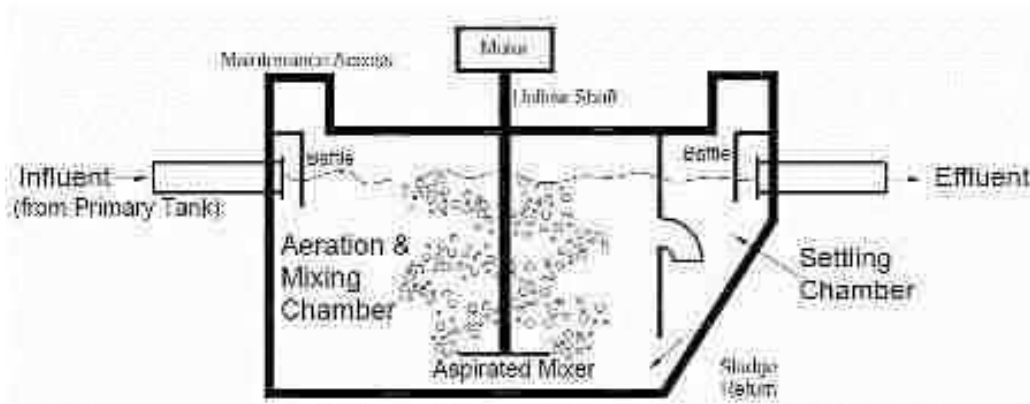


Types of Septic Systems & Septic Designs

Taken from: InspectAPedia
Free Encyclopedia of Building & Environmental Inspection, Testing, Diagnosis, Repair



Types of septic systems: onsite waste disposal system types.

This septic system design reference lists and describes all of the types of septic systems, including both conventional septic tank and drainfield systems and alternative septic system designs for difficult building sites such as wet sites, steep sites, rocky sites, limited space, bad soils with no percolation or sandy soils with too fast percolation, and other difficult site conditions. We provide detailed articles about each alternative septic system design choice, listing its features, design requirements, inspection details, maintenance needs, product sources.

We include links to septic design engineers, advanced septic system products and septic design books and building codes. This document is a chapter provides in our Septic Systems Online Book.

Definitions of Septic System Types & Onsite Wastewater Treatment Alternative Designs



Daniel Friedman, Massachusetts Title 5 Licensed Septic System Inspector, & New York State H.I. License # 16000005303 (inception to 2008).

This document catalogs conventional and alternative septic system designs and provides links to detailed descriptions of these designs for onsite wastewater treatment.

"Septic System Alternative Designs" refers to any onsite wastewater disposal method other than the widely used conventional septic tank and leach field. In the U.S. most states require that an "alternative septic system" be designed by a professional and submitted to the local health department for approval.

Examples of advanced septic designs include aerobic septic systems, chemical, composting, incinerating & waterless toilets, evaporation-transpiration (ET) septic systems, septic media filters, greywater systems, holding tank septic systems, mound septic, raised bed septic, pressure dosing septic systems, sand bed filters, peat beds, constructed wetlands, wastewater lagoons, constructed wetlands, and septic disinfection systems.

Also see [SEPTIC SYSTEM INSPECT DIAGNOSE REPAIR](#) - home.

Each of the links below presents a document with more in-depth information about each of these alternative septic system designs.

Septic Tank Types

Septic tanks are responsible for retaining solid waste in a residential onsite wastewater treatment system (septic system), and for partial treatment of sewage and septic effluent

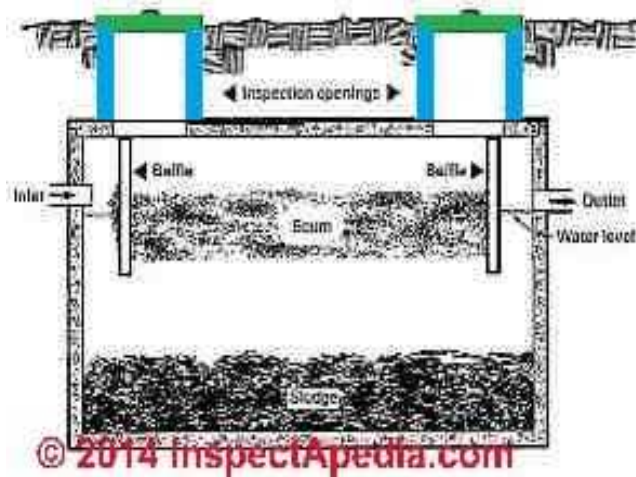
to improve its sanitation. In a typical conventional septic tank waste water is treated to about 40% of total treatment required before discharge to the environment.

