CHAPTER 73a. STANDARDS FOR ONLOT SEWAGE TREATMENT FACILITIES

Cross References

This chapter cited in 6 Pa. Code § 21.27 (relating to domiciliary care home certification and recertification standards); 7 Pa. Code § 49.45 (relating to sewage); 7 Pa. Code § 78.73 (relating to sewage disposal); 7 Pa. Code § 82.10 (relating to sewage disposal); 25 Pa. Code § 71.21 (relating to content of official plans); 25 Pa. Code § 71.62 (relating to individual and community onlot sewage systems); 25 Pa. Code § 71.73 (relating to sewage management programs for sewage facilities permitted by local agencies); 25 Pa. Code § 72.2 (relating to scope); 25 Pa. Code § 72.21 (relating to general); 25 Pa. Code § 72.33 (relating to well isolation distance exemption); 25 Pa. Code § 171.5 (relating to sewage disposal); 28 Pa. Code § 18.5 (relating to sewage disposal); 28 Pa. Code § 19.6 (relating to sewage disposal); and 28 Pa. Code § 20.22 (relating to sewer connection); 34 Pa. Code § 403.1 (relating to scope); and 34 Pa. Code § 403.21 (relating to Uniform Construction Code).

Subchapter A. GENERAL

Sec.

§ 73a.1. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

Absorption area—An onlot sewage system component where effluent from another component of an onlot sewage system is distributed into and through the soil for further renovation prior to assimilation into groundwater.

Act—The Pennsylvania Sewage Facilities Act (35 P. S. § § 750.1—750.20).

Advanced treatment—The use of physical, biological and chemical operations and processes designed to remove biochemical oxygen demand (BOD_5) and total suspended solids (TSS) to levels of less than 10 milligrams per liter (mg/L).

Aggregate Area—The square footage occupied by the aggregates in a soil absorption area, the square footage of the area extending directly under and 10 feet beyond the outer wetted perimeter of a spray distribution field, the square footage directly under and extending two feet beyond the outermost installation of drip distribution tubing in a drip distribution area, or the outermost limits of the sand bed in a micromound, from which horizontal isolation distances are measured.

Agricultural areas—Areas used primarily for the production of crops.

Alternate sewage system—A method of demonstrated onlot sewage treatment and renovation in the soil not described in this title.

Biochemical treatment—The use of biological and chemical unit processes in the treatment of sewage.

Biochemical oxygen demand (BOD_5)—The amount of dissolved oxygen, expressed in milligrams per liter (mg/L), required by bacteria while stabilizing, digesting or treating organic matter under aerobic conditions.

Bonded disposal system—An individual sewage system sited using percolation tests located on a single lot serving a single family residence, where soil mottling is within 20 inches of the mineral soil surface, the installation, operation and replacement of which is guaranteed by the property owner.

Borehole—A circular hole made by boring; esp. a deep vertical hole of small diameter, such as a shaft, a well (an exploratory oil well or a water well), or a hole made to ascertain the nature of the underlying formations, to obtain samples of the rocks penetrated, or to gather other kinds of geologic information.

Building sewer—Piping carrying sewage from a building to a treatment unit or holding tank.

Clean Streams Law—The Clean Streams Law (35 P. S. § § 691.1—691.1001).

Coarse Aggregate—Coarse material meeting the required size and grading criteria specified in a section of this chapter and the following specifications:

(i) The coarse aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The coarse aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using ASTM C 142.

(iii) The coarse aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using ASTM C 117 or PMT No. 100.

Conventional sewage system—A system employing the use of demonstrated onlot sewage treatment and disposal technology in a manner specifically recognized by this chapter. The term does not include alternate or experimental sewage systems.

Domestic wastewater—Raw sewage effluent with composition within the following ranges: 12 - 50 mg/L ammonia as nitrogen, 8 - 35 mg/L organic nitrogen (20 - 85 mg/L total Kjeldahl nitrogen), 350 - 1200 mg/L total solids, 100 - 350 mg/L total suspended solids and 110 - 400 mg/L BOD_5.

Dosing pump—The pump housed in a dosing tank that provides a measured volume of sewage effluent to the pressurized distribution system in an absorption area.

Experimental sewage system—A method of onlot sewage treatment and renovation in the soil not described in this chapter that is proposed for the purpose of testing and observation.

Filter tank—The tank housing the piping and media of a filter unit.

Filter units—A system of distribution piping, media, aggregate and collection piping used for the filtration and biochemical treatment of sewage. The term includes:

(i) *Buried media filter*—A system of distribution piping, media, aggregate and collection piping contained in a buried liner used for the intermittent filtration and biochemical treatment of sewage.

(ii) *Free access media filter*—An accessible system of filter tanks containing distribution piping, media, aggregate and collection piping and used for the intermittent filtration and biochemical treatment of sewage.

(iii) *Recirculating media filter*—An accessible system of filter tanks, pressure dose distribution piping, media, aggregate and collection piping used for the recirculating filtration and biochemical treatment of sewage.

