

Commonwealth of Pennsylvania
Department of Environmental Protection (DEP)
Bureau of Water Standards and Facility Regulation
Harrisburg, PA

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Technology: Eljen Geotextile Sand Filter (Eljen GSF[®])

Classification Type: Alternate technology (Listing #A2010-0007-0002)

Classification Date: February 24, 2010, August 1, 2011

In accordance with Title 25, Chapter 73, Section 73.72, DEP classifies the Eljen Geotextile Sand Filter (Eljen GSF[®]) for use as an alternate onlot sewage treatment system in the Commonwealth of Pennsylvania. This classification permits the use of the Eljen GSF as an advanced treatment system used for the specific purposes of reducing BOD₅ and TSS in the sewage effluent. This system has demonstrated that it can produce an effluent equal to or better than 10 mg/l BOD₅/CBOD₅ and 10 mg/L TSS as monthly averages.

I. Technology Description

The Eljen GSF is a modular treatment component integrated with a soil absorption system comprised of an anti-siltation fabrics, perforated pipes, Bio-Matt fabrics, cusped plastic cores, and a layer of sand situated above the native soil. The Eljen GSF design provides increased surface area for biological treatment that exceeds the module's footprint. Anti-siltation geotextile fabric covers the top and sides of the Eljen GSF module to protect the specified sand and soil from fines that can clog the sand while maintaining effluent storage within the module. Open air channels within the B43 module support aerobic bacteria growth on the Bio-Matt geotextile fabric interface.

II. Design Requirements

- A. Location: The Eljen GSF must be installed for the treatment of domestic strength wastewater only.
- B. Treatment Tank:
 - (1) Tank installations must consist of either a two-compartment tank, two tanks in series, or otherwise conformed to meet the requirements of Section 73.31. Vertically aligned circular (round) tanks are not permitted.
 - (2) The septic tank capacity must be sized to have a minimum hydraulic retention time of 2.5 days using the estimated maximum daily sewage flows from Section 73.17.
 - (3) Measures to control flotation of the tank must be implemented when the tank is installed in areas below any indication of a water table.

- (4) An effluent filter bearing the seal of NSF indicating testing and approval by that agency under Standard No. 46 must be installed on the outlet of the final tank or compartment.

C. Dosing:

- (1) Distribution of effluent from the septic tank or pump chamber to the absorption area may be by either gravity or pressure distribution.
- (2) If a pump is required to lift effluent to the filter, a timed dose is required.
- (3) Pressurized systems or lift pump/gravity systems shall meet the following requirements:
 - a) Dose less than 4 gallons/dose/module.
 - b) Dose less than 30 gallons per day/module.
- (4) The dosing tank shall be sized in accordance with Section 73.45.

D. Construction: The Eljen GSF must be installed with the following criteria:

- (1) Per the manufacturer's installation instructions as described in the Pennsylvania Design and Installation Manual. The manual can be obtained from the manufacturer's website.
- (2) The Eljen GSF may be installed on slopes less than 15%.
- (3) Only B43 modules (48" L, 36" W, and 7" H) may be used. If the number of modules required is fractional, round up the nearest whole number. Modules may not be cut or otherwise resized.
- (4) In calculating the number of modules necessary, the effective bottom absorption area will be either 16 ft² per module for percolation rates between 3 min/in to 60 min/in or 24 ft² per module for percolation rates between 61 min/in to 180 min/in.
- (5) The aggregate used must be a medium to coarse, washed, silica sand meeting the uniform size and grading requirements in ASTM C33 (sand) specifications. The aggregate must have less than 10% passing a #100 sieve and less than 5% passing a #200 sieve. Alternatively, PA DOT Type A (Cement Concrete Sand) sand may be used.
- (6) A minimum of 12" of specified sand must be placed underneath the B43 modules.
- (7) For percolation rates ranging between 3 min/in to 60 min/in, a minimum of six inches (6") of sand must be placed at the perimeter of the modules. For percolation rates ranging from 61 min/in to 180 min/in, a minimum of eighteen inches (18") of sand will be required along both sides of the B43 modules while a minimum of six inches (6") of sand will be required at the beginning and end of each Module row.
- (8) A minimum of twelve inches (12") of specified sand must be used between rows of modules in beds with percolations rates between 3 min/in to 60 min/in. For percolation rates between 61 min/in to 180 min/in, thirty-six inches (36") of specified sand between rows of modules in beds must be used.

