TEXTILE FILTER DRIP ON-SITE SEPTIC SYSTEM

General

Wastewater exiting the residence is directed into the inlet compartment of the septic tank for primary treatment and clarification of solids. Effluent leaving the primary septic tank enters the pump tank, or dosing chamber, which contains a screened pump vault, pump, and level control float switches. Effluent is pumped from the dosing chamber to a textile filter for secondary treatment. After repeated circulation through the textile filter, the treated wastewater flows to a pump chamber for distribution to the disposal field (subsurface drip irrigation).

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 mounted in a screened vault suspended in the outlet compartment of the dosing tank, and discharge of effluent is carried out via Schedule 40 PVC pipe to the disposal field. The electrical panel controlling the various pumps doses the wastewater on a regular, predetermined basis. A high level alarm is 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.

Textile Filter Bed

The textile filter(s) consist of a pre-fabricated unit, set in close proximity to the pump tank. These filters utilize microbial action to digest the various components of the wastewater prior to distribution to the disposal field.

The product manufacturer requires the homeowner to conduct routine maintenance of the filter via a maintenance contract with a certified maintenance operator. Please contact the system designer or the product manufacturer for more information.

Subsurface Drip Disposal Field

The disposal field for the dwelling consists of a subsurface drip disposal field. A description of the various system components and required maintenance activities are as follows:

1.Wasteflow® Drip-Line
Wasteflow® lines carry the water into the disposal/reuse area. Wasteflow® lines are connected to the supply and return with compression or lock-slip fittings. Standard spacing between lines and emitters are 24" on center. The drip-line has no joints that may pull apart during installation and is ideal for tractor mounted burying machines. It is sold in 500-ft. rolls. For export 400-m rolls are available. Rolls of alternative lengths may be special ordered.

Wasteflow® Drip-Line Features:

Rootguard® - The risk of root intrusion with an emitter slowly releasing nutrient rich effluent directly into the soil, is well known to anyone who has observed a leaking sewer pipe. Geoflow® has an exclusive license for Rootguard®, to protect emitters from root intrusion. Rootguard® carries a 10-year warranty against root intrusion.

Turbulent Flow Path - Wasteflow® drip emitters are pre-inserted in the tube 6", 12" or 24" apart with 24" being the most popular. Angles in the emitter flow path are designed to cause turbulence in order to equalize flow between emitters and keep the emitters clean. Geoflow® emitters boast large flow paths, which, coupled with turbulent flow, have proven over the years to be extremely reliable and dependable.
Bactericide - Geoflow® Wasteflow® has an inner lining impregnated with a bactericide, ultra fresh DM-50, to inhibit bacterial growth on the walls of the tube and in the emitter.

Wasteflow® Classic & Wasteflow® PC Drip-Line – For Wasteflow® Classic the flow rate delivered by the emitter is a function of the pressure at the emitter. Wasteflow® PC will have a constant flow rate at all pressures from 7 to 60 psi – to ensure a long life. The recommended operating range is 10 to 45 psi.

Wasteflow® PC Specification – The drip-line shall consist of nominal sized 1/2" linear low density polyethylene tubing, with turbulent flow, drip emitters bonded to the inside wall. The drip emitter flow passage shall be 0.032" x 0.045" square. The tubing shall have an outside diameter (O.D.) of approximately .648209" and an inside diameter (I.D.) of approximately .55". The tubing shall consist of three layers; the inside layer shall be a bactericide protection, the middle layer shall be black and the outside layer shall be purple striped for easy identification. The drip-line shall have emitters regularly spaced 24" (or 12" or 6") apart. The pressure compensating emitters shall be molded from virgin polyethylene resin with a silicone rubber diaphragm. The pressure compensating emitters shall have nominal discharge rates of 0.53 gallons per hour. The emitters shall be impregnated with Treflan® to inhibit root intrusion for a minimum period of ten years and shall be guaranteed by the manufacturer to inhibit root intrusion for this period. Wasteflow® PC pressure compensating drip-line shall be Geoflow® model number WFPC16-2-24 or WFPC16-2-12 or WFPC16-2-06.

To periodically flush the drip-field, after 10 dosing cycles (field adjustable) the pump will operate for 5 minutes (field adjustable) with the field flush valve opened and the field flush valve will stay open until all zones have been flushed. This operation will also occur after a power outage.

2. Filters
Geoflow® systems use a self-cleaning vortex filter with a stainless screen 150 mesh or
100 micron filter element. The self-cleaning action is efficient over a range of flow rates depending on the filter size. The clean-out port is at the base and can be opened and closed manually or automatically. If using a manual flush valve, please keep the valve ajar slightly at all times for continuous flushing. The controller will fully open automatic flush valves.

Filter Specification - 1" filter. The Y filter body shall be molded from glass reinforced engineering grade black plastic with a 1" male pipe thread (MIPT) inlet and outlet. The two-piece body shall be capable of being serviced by untwisting and shall include an O-ring seal. An additional 3/4" MIPT outlet shall be capable of periodic flushing. The 150-mesh filter screen is all stainless steel, providing a 28.4 square inch filtration area. The screen collar shall be molded from

vinyl. The filter shall flush flows from 7-28 gpm. The 1" filter shall be Geoflow® vortex filter model number AP4E-100.

3. Supply Manifold

This carries the water from the dosing tank to the disposal area. Rigid PVC is usually used and must be designed to slope back to the pump tank in freezing conditions. The velocity in the manifold should be between 2' per second and 5' per second (fps).