The remaining effluent treatment normally occurs in the soils around and under the drainfield or absorption system. Some more advanced or alternative-design private septic systems achieve much higher levels of treatment by oxygenation (aerobic septic systems), chemical treatment (disinfection systems), or other methods. See [SEPTIC SYSTEM DESIGN ALTERNATIVES](#).

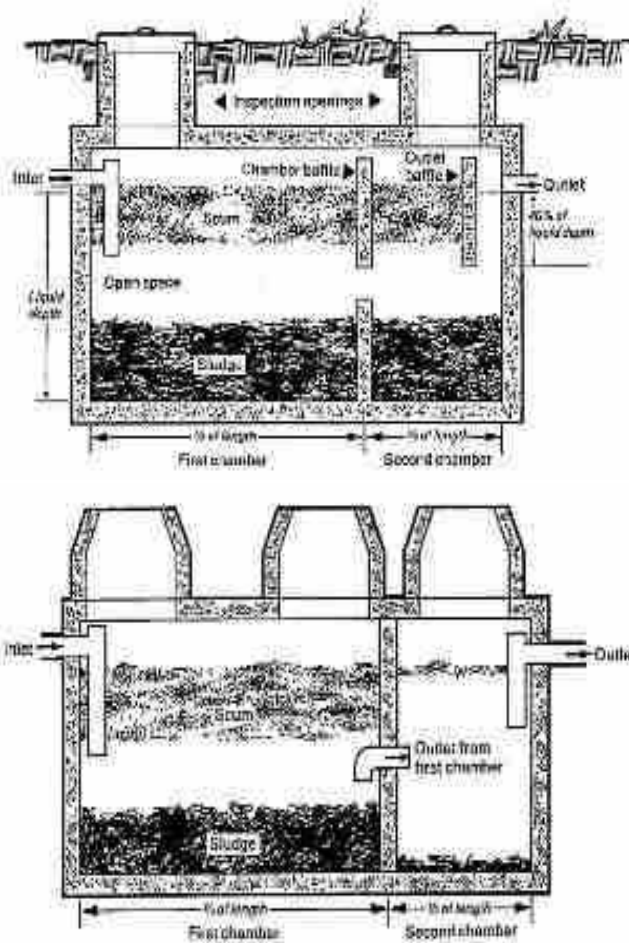
Septic tanks of Single vs. Multiple Compartments

More septic tank compartments means that solid waste (floating scum, settled sludge) are better-separated from septic effluent before it is discharged to a drainfield. Below we illustrate single compartment (below left) and two-compartment (below right) septic tank designs. Image source: USDA.

Advanced treatment septic tanks may use more compartments, including a final pumping chamber, as well as other features such as aerobic systems (shown at the top of this page), media filters, or effluent filters that both improve the level of wastewater treatment and also improve the life expectancy of the absorption field or drainfield.



You may also notice that our septic tank shown above has inlet and outlet baffles constructed of concrete while the septic tank below shows an inlet baffle constructed using plastic pipe - a common repair method if septic tank baffles are damaged.



This USDA sketch of a different two-compartment septic tank design illustrates how additional compartments can help retain solid waste in the septic tank and improve the quality of wastewater discharged to the drainfield or soakaway bed or absorption bed.

Septic Tank Materials & Construction



Typical septic tank materials of construction include

- Home-made site-built, using concrete blocks, stone, or even in on occasion wood; often we find such tanks are unsafe, under-sized, and short lived. See [HOME MADE SITE BUILT TANKS](#). Wood septic tanks should not be used.
- Poured concrete, normally reinforced, rectangular, on occasion round. See [CONCRETE SEPTIC TANKS](#)
- Steel, round or rectangular, various profiles including low-profile for shallow-depth rocky sites; extra risk of rust-out, leaks, unsafe covers, lost baffles. Depending on soil conditions, a steel septic tank can rust through in as few as five years, and typically last less than 20 years. See [STEEL SEPTIC TANKS](#)
- Fiberglass - wide range of sizes and shapes. See [FIBERGLASS / PLASTIC SEPTIC TANKS](#)
- Plastic - wide range of sizes & shapes. See [FIBERGLASS / PLASTIC SEPTIC TANKS](#)

Basic septic system designs are discussed in the articles listed just below

Basic septic tank and drainfield systems are discussed at [SEPTIC SYSTEM DESIGN BASICS](#).

