

**567—69.13 (455B) Packed bed media filters.**

**69.13(1) Intermittent sand filters.** The general requirements for intermittent sand filters are as follows:

*a. Use.* Intermittent sand filters may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

*b. Location.* Intermittent sand filters shall be located in accordance with the distances specified in Table I.

*c. Sampling port.* A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line.

*d. Effluent sampling.* All intermittent sand filters having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

*e. Prohibited construction.* There shall be no construction, such as buildings or concrete driveways, covering any part of an intermittent sand filter.

**69.13(2) Construction.**

*a. Number.* An intermittent sand filter shall consist of one filtering bed or two or more filtering beds connected in series and separated by a minimum of 6 feet of undisturbed earth.

*b. Pipelines.* Each bed shall contain a horizontal set of collector lines. The collector lines shall be equivalent to SDR 35 PVC pipe, 10-inch-diameter gravelless drainpipe, EPS aggregate or other suitable materials.

(1) One collector line shall be provided for each 6 feet of width or fraction thereof. A minimum of two collector lines shall be provided.

(2) The collector lines shall be laid to a grade of 1 inch in 10 feet (or 0.5 to 1.0 percent).

(3) Each collector line shall be vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened or provided with a perforated cap.

(4) Gravelless drainfield pipe with fiber wrap may be used for the collector lines. If fiber wrap is used, no gravel or pea gravel is required to cover the collector lines and the pipe shall be bedded in filter sand.

(5) If 4-inch plastic pipe with perforations is used for the collector lines, the lines shall be covered as follows:

1. Gravel  $\frac{3}{4}$  inch to  $2\frac{1}{2}$  inches in size shall be placed around and over the lower collector lines until there is a minimum of 4 inches of gravel over the pipes.

2. The gravel shall be overlaid with a minimum of 3 inches of washed pea gravel  $\frac{1}{8}$ -inch to  $\frac{3}{8}$ -inch size interfacing with the filter media. A layer of fabric filter may be used in place of the pea gravel. Fabric filters must be 30 by 50 mesh with a percolation rate of at least 5 gal/sq. ft.

(6) A minimum of 24 inches of coarse washed sand shall be placed over the pea gravel or above the gravelless drainfield pipe. The sand shall meet the Iowa DOT standards for concrete sand: 100 percent of the sand shall pass a 9.5 mm screen, 90 to 100 percent shall pass a 4.75 mm screen, 70 to 100 percent shall pass a 2.36 mm screen, 10 to 60 percent shall pass a 600 Tm screen, and 0 to 1.5 percent shall pass a 75 Tm screen.

(7) The discharge pipe that extends from the collection system shall be SDR 35 PVC pipe at a minimum.

**69.13(3) Subsurface sand filters.**

*a. Distribution system and cover.*

(1) Gravel base. Six inches of gravel  $\frac{3}{4}$  inch to  $2\frac{1}{2}$  inches in size shall be placed upon the sand in the bed.

(2) Distribution lines. Distribution lines shall be level and shall be horizontally spaced a maximum of 3 feet apart, center to center. Distribution lines shall be rigid perforated PVC pipe.

(3) Venting. Venting shall be placed on the downstream end of the distribution lines, with each distribution line being vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened or provided with a perforated cap.

(4) Gravel cover. Enough gravel shall be carefully placed to cover the distributors.

(5) Separation layer. A layer of material such as unbacked, rolled, 3/2-inch-thick fiberglass insulation, untreated building paper of 40- to 60-pound weight or synthetic drainage fabric shall be placed upon the top of the upper layer of gravel.

(6) Soil cover. A minimum of 12 inches of soil backfill shall be provided over the beds.

(7) Distribution boxes. A distribution box shall be provided for each filter bed where gravity distribution is used. The distribution boxes shall be placed upon undisturbed earth outside the filter bed. Separate watertight lines shall be provided leading from the distribution boxes to each of the distributor lines in the beds.

(8) As an alternative to gravel and rigid PVC pipe, EPS aggregate may be used for the distribution system. The EPS aggregate shall cover the entire surface of the sand filter, and a 3-foot separation between distribution pipes shall be maintained.

(9) Pressure distribution. Pressure dosing is recommended to improve effluent distribution across the surface of the filter. Pressure distribution systems may use conventional rock and PVC pipe, chambers with small-diameter pipe, or EPS aggregate with small-diameter pipe.

*b. Sizing of subsurface sand filters.*

(1) Gravity flow. For residential systems, subsurface sand filters shall be sized at a rate of 240 square feet of surface area per bedroom.

(2) Siphon-dosed. For residential systems, subsurface sand filters dosed by a dosing siphon shall be sized at a rate of 180 square feet of surface area per bedroom.

(3) Pressure-dosed. For residential systems, subsurface sand filters dosed by a pump shall be sized at a rate of 150 square feet of surface area per bedroom.

(4) Nonhousehold. Effluent application rates for commercial systems treating domestic waste shall not exceed the following:

1. 1.0 gallon/square feet/day for single bed sand filters.

2. The total surface area for any subsurface sand filter system shall not be less than 200 square feet.

**69.13(4) Free access sand filters.**

*a. Pretreatment required.* These systems must be preceded by a secondary treatment system discharging a treated effluent with BOD and TSS values less than 30 mg/L.