4. Return Manifold

In order to help clean the system, the ends of the drip lines are connected together into a common return line, most often made of rigid PVC. This line will help equalize pressures in the system. Flushing should be done frequently during the installation period. Periodic flushing under full system pressure will guarantee a long system life. The return manifold should be installed to drain the line back to the pretreatment tank in freezing climates.

5. Pressure Regulator

Pressure regulators fix the inlet pressure at a given rate and are recommended with Wasteflow® Classic. Under normal operating conditions, pressure in the drip lines should be:

10 psi to 45 psi for Wasteflow® Classic
7 psi to 60 psi for Wasteflow ®PC

6. Air Vacuum Breaker

Air vacuum breakers are installed at the high points to keep soil from being sucked into the emitters due to back siphoning or backpressure. This is an absolute necessity with underground drip systems. They are also used for proper draining of the supply and return manifolds in freezing conditions. Use one on the high end of the supply manifold and one on the high point of the return manifold. Additional air vents may be required depending on terrain. Maximum flow per vacuum breaker is 50 gpm. Freezing conditions require the air vacuum breaker be protected with insulation.

Air Vacuum Specification - The air vacuum relief valve provides instant and continuous vacuum relief and non-continuous air relief. Both the body and the removable dirt cover shall be constructed of molded plastic. The body and the dirt cover shall be connected with a 3/4" hose thread. The ball shall be constructed of low density plastic and the internal seat shall be constructed of vinyl. The air vacuum relief valve shall seal at 5 psi. Inlet size shall be a 1" male pipe thread. The air vent shall be Geoflow® item number APVBK-1.

7. Filter Flush Valves

Used to flush debris from the filter cleanout port back to the pretreatment tank, this can be electronically activated solenoid valve or a manual ball valve. The solenoid valve is electrically operated and used to flush the drip-field and vortex filter. It is normally closed, and in the event of a power failure the valve closes. Unique dual ported diaphragm greatly minimizes clogging. In operation, the diaphragm ports constantly flex, inhibiting sand, silt and debris from blocking the valve action. The porting design also permits equal pressure on both sides of the diaphragm wall, regardless of line pressure when valve is not operating, and nearly equal pressure across the wall when operating. The DW valve diaphragm is made of nylon fabric reinforced Buna-N rubber; a grooved rib interlocks with cover and body to prevent leakage. Nylon exhaust orifice is non-corrosive and has an opening sized larger that the diaphragm ports so that any pieces of sand or silt passing through the diaphragm will not be trapped beneath the solenoid actuator. The solenoid is constructed of molded epoxy resin having no carbon steel components exposed thereby eliminating possible external corrosion and deterioration. Solenoid is completely waterproof, with

an O-ring seal, and complies with NEC Class II circuit requirements for 24V a.c. operation (also operates on 12 volts d.c. up to 75 psi). The actuator is Teflon coated stainless steel and brass with a molded-in place rubber exhaust port seal; a stainless steel spring assures positive seating. Stainless steel 1/4" cover bolts and mating brass body inserts make re-assembly easy. Shock cone on diaphragm seat eliminates water hammer in all except extreme cases.

Flow Control – A brass, non-rising type flow control stem for throttling the valve from full open to close positions.

Manual Bleed Lever – An easy-to-use, hand operated control bleeds valve to downstream; have stops for open and closed positions. Cold water working pressure: 150 psi.

8. Field Flush Valves

Used to flush out fine particles, which have passed through the filter and accumulated on the bottom of the tube, at the end of each lateral. The field flush valve can be manual or electronic. If manual, it should be opened for full flushing at least every six months and left cracked open slightly to flush continuously and provide for drainage of the flush line in freezing conditions. Cracking open a manual valve can also be used to increase the flow through the system to be within the efficient flow rate of the filter and/or pump is necessary. Certain states do require automated electronic flushing. Please refer to your state codes.

9. Drip System Component Maintenance

The best way to assure years of trouble free life from your system is to consistently monitor the system and perform regular maintenance functions. For large systems or systems with a BOD > 20 mg/1 automation of maintenance if essential. For smaller systems with a BOD > 20mg/1 semi-annual inspection and maintenance is adequate.

a) Remove the spin filter and install a clean cartridge. Clean the used filter cartridge back at the shop with a pressure hose. The filter cartridge should be cleaned from the outside inwards. If the bacteria buildup is a problem, we advise first trying lye, and if the problem persists, soak it in a chlorine bath. Soak the filter cartridge in a mixture of 50% water and 50% bleach.
b) Open the field flush valve.
c) Manually turn on the pump.
d) Flush the system for approximately five minutes.
e) Close the field flush valve.
f) Check for proper pressures in the field and it a ball valve is used, reset the field flush valve for 1-psi loss.
g) Remove the lids on the vacuum breaker and check for proper operation.
h) Visually inspect the field for any irregularities.
i) Turn off the pump and reset the controller for auto mode.
j) Periodically remove and clean the field flushes and filters flush valves.

Inspection Ports

A number of inspection ports are installed into the system to allow for observation of water levels. Inspection ports are located within the drip disposal and down-slope of the disposal field.

On-Site Septic System Inspection

Septic Tank

The septic 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 textile filter bed and disposal field.

Distribution Laterals

The distribution laterals, located in the textile filter bed and manifold of the disposal field, should be flushed once annually to remove accumulated debris. This task may be accomplished simply by removing the caps from one of the risers, located at the end of the textile filter, 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.

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 textile 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 for a recommended contractor if necessary.

Inspection Pipe and Monitoring Well Observations

The system's monitoring wells (located within and down-slope from the disposal field) 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