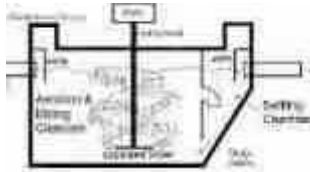
Here are some more detailed articles about basic septic system design, installation, inspection, maintenance, cleaning or pumping, & repair.

- [SEPTIC SYSTEM DESIGN MANUAL - Online](#)
- [SEPTIC SYSTEM, HOME BUYERS GUIDE](#)
- [OUTHOUSES & LATRINES](#)
- [ALTERNATIVE & WATERLESS TOILETS](#)
- [TOILET TYPES, CONTROLS, PARTS](#)

Alternative or Advanced Septic System Design Types (for Difficult Sites)

- Alternative septic system designs & products, typically used at difficult sites, are at [SEPTIC SYSTEM DESIGN ALTERNATIVES](#)

Also see this discussion of the most common alternative septic system besides mounds or raised bed designs:



- **Aerobic Treatment Septic Systems:** in residential use, ATUs are pre-packaged septic treatment systems which are in essence a mini-wastewater treatment plant for home use. Waste is fed into a "trash tank" (similar to a septic tank); effluent moves to a clarifier. Air (oxygen) is pumped through the system to provide oxidation and waste treatment using a variety of designs.
- Aerobic septic system treatment units (ATUs) are used at sites where a conventional drain field system cannot be employed, and are capable of successful wastewater treatment of septage on difficult or "impossible" residential sites. See [AEROBIC TREATMENT SEPTIC SYSTEMS](#) and also see [AEROBIC SEPTIC SYSTEM DISINFECTION](#) - Use of calcium hypochlorite tablets for aerobic septic systems. (Do not use pool chlorine tablets)

Definitions of Types of Septic Systems, Toilets, Components

- **CHEMICAL TOILETS:** use a chemically treated reservoir located directly below the toilet seat. The chemicals reduce odors and perform partial (incomplete) disinfection of the waste. Chemical toilets have limited storage capacity and must be pumped and periodically cleaned by a septic company.

Similar to simple chemical toilets but more sophisticated in design are recirculating toilets which separate the waste from the chemical and then re circulate the fluid through the toilet tank. Also see [ALTERNATIVE & WATERLESS TOILETS](#).

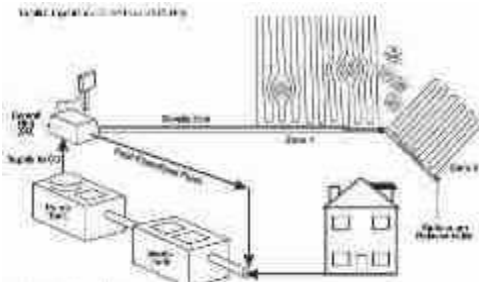
- **COMPOSTING TOILETS:** may be used where the water supply is limited or not available at all, or where a building owner for other reasons wishes to conserve water use. Other wastewater treatment will still be required for handling graywater from sinks and showers. Also see [ALTERNATIVE & WATERLESS TOILETS](#) for details.
- **AEROBIC CONTINUOUS FLOW, Suspended Growth** - The activated sludge process is an aerobic suspended-growth process that maintains a relatively high population of microorganisms (biomass) by recycling settled biomass back to the treatment process.

The biomass converts soluble and colloidal biodegradable organic matter and some inorganic compounds into cell mass and metabolic end products. The biomass is separated from the wastewater through settling in a clarifier for recycling or wasting to sludge handling processes. Preliminary treatment to remove settleable solids and floatable materials is usually provided by a septic tank or other primary treatment device. Most onsite designs are capable of providing significant ammonia oxidation and effective removal of organic matter.

