tank to the field.

For pump life these pumps like to run a couple times a day; for field life the septic field likes to get a large dose of at least 100 gallons.

The designer usually sizes the pump chamber and the activating floats so the system kicks in 2 or 3 times a day.

**Siphon Chamber**




In the event the system is larger and the effluent is travelling to a drainfield that is lower than the tank; then a SIPHON CHAMBER would be used.

After leaving the Septic Tank the effluent must be distributed to the drainfield. The DISTRIBUTION BOX evenly disperses the effluent to each leg of the drainfield. There are a variety of innovative devices (speed-leveler) that may help a more even distribution.

Speed Leveler makes it easy to get even flow from the distribution box.

## Drainfield Options

The ultimate challenge for the drainfield is to disperse the continuous flow of effluent from the distribution box. This can be from percolation through the soil or evaporation or providing water for vegetation. Most of the innovations in septic systems (outside of the Turtle Tank design) have been in new drainfield components. The common gravel in trench has been replaced by septic chambers, which have a greater "surge capacity." The diagram shows that for each running foot of field the septic chamber has more void space to allow a greater amount of effluent to be stored while it percolates and evaporates away. There are other advantages such as there is no "stone shadow" which is the problem of drainrock covering the infiltrative surface of the trench. There are long term technical issues with septic chambers that have increased the popularity of the latest innovation; Synthetic Aggregate.

All that styrofoam that was clogging up the landfill can now be used as a substitute for drainrock.

Most urban / rural areas in North America are witnessing a short supply of aggregate which also points to the logistical action of recovering styrofoam to be used as drainrock. Turtle Tanks has its own proprietary process for taking virgin waste EPS styrofoam and turning it into “Synthetic Aggregate.”

That covers the basics of septic systems from a technical sales perspective, you can always send a quick question by email which would be returned promptly.

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Jim Ripley

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The Turtle Man

# Turtle Tank Accessories

TTA-EF110Y | TTA-EF110W | TTA-EF110R | TTA-EF110B

use as shown

TTA-EF4

TTA-EF6

TTC-DB3
TTC-DB5
TTC-DB7

TTP-DB3

TTP-DB5

TTP-DB6

TTP-DB8

TTP-SL4

TTP-SL3

TTP-DBRL
TTP-DBIP

TTP-DBR11

TTP-DBR16

TTC-R6
TTC-R12

TTA-BS

TTP-RLL

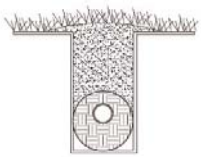
TTA-EP

TTA-SP

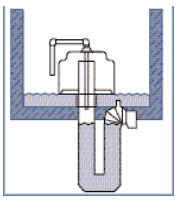
TTA-MJC

TTA-MJS

TTA-MSS TTA-MST

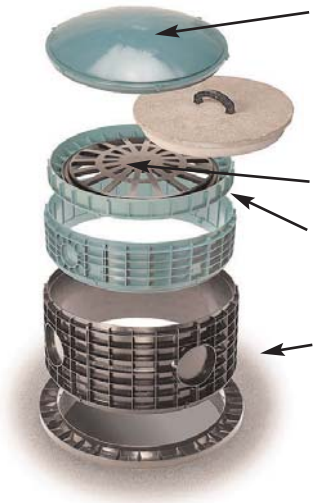


TTFA-EF12P
TTFA-12
(no pipe)



TTA-S417

TTA-FC



Riser Lid - TTP-RL
(Molded-in gasket)

Concrete Lid - TTC-RLP
(special order)

Safety Lid - TTP-RSL

Safety Pan - TTP-RSP

6" Tall Riser - TTP-R6

12" Tall Riser - TTP-R12

Tank Adapter Ring - TTP-RAR
Adapt to existing concrete tank.

**Waterproof Sealer:** TTA-WP Brush or Spray on Urethane Sealer