*b. Description.* Media characteristics and underdrain systems for free access filters are similar to those for subsurface filters. Dosing of the filter should provide uniform distribution across the entire surface of the bed. Dosing frequency is usually greater than four times per day. For coarser media (greater than 0.5 mm), a dosing frequency greater than six times per day is desirable. Higher acceptable loadings on these filters as compared to subsurface filters relate primarily to the accessibility of the filter surface for maintenance. Gravel is not used on top of the sand media, and the distribution pipes are exposed above the surface.

*c. Distribution.* Distribution to the filter may be by perforated pipe laid on the surface, by pipelines discharging to splash plates located at the center or corners of the filter, or by spray distributors. Care must be taken to ensure that lines discharging directly to the filter surface do not erode the sand surface. The use of curbs around the splash plates or large stones placed around the periphery of the plates will reduce the scour. A layer of washed pea gravel placed over the filter media may also be employed to avoid surface erosion. This practice will create maintenance difficulties, however, when it is time to rake or remove a portion of the media surface.

*d. Covers.* Free access filters shall be covered to protect against severe weather conditions and to avoid encroachment of weeds or animals. The cover also serves to reduce odors. Covers may be

constructed of treated wooden planks, galvanized metal, or other suitable material. Screens or hardware cloth mounted on wooden frames may also serve to protect filter surfaces. Where weather conditions dictate, covers should be insulated. A space of 12 to 24 inches should be allowed between the insulated cover and sand surface. Free access filters may not be buried by soil or sod.

*e. Loading.* The hydraulic loading for free access sand filters shall be 5.0 gpd/sq. ft.

**69.13(5) Dosing.** Dosing for sand filters is strongly advised. Without dosing, the entire area of the sand filter is never effectively used. Dosing not only improves treatment effectiveness but also decreases the chance of premature failure.

*a. Pumps.* A pump shall be installed when adequate elevation is not available for the system to operate by gravity.

(1) The pump shall be of corrosion-resistant material.

(2) The pump shall be installed in a watertight pit.

(3) The dosing system shall be designed to flood the entire filter during the dosing cycle. A dosing frequency of greater than two times per day is recommended.

(4) A high water alarm shall be installed.

*b. Dosing siphons.* When a dosing siphon is used where elevations permit, such siphon shall be installed as follows:

(1) Dosing siphons shall be installed between the septic tank and the sand filter bed.

(2) Dosing siphons shall be installed with strict adherence to the manufacturer's instructions.

*c. Dosing tanks.* The dosing tank shall be of such size that the siphon will distribute effluent over the entire filter during the dosing cycle. Smaller, more frequent doses are recommended.

*d. Effluent sampling.* A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All free access sand filters having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

**69.13(6) Peat moss biofilter systems.** General requirements for individual peat moss biofilter systems are as follows:

*a. Use.* Peat moss biofilter systems may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

*b. Certification.* All peat moss biofilter systems shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (March 2008), or equivalent testing as determined by the department.

*c. Installation and operation.* All peat moss biofilter systems shall be preceded by a septic tank and installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The septic tank shall be sized as specified in paragraph 69.8(2) "a" or larger if recommended by the manufacturer. Sizing of the system should be based on the manufacturer's specifications.

*d. Maintenance contract.* A maintenance contract for the proper monitoring and servicing of the entire treatment system shall be established between the owner and a certified technician for the life of the system. All monitoring and servicing shall be performed by a manufacturer's certified technician or person demonstrating knowledge of the system in accordance with the manufacturer's standards. Manufacturers are responsible for ensuring that an adequate number of maintenance providers are available to service all peat moss biofilters at the specified intervals. Maintenance contracts and responsibility waivers shall be recorded with the county recorder and in the abstract of title for the premises on which the system is installed. The maintenance provider shall perform the required maintenance and reporting to the owner and to the administrative authority. The maintenance provider shall also report any discontinuance of maintenance of the peat moss biofilter system to the administrative authority. Peat moss biofilter systems shall be inspected annually by the maintenance provider. A copy of the maintenance contract shall be on file in the office of the administrative authority.

*e. Effluent sampling.* A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All peat moss biofilter systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

**69.13(7) Recirculating textile filter systems.** General requirements for recirculating textile filter systems are as follows:

*a. Use.* Recirculating textile filter systems may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

*b. Certification.* All recirculating textile filter systems shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (March 2008), or equivalent testing as determined by the department.

*c. Design.* Recirculating textile filter systems shall be designed to prevent the passage of untreated waste during an equipment malfunction or power outage.

*d. Installation and operation.* Recirculating textile filter systems shall be preceded by a septic tank and installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The septic tank shall be sized as specified in paragraph 69.8(2) "a" or larger if recommended by the manufacturer. Sizing of the system should be based on the manufacturer's specifications.

*e. Maintenance contract.* A maintenance contract for the proper monitoring and servicing of the entire treatment system shall be established between the owner and a certified technician for the life of the system. All monitoring and servicing shall be performed by a manufacturer's certified technician or person demonstrating knowledge of the system in accordance with the manufacturer's standards. Manufacturers are responsible for ensuring that an adequate number of maintenance providers are available to service all recirculating textile filters at the specified intervals. Maintenance contracts and responsibility waivers shall be recorded with the county recorder and in the abstract of title for the premises on which the system is installed. The maintenance provider shall perform the required maintenance and reporting to the owner and to the administrative authority. The maintenance provider shall also report any discontinuance of maintenance of the system to the administrative authority. Recirculating textile filter systems shall be inspected, at minimum, annually by the maintenance provider. A copy of the maintenance contract shall be on file in the office of the administrative authority.

*f. Effluent sampling.* A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All recirculating textile filter systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.