- [DISINFECTION SEPTIC SYSTEMS](#): use chlorination or ultraviolet light (UV) to disinfect wastewater effluent before it is discharged to the environment.
- **Dosing Systems, Pressure or Gravity**: Dosing septic systems permit the septic system drain field to rest between effluent doses and, depending on design, may alternate use of drainfield sections. Two broad types of dosing systems are Gravity-Dosing (effluent flows from an effluent tank to the absorption system by gravity) or Pressure-Dosing (effluent is pumped from a dosing chamber to the absorption field). See [GRAVITY DOSING SEPTIC SYSTEMS](#)

and [PRESSURE-DOSED DRAINFIELD SEPTIC SYSTEMS](#) for details.

- **Drainfields**: a generic term for septic effluent disposal, usually referring to "conventional-design" septic leach fields or septic leaching beds, leach fields, septic gravity trenches, septic leach lines, septic seepage beds or septic system drainaway fields. See [SEPTIC DRAINFIELD SIZE](#) for design specifications for septic drainfields.



- [DRIP DISPERSAL SEPTIC TANK EFFLUENT SYSTEMS](#) - (Jantrania/Gross wastewater system type III or if treated to level 2 or better effluent, Jantrania/Gross wastewater system type VII). Septic effluent is distributed to the soil by a drip system that flows by gravity from through a series of perforated pipes or porous piping material. Note that effluent may *enter* the drip system from a pump and pumping chamber however.
- [DISINFECTION SYSTEMS, SEPTIC EFFLUENT](#) for septic system designs. The process of disinfection destroys pathogenic and other microorganisms in wastewater. A number of important waterborne pathogens are found in the United States, including some bacteria species, protozoan cysts, and viruses. All pretreatment processes used in onsite wastewater management remove some pathogens, but data are scant on the magnitude of this destruction.
- [EVAPORATION-TRANSPIRATION \(ET\) Septic Systems](#): and Evapo-Transpiration Absorption Septic Systems (ETA) dispose of septic effluent from the septic tank by providing a surface area intended to allow the effluent to evaporate. ET systems depend entirely on evaporation while ETA systems make use of both evaporation and (limited) soil absorption of septic effluent. (Jantrania/Gross wastewater system type IX if effluent is treated to level 2 or better).

ET beds may be used with or without intermediate storage tanks and with or without

effluent recycling systems. In this discussion of evaporation/transpiration septic systems we include the advanced [Tafgard SOIL BASED WASTEWATER TREATMENT SYSTEMS](#) - developed in Japan by Taisei Kogyo Co., Ltd., this system uses a combination of a five-chamber waste treating septic tank designed by Taisei, effluent disposed-of by an evaporation-transpiration system through aerated soil (effluent spread horizontally and upwards from distribution piping).

- Filter bed effluent treatment septic systems (if treated to level 2 effluent or better, Jantrania/Gross wastewater system type VIII) - see various filter media types listed here such as sand beds, fabric filters, etc. Filter beds may be [MOUND SEPTIC SYSTEMS](#) or

[RAISED BED](#) septic systems,

[MEDIA FILTER](#) septic systems, septic systems or

[SAND BED](#) filter septic systems.

Readers should distinguish between types of septic filter beds (listed above) and other septic filter products such as [SEPTIC FILTERS](#) used at or in the septic tank or seepage pit.

- [FIXED-FILM PROCESSOR](#) septic system designs (FFS) are biological treatment processes that employ a medium such as rock, plastic, wood, or other natural or synthetic solid material that will support biomass on its surface and within its porous structure.

At least two types of fixed-film systems may be considered--those in which the medium is held in place and is stationary relative to fluid flow (trickling filter) and those in which the medium is in motion relative to the wastewater (e.g., rotating biological disk). A third classification includes dual-process systems that encompass both fixed and suspended biomass together or in series. This approach is covered in Fact Sheet No. 1 on continuous-flow suspended-growth aerobic systems (CFSGAS).



- [GRAVELLESS SEPTIC SYSTEMS](#) or "no rock" or "chamber" systems are not a complete alternative onsite wastewater design. Rather these are special products using geotextiles, plastic chambers, or polystyrene-wrapped perforated piping for effluent disposal into the soil, providing alternatives to conventional gravel-trench drainfields.

In some cases these systems might permit design of an acceptable effluent disposal system where a site too little space for a conventional drainfield, or where gravel is

unavailable or is very expensive. Some gravelless systems are accepted for use in areas with difficult or low-perc soils.

