

SAND FILTER AT GRADE ON-SITE SEPTIC SYSTEM

General

Wastewater exiting the residence is directed into the primary compartment of the septic/dosing tank for primary treatment and clarification of solids. Effluent leaving the primary compartment enters the secondary compartment, or dosing chamber, of the septic/dosing tank, which contains a screened pump vault and pump. Effluent is pumped from the dosing chamber to an intermittent sand filter for secondary treatment. After passing through filter media in the sand filter bed, treated effluent is collected at the bottom of the sand filter and transported via a second pump to the disposal field.

Dosing System

To insure uniform distribution of effluent to the disposal field, an effluent pump is employed to transfer effluent to the disposal field. The pump is usually mounted in a screened vault suspended in the outlet compartment of the septic/dosing tank, and discharge of effluent is carried out via Schedule 40 PVC pipe to the disposal field. The dosing assembly is usually fitted with an integral non-resettable dose counter, which allows for the calculation of the volume of effluent pumped to the disposal field. A high level alarm is usually installed into the pump chamber, with the alarm panel attached to the outside of the house or in the garage. This alarm will sound if the effluent in the tank reaches elevated levels and may indicate that the pump is not functioning properly. The tank's access manholes are fitted with water-tight, gas-tight risers and lids which extend above finished grade to allow access for periodic maintenance.

Sand Filter Bed

The sand filter bed is constructed below ground in an appropriate excavation. The excavation is lined with a 30 mil PVC liner to ensure that the bed is water tight. The filter is fitted with the under-drain piping (collection system) and pump vault. A lower layer of pea gravel is placed over the filter bottom and under-drain piping.

The filter's sand body (which is approximately 24" in depth and is positioned on top of the lower gravel layer) consists of a very specific, medium for treatment of effluent prior to distribution to the native soil. The sand fill is then "capped" by another layer of clean washed pea gravel which encloses the distribution piping network. Distribution laterals are constructed of Schedule 40 PVC pipe, perforated by orifices of approximately 1/8" diameter to allow for the distribution of effluent onto the sand surface in a uniform manner. Each of the laterals, at its distal end, is fitted with a riser, threaded male adapter and water tight cap which may extend 2 – 6 inches above the finished grade of the field and allows for periodic maintenance.

Disposal Trench Configuration

The disposal trenches are constructed on contour, parallel to the slope. The bed is constructed by deposition of clean, washed 3/4" crushed rock directly onto the prepared ground surface. Within the gravel is placed a distribution lateral through which the effluent is pumped from the pump chamber. Small diameter (@ 1/8") holes are drilled into the distribution laterals to allow for the dispersal of effluent. At the ends of the laterals and rising through the soil cover over the bed, is a cleanout assembly which consists of a short section of pipe attached by an elbow to the distribution lateral. This section of pipe terminates with a threaded adapter that may be unscrewed for periodic cleaning.

A layer of earth backfill is usually mounded over the entire disposal field so that it extends a minimum of 12" deep over the gravel bed.

Inspection Ports

A number of inspection ports are installed into the system to allow for observation of water levels. One inspection port is located in each end of the sand filter and penetrates the soil cover and upper gravel layer to the top of the sand fill. Other inspection ports are located in the ends of the disposal trenches and down-slope of the disposal field.

On-Site Septic System Inspection

Septic/Dosing Tank

The septic/dosing tank should be inspected by the homeowner or a professional septic tank pumping contractor approximately once per year for sludge accumulation and should be pumped as necessary to prevent sludge from entering the disposal trenches. The tank should be pumped when the sludge accumulates to within 12-18" of the bottom of the inlet structure (TEE). The septic tank will require less frequent pumping if the amount of solid material introduced into the septic tank is minimized.

Solid materials such as food scraps and vegetable trimmings should be disposed in the garbage or a compost pile. Grease should not be poured down the drain, but rather collected and disposed in the garbage. Paper products such as disposable diapers, kleenex, sanitary napkins and paper towels are also harmful and should be disposed in the garbage. Garbage disposal units are strongly discouraged.

For more information concerning septic tanks and pumping procedures, contact the designer or a qualified septic tank pumping contractor. Failure to pump the tank when necessary may result in clogging and/or premature failure of the disposal trenches.

The dosing chamber has been fitted with a screened pump vault which requires periodic rinsing to function properly. It is recommended that, at a minimum, the screened siphon vault be

removed (simply lift it out of its protective enclosure), rinse clean and replace every time the tank is inspected for sludge accumulation.

Distribution Laterals

The distribution laterals, located in the sand filter bed and disposal trenches, should be flushed once every two years to remove accumulated debris. This task may be accomplished simply by removing the cap from the riser, located at the end of the disposal trench, and cycling the pump for a short period of time. This procedure will allow any debris to flow out of the end of the lateral. By removing each of the riser caps in turn, all of the laterals can be cleaned. The effluent being purged from the system should be collected in an appropriate manner and deposited into the primary side of the septic tank.

Mechanical Components

This septic system includes a variety of mechanical and electrical components such as pumps, valves, float switches and alarms. The alarms, which should be mounted in the living/user quarters of the dwelling (garage is acceptable), are installed for the protection of the homeowner. In the event of power or pump failure the alarm will sound, indicating that the liquid level in the dosing chamber or sand filter has risen above its normal level. If this should occur and it can be determined that electrical power to the pump(s) has not been interrupted, the homeowner should contact a local contractor which specializes in pump system repair and/or replacement. The designer may be contacted or a recommended contractor if necessary.

Inspection Pipe and Monitoring Well Observations

The system's monitoring wells (two wells, located down-slope from the disposal field) and inspection pipes (located within each of the disposal trenches) should be inspected at least twice per year by the homeowner, once during February or March and once during August or September. During each inspection the date and depth of water should be noted. Signs of septic system failure include discharge of sewage to the ground surface and saturated upper soils horizons during periods of dry weather. If the system is clearly failing, the designer and the local building department should be notified immediately.

Water levels in the inspection pipes or monitoring wells which are very near the ground surface may indicate potential problems, but do not alone constitute failure. In such cases, the system should be monitored more frequently for clear signs of failure, perhaps once per week, until a clear pattern is developed.

Site Improvement Restrictions

The following are some common site improvements which may have a potentially negative impact on the proper operation of the septic system (tank and disposal field):

- ★ Any grading within the area containing the septic system, or the area down-slope of the disposal field
- ★ Operating or parking vehicles and/or heavy equipment on any portion of the septic system
- ★ Livestock (cattle, horses, swine, llamas, etc.) on the disposal field or the area immediately down-slope from the disposal field
- ★ Diversion of surface runoff (including house downspouts) onto the disposal field
- ★ Construction of any structures (including above-ground pools) or storage facilities on the disposal area
- ★ Paving with concrete or asphalt



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