- (9) The PVC pipe distributing effluent to the B43 module for gravity or pressurized systems shall meet the following specifications:
 - a) The diameter of the SDR-35 or equivalent pipe shall be 4 inches.
 - b) The perforations shall be located at both the 5:00 and 7:00 positions.
- (10) For pressurized systems, the orifices for the inner pipe must:
 - a) Conform to Section 73.44 with the exception that the orifices must be placed at the 12:00 position.
 - b) Include a minimum of one ¼" diameter drain hole at the 6:00 position for each lateral.
- (11) Due to the assembly of the laterals, Section 73.52(b)(11) is not required.
- (12) The area surrounding the tanks and the absorption areas shall be constructed to divert surface water.

E. Use of the Component/System and Siting Requirements:

- (1) Eljen GSF may be used for either new construction or as a repair.
- (2) For final treatment and disposal for an onlot system described in Chapter 73 other than IRSIS, up to a 40 percent reduction in the size of the absorption area is allowed where the percolation rate is in the range of 3 to 60 minutes per inch (min/in), inclusive. However, where the percolation rate is in the range of 61 to 180 min/in, inclusive, no reduction in absorption area sizing is permitted.
- (3) For final treatment and disposal for an at-grade absorption area exhibiting limiting zones **greater than or equal to 20 inches** from the mineral soil surface, the following specifications must be met:
 - a) The soil profile must show that there is a minimum of 20 inches of suitable soil between the bottom of the proposed absorption area and the limiting zone.
 - b) The system must use a pressure-dosed distribution system.
 - c) The absorption areas must be sized in accordance with the requirements of Section 73.16(c) (Table A), using the column under "Subsurface Sand Filters and Elevated Sand Mounds." No sizing reduction is permitted for use of an aerobic tank.
 - d) Where the percolation rate is in the range of 3 to 60 minutes per inch, inclusive, up to a 40 percent reduction in the size of the absorption area is allowed. However, where the percolation rate is in the range of 61 to 180 min/in, inclusive, no reduction in absorption area sizing is permitted.
 - e) Placing absorption areas hydraulically upgradient or downgradient from each other (known as "stacking") is prohibited.
 - f) A minimum 4:1 length-to-width ratio shall be used for slopes up to 12%. Slopes ranging from 12% to 15% is recommended to utilize a 6:1 length-to-width ratio or greater.
 - g) A 2:1 aggregate sand slope shall be maintained on all sides of the aggregate.
 - h) Berms shall meet the requirements of Section 73.55(b)(7) and 73.55(d)(3). The cover over the aggregate shall be at least 12 inches of soil suitable for the growth of vegetation and shall be seeded to assure the stability of the berm.

- i) The surface shall be chisel plowed across the slope, including the area under the berm, as described in Section 73.55(b)(2).
 - j) Lateral end cleanouts are required.
- (4) Where absorption area sizing reductions are proposed, they are not cumulative. No additional sizing reduction is allowed for use of an aerobic tank.
 - (5) If absorption area sizing reductions are proposed, where the system is used to serve a new dwelling, the soil profile evaluations and percolation testing must document that sufficient area is available for installation of a full-sized absorption area (prior to the calculation of the 40% reduction).
 - (6) The absorption area must be designed to take full advantage of the slope to move effluent out from under the absorption area and downgradient with the laterals placed parallel to the contour.

III. Minimum Maintenance Standards

- A. Inspection of the area around soil absorption area every 6 months by the homeowner to ensure that there is no ponding of effluent or downgradient seepage.
- B. Septic tanks, dosing tanks, and lift pump tanks shall be inspected every 6 months for structural integrity of the tank, inlet and outlet baffles, solids retainer, pumps, siphons, and electrical connections by the maintenance entity established under Chapter 72, Section 72.25(h). The inspection and concurrent pumping of excess solids shall be conducted in accordance with the manufacturer's requirements.

IV. Permitting Requirements

- A. An SEO who has successfully completed an appropriate Department sponsored training course that included this specific technology or has received review delegation in writing from the Department may independently review the design and issue the permit for systems including components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.
- B. Copies of the plans and specifications and the designer's report are to be attached to the applicant's, sewage enforcements officer's, and the Department's copy of the application for sewage permit.

V. Planning Requirements

Not Applicable