- [GREYWATER SYSTEMS](#): refer to systems which reduce the liquid effluent load on a septic system by separating greywater (or graywater) from sinks and showers from blackwater (black water) from toilets. When we inspect a home which uses a separate drywell to handle greywater we presume that the owners discovered that their septic system, or at least its leach field, was of limited capacity or life. Also see [ALTERNATIVE & WATERLESS TOILETS](#).
- [GRAVITY or SIPHON DOSING SEPTIC SYSTEMS](#): move septic effluent from the septic tank to a final effluent treatment/dispersal/disposal system such as a drainfield by accumulating septic effluent in a dosing tank or chamber and periodically sending the "dose" of effluent to the drainfield.

To move effluent from the dosing tank to the drainfield a "gravity" dosing system uses a mechanical device such as a bell siphon system, tipping tank, or float valve to determine when the dosing tank is full and ready to send effluent to the drainfield at intermittent frequencies or in "doses".

Effluent flows from the dosing tank to the drainfield by gravity. Gravity/siphon dosing systems usually require a larger effluent holding tank or chamber than pressure dosing systems. While some gravity dosing systems do not require electricity to operate, other "gravity" dosing system designs which place the dosing tank uphill and distant from the septic tank, can require an effluent pump to move wastewater from the septic tank to the remote dosing chamber/tank. Dosing systems permit the drain field to rest between doses and, depending on design, may alternate use of drainfield sections.

- [GRAVITY TRENCH SEPTIC SYSTEMS](#) is a generic term to describe distribution of septic effluent into a treatment and dispersal/disposal system using perforated pipes buried in gravel-filled trenches dug into the soil.

An example is the conventional septic drainfield but gravity trenches can be used in other designs such as with gravity or pressure dosing systems. Gravity trench effluent systems may also be designed for "level 2 or better" effluent treatment (Jantrania/Gross wastewater system type V). Septic gravity trenches and their design specifications are discussed in detail at [SEPTIC DRAINFIELD SIZE](#).

- **Greenhouse treatment** of septic effluent to level 3 or better (Jantrania/Gross wastewater system type XI). Greenhouses, like ET beds, may be used with or without storage tanks and effluent recycling systems. The system uses an enclosed "greenhouse" constructed around plants and a mini "constructed wetlands" to treat effluent.

Greenhouse wastewater treatment systems permit maintaining the treatment system at a higher temperature than otherwise might be possible, such as in a cold or cool climate area.

Also see [Constructed and Natural](#)

[WETLAND SEPTIC SYSTEMS](#)

and

also [LAGOON SEPTIC SYSTEMS](#)

- [HOLDING TANK SEPTIC SYSTEMS](#): use a sealed tank to hold household waste and wastewater until the tank can be pumped out by a septic pumping company.

Most jurisdictions do not permit septic holding tanks as a permanent wastewater handling method for full-time occupied residences, but holding tanks may be permitted during new home construction and in other special cases. In New York State we've seen holding tank systems in use on small-lot properties located along the Hudson River. Generally such systems will not be acceptable for full time occupied residences as even a large tank of several thousand gallons will require frequent and costly pumping and disposal.

- [INCINERATOR TOILET SYSTEMS](#): incinerating toilets use electricity or gas to burn the waste placed into these systems. Like chemical toilets and holding tanks they have limited capacity, are used where water is not available or must be conserved, and they do not address the handling of remaining graywater from sinks and showers.

My favorite of this type was the "Destroylet" incinerator toilet which was electric/propane fueled and which is no longer on the market. Each flush resulted in a more than 10-minute burn cycle which produced a pretty smelly exhaust. See [ALTERNATIVE & WATERLESS TOILETS](#) for details about all types of waterless toilet systems.

- **Inspection and Testing of septic systems** is discussed at [SEPTIC DYE TEST PROCEDURE](#) and at [SEPTIC FAILURE SIGNS](#)
- [LAGOON SEPTIC SYSTEMS](#): also known as "pond systems" for onsite wastewater treatment are less often found in use for single family residential wastewater treatment. A residential lagoon system may use a conventional septic tank, but effluent from the tank flows to a storage pond or lagoon for further treatment.

Lagoon systems require comparatively large land areas and are more likely to be found therefore in rural areas or where a common wastewater treatment system has been designed to serve multiple dwellings. Also see [CONSTRUCTED WETLAND SEPTIC SYSTEMS](#)

- [LATRINES](#), Latrine or simple trench systems, useful in remote and impoverished areas to improve sanitation and thus the quality of drinking water and other special, extremely low-cost waste handling, wastewater treatment systems are ignored by most modern texts on onsite wastewater treatment, excepting perhaps military manuals which address field toilets and sanitation for military operations. This topic needs considerably more attention as a step in assisting rural, poor areas in developing nations.

Articles, illustrations, and text contributions are wanted; additions to this special topic will be provided as they are developed at this website. Inadequate disposal and treatment of human and animal waste in poor areas is a major cause of dysentery and often high infant and child mortality.

Meanwhile see the helpful but inadequate resource sketches at http://www.africanwater.org/ecosan_main.htm"the African Water Page and Ecological Sanitation" and <http://peacecorps.mtu.edu/erda/links.htm> a peace corps site on composting latrines

- [LOW COST SEPTIC SYSTEMS](#) - suggestions for improving sanitation when a home has no septic tank and no septic system and where money is scarce.
- [MEDIA FILTER SEPTIC SYSTEMS](#): use a conventional septic tank followed by any of several methods to further filter and treat septic effluent before it is discharged to the soil, soil surface, or waterway. Treatment is by both actual filtration and ultimately by a biochemical process as the filter "matures" and includes its own biomass.

Both natural media filter septic systems (such as sand, gravel, or peat) and synthetic media filter septic systems (foam cubes, glass, slag) are used. See these septic media filter design articles

- [BAT MEDIA SEPTIC PLANTS](#) - biologically accelerated treatment septic system designs - BAT systems
- [DOSING CONTROL for SEPTIC MEDIA SYSTEMS](#)
- [FOAM CUBE SEPTIC MEDIA FILTERS](#)
- [PEAT SEPTIC MEDIA FILTERS](#)
- [RUCK® SEPTIC MEDIA FILTER SYSTEMS](#)
- [SAND FILTER SEPTIC DESIGN SPECIFICATIONS](#)
- [SAND SEPTIC MEDIA FILTERS](#)
- [SEPTIC MEDIA FILTER CAPACITY & MAINTENANCE](#)
- [SEPTIC MEDIA FILTER SOURCE LIST](#)
- [SEPTIC MEDIA FILTER SYSTEM OPERATION](#)

- [SINGLE PASS vs RECIRCULATING SEPTIC MEDIA FILTER DESIGNS](#)
- [TEXTILE SEPTIC MEDIA FILTERS](#)
- [TYPES of SEPTIC MEDIA FILTER MATERIALS](#)
- [MOUND SEPTIC SYSTEMS](#): a wastewater absorption trench system which has been constructed using "suitable soil-fill material" which has been placed on top of the natural soil on a building lot. Mound systems are often confused with "raised systems" (see below) but have different design requirements, are generally smaller in total size, and depend on the fill material for successful wastewater treatment. Also see "Raised Systems" below.
- [OUTHOUSES & LATRINES](#) - Outhouses, or latrines or simple trench systems, useful in remote and impoverished areas to improve sanitation and thus the quality of drinking water and other special, extremely low-cost waste handling, wastewater treatment systems are ignored by most modern texts on onsite wastewater treatment, excepting perhaps military manuals which address field toilets and sanitation for military operations. This topic needs considerably more attention as a step in assisting rural, poor areas in developing nations.

Packaged Onsite Residential and Small Commercial Septic Systems

- **PACKAGED ONSITE RESIDENTIAL SEPTIC TREATMENT SYSTEMS**: complete packaged onsite wastewater treatment systems can produce sufficiently cleaned and treated wastewater that these systems may be permitted where local regulations would not permit a conventional septic tank and absorption field. These packaged wastewater treatment plants are sold in sizes and designs suitable for residential and other smaller, non-commercial installations.

Check with your local building department and local septic engineers. Some aerobic treatment units or ATUs may also meet this specification. Some example suppliers of packaged onsite wastewater treatment systems are listed here:

- Delta POD Series™ ECOPOD® Advanced Wastewater Treatment, for individual residential installations, cluster designs, and small-to-medium commercial applications. Delta Environmental, , 8263 Florida Blvd., Denham Springs LA 70726, USA, Tel: 800-219-91283, Website: <http://www.deltaenvironmental.com/ecopod.asp>
- NSF / ANSI 40: Residential Onsite Systems, described by NSF, worldwide offices, NSF International P.O. Box 130140 789 N. Dixboro Road Ann Arbor, MI 48105, USA e info@nsf.org p +1 734 769 8010 f +1 734 769 0109 Toll Free USA +1800 NSF MARK (800 673 6275)

NSF/ANSI 40 is a standard for residential wastewater treatment systems with rated capacities between 400 and 1,500 gallons (1,514 and 5,678 liters) per day. We can evaluate any kind of system, regardless of treatment technology, in test facilities in the U.S., Canada and Europe.

To achieve certification, treatment systems must produce an acceptable quality of effluent during a six-month (26-week) test. Class I systems must achieve a 30-day average effluent quality of 25 mg/L CBOD5 and 30 mg/L TSS or less, and pH 6.0-9.0 spanning six months of testing. System service and maintenance are prohibited during the test period.

For more information on NSF/ANSI 40, call +1 734.827.5668 or email wastewater@nsf.org.

Website: <http://www.nsf.org/services/by-industry/water-wastewater/onsite-wastewater/residential-wastewater-treatment-systems>

- Orenco Systems, Inc., 814 Airway Avenue, Sutherlin, OR 97479 USA, +1 (541) 459-4449 / (800) 348-9843 provides engineered packaged septic systems and water-tight wastewater handline systems. Website: <http://www.orenco.com/sales/>
- SeptiTech, 69 Holland St., Lewiston ME 04240 USA, Tel: 207-333-6940, email: info@septitech.com - wastewater treatment products for properties not hooked up to a public sewerage system, including SeptiTech® STAAR™ System
- SSI Aeration, MMBR Systems (moving bed bioreactor systems) SSI Aeration, Inc. 4 Tucker Drive Poughkeepsie NY 12603 USA +1-845-454-8171 +1-845-454-8094 Website: <http://www.ssi-aeration.com/>

Also see [HOLDING TANK SEPTIC SYSTEMS](#)

Also see [SEPTIC SYSTEM DESIGN ALTERNATIVES](#)

- [PEAT FILTERED SEPTIC SYSTEMS](#) : Septic effluent treatment systems using peat as the filter media include an effluent dosing system, peat filter media, and a drainage system. Unlike sand bed filters, peat filtration systems are sold as prepackaged systems which provide modular peat units enclosed in containers or "pods" ready to install. Also see [MEDIA FILTER SEPTIC SYSTEMS](#)
- [PRESSURE-DOSED DRAINFIELD SEPTIC SYSTEMS](#): pressure dosing systems use a separate dosing chamber and pump, located downstream from the septic tank, to move effluent into a drainfield which in turn distributes effluent through a pressure-fed network of distribution pipes. (Jantrania/Gross wastewater system type II or if treated to level 2 or better effluent, system type VI)

Pressure dosing is used in a variety of disposal field designs including mounds and sand beds, and have the advantage of being able to distribute effluent uniformly throughout the absorption system, and the disadvantage of added system cost and complexity, along with the requirement for electricity for system operation.

An alternative but *possibly* less long-term reliable version of a drainfield dosing

system that may not require electricity is the siphon system.

Also see [Dosing Systems, Gravity/Siphon](#).

- [RAISED BED SEPTIC SYSTEMS](#): a wastewater absorption trench system which has been constructed in soil-fill material which has been placed on top of the natural soil on a building lot.

Raised systems are often confused with "mound systems" (see below) but have different design requirements, and make at least partial use of existing soils for wastewater treatment. Also see "Mound Systems" above.

- [SAND BED or SAND FILTER SEPTIC SYTEMS](#): also referred to as an Intermittent Sand Filter Septic System: wastewater effluent from the septic tank is intermittently distributed over the surface of a specially prepared bed of sand placed atop the existing soil surface. Effluent which has passed through the sand is collected by additional pipes at the bottom of the sand bed. The sand is not visible as it's covered by topsoil.
- [SEPTIC EFFLUENT SPRAY & SEPTIC SPRAY HEAD](#) effluent dispersal systems often combined with aerobic septic system designs, treat septic wastewater effluent to level 3 or better (Jantrania/Gross wastewater system type X). S

ptic spray systems are high-level-of-treatment aerobic septic systems using spray heads to disperse effluent require maintenance that includes occasional spray head cleaning or replacement. You'll need to identify the brand and model effluent spray head on your aerobic septic system in order to replace with the same part in-kind.

Also see [SEPTIC TANK SUPPLIERS](#): a directory list of septic tank suppliers and

see [SEPTIC SYSTEM SUPPLIERS](#) for directory lists of other septic system component suppliers for sources of septic effluent spray system repair parts and sprayers.

- **Septic Tanks**: septic tank types are described at [TANK INSPECTION PROCEDURE](#) and include
 - steel septic tanks,
 - concrete septic tanks,
 - plastic and
 - fiberglass septic tanks, and
 - home-made septic tanks that we've found constructed of stone, concrete block, bamboo, brick, and wood.Also see [SEPTIC TANK SOURCES](#) or for a directory list of septic tank suppliers

see [SEPTIC SYSTEM SUPPLIERS](#) for directory lists of other septic system component suppliers.

- [SEPTIC TANK & GRAYWATER FILTERS](#) are products used at a septic tank outlet or at a graywater tank inlet or outlet to prevent suspended solids from reaching and clogging the soil absorption system. Readers should distinguish between in-tank septic or graywater filters and types of septic media filter and bed systems such as: [MOUND SEPTIC SYSTEMS](#) or

[RAISED BED](#) septic systems,

[MEDIA FILTER](#) septic systems, septic systems

or [SAND BED SEPTIC](#) systems.

- [SEQUENCING BATCH REACTOR SEPTIC SYSTEMS](#) - The sequencing batch reactor (SBR) process is a sequential suspended growth (activated sludge) process in which all major steps occur in the same tank in sequential order (figure 1). There are two major classifications of SBRs: the intermittent flow (IF) or "true batch reactor," which employs all the steps in figure 1, and the continuous flow (CF) system, which does not follow these steps.
- [STEEP SLOPE SEPTIC SYSTEM DESIGNS](#) - how to install sewer lines from building to septic tank; how to install septic drainfields, leach field systems at steep or sloped sites.
- [TOILETS, INSPECT, INSTALL, REPAIR](#)
 - [ALTERNATIVE & WATERLESS TOILETS](#)
 - [TOILET FLUSHOMETER VALVES](#)
 - [TOILET INSTALLATION PROCEDURE](#)
 - [TOILET OVERFLOW EMERGENCY](#)
 - [TOILET REPAIR GUIDE](#)
- Trenches for effluent dispersal, gravity fed or pressure dosed, with gravel or gravelless systems are discussed under conventional septic and drainfield pages, pressure dosing, or gravelless systems. Also see "Gravity Trenches" above.
- [VEGETATED SUBMERGED BED SEPTIC SYSTEMS](#) and

other [HIGH SPECIFIC SURFACE ANEROBIC REACTOR SEPTIC SYSTEMS](#) - A high-specific-surface anaerobic reactor is any tank or cavity filled with solid media through which wastewater flows with a high hydraulic retention time (HRT). In onsite treatment the two primary types are vegetated submerged beds (VSBs) and

anaerobic upflow filters (AUFs). The first is characterized by horizontal flow and prolific growth of macrophytes on the surface.

The second comes in a variety of forms from upflow sludge blanket systems and fixed media anaerobic filters to partially fluidized beds of fine media. Both have long HRTs, produce anaerobic effluents, generally treat either high-strength or minimally pretreated wastewater, and usually require some form of posttreatment to meet surface discharge or water reuse requirements

- Wastewater Treatment Systems, Onsite, Packaged: see [PACKAGED ONSITE RESIDENTIAL SEPTIC SYSTEMS](#)
- [WATERLESS TOILETS](#): also see the various toilet types and greywater/graywater links on this page such as [CHEMICAL TOILETS](#), [COMPOSTING TOILETS](#), and [INCINERATOR TOILET SYSTEMS](#). (Jantrania/Gross wastewater system type IV).

Also see [GREYWATER SYSTEMS](#).

See [ALTERNATIVE & WATERLESS TOILETS](#) for details of all of these systems.

- [WETLAND SEPTIC SYSTEMS](#) or "natural" septic systems use a constructed wetlands area (or a greenhouse) to treat septic effluent. These systems are more common in Louisiana, Mississippi, Tennessee, South Dakota, and Florida where both municipal wetland septic designs and private homeowner wetland septic system designs are in use. "Wetlands" may include both visible water such as open ponds, and underground water located in constructed beds which are covered with soil. Also see [LAGOON SEPTIC SYSTEM DESIGNS](#)

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