Fine Aggregate—Fine material meeting the required size and grading criteria specified in a section of this chapter and the following specifications:

(i) The fine aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The fine aggregate shall not contain more than 5 % by weight clay lumps and friable particles. Testing shall be performed using ASTM C 142.

(iii) The fine aggregate shall not contain more than 3% by weight material finer than No. 200 sieve. Testing shall be performed using ASTM C 117 or PMT No. 100.

Forested areas—Areas where the predominant vegetative cover is comprised of trees with a closed canopy.

Geotextile—Permeable material consisting of mesh polypropylene, polyester, nylon or similar material, used to prevent migration of soil or filter media into coarse aggregate.

Grassed area—An area where the predominant vegetative cover is comprised of grasses, bushes or trees not forming a closed canopy.

Hydraulic linear loading rate— The maximum volume of wastewater that a soil surrounding a wastewater infiltration system can transmit far enough away from the infiltration surface such that it no longer influences the infiltration of additional wastewater.

Individual residential spray irrigation system—An individual sewage system which serves a single dwelling and which treats and disposes of sewage using a system of piping, treatment units and soil renovation through spray irrigation.

Industrial waste—A liquid, gaseous, radioactive, solid or other substance, which is not sewage, resulting from manufacturing, industry, other plants or works and mine drainage, silt, coal mine solids, rock, debris, dirt and clay from coal mines, coal collieries, breakers or other coal processing operations. The term includes substances whether or not generally characterized as waste.

Lift pump—A submersible pump used to convey effluent to the filter and from the filter to the disinfection tank.

Light weight equipment—Equipment with a total weight of 15,000 pounds or less and a maximum ground pressure of 6.5 pounds per square inch.

Limiting zone—A soil horizon or condition in the soil profile or underlying strata that includes one of the following:

(i) A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil redoximorphic features.

(ii) Any rock formation with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments.

(iii) A rock formation that is so slowly permeable that it effectively limits downward passage of effluent.

(iv) Any stratum or soil condition that is so slowly permeable that it effectively limits downward passage of effluent.

(v) Saprolite.

Local agency—A municipality (or any combination of municipalities acting cooperatively or jointly under the laws of the Commonwealth), county, county department of health or joint county department of health.

Malfunction—the failure of an onlot sewage treatment system or component to perform as designed resulting in, but not limited to, any of the following:

(i) A discharge of untreated or partially treated sewage to the surface of the ground, except individual residence spray irrigation systems.

(ii) A discharge of untreated or partially treated sewage into waters of the Commonwealth.

(iii) A chronic occurrence of sewage backing-up into plumbing fixtures within the structure that the system serves not related to pipe clogs or other treatment component failures.

(iv) Any sample exceeding 150% of the required treatment level for the component.

Mineral soil—Soil, excluding the natural organic layers of the surface, which consists of naturally occurring mineral matter with organic materials not exceeding 20 percent by weight. This does not include the organic layer, which consists of recognizable, decomposing materials such as grass, sticks leaves etc.

Municipality—A city, incorporated town, township, borough or home rule municipality other than a county.

NSF—NSF International.

Person—The term includes an individual; association; public or private corporation for-profit or not-for-profit; partnership; firm; trust; estate; department; board; bureau or agency of the United States or the Commonwealth; political subdivision; municipality; district; authority; or other legal entity which is recognized by law as the subject of rights and duties. The term includes the members of an association, partnership or firm and the officers of a local agency or municipal, public or private corporation for-profit or not-for-profit.

Primary treatment—The use of physical operations to remove floating and settleable solids found in wastewater.

Proprietary component—A unit or mechanism manufactured or marketed by a company or individual having the exclusive right to manufacture or sell it.

Qualified registered professional engineer—A person registered to practice engineering in this Commonwealth who has experience in the characterization, classification, mapping and interpretation of soils as they relate to the function of onlot sewage disposal systems.

Qualified registered professional geologist—A person registered to practice geology in this Commonwealth who has experience in the characterization, classification, mapping and interpretation of soils as they relate to the function of onlot sewage disposal systems.

Qualified soil scientist—A person certified as a sewage enforcement officer and who has documented 2 years' experience in the characterization, classification, mapping and interpretation of soils as they relate to the function of onlot sewage disposal systems and either a Bachelor of Science Degree in soils science from an accredited college or university or certification by the American Registry of Certified Professionals in Agronomy, Crops and Soils.

Renovation—The act of improving the effluent quality prior to reaching the groundwater.

Rock outcrop—The part of a rock formation that appears above the surface of the surrounding land.

RSF—Recirculating subsurface filter.

Saprolite—Soft, friable, isovolumetrically weathered bedrock that retains the fabric and structure of the parent rock exhibiting extensive inter-crystal and intra-crystal weathering.

S*econdary treatment*—The use of physical, biological and chemical operations and processes designed to remove biochemical oxygen demand (BOD_5) and total suspended solids (TSS) to levels of less than 30 milligrams per liter (mg/L).

Seepage area—The aggregate area of an absorption area or the surface area of a media filter.

Sewage—A substance that contains the waste products or excrement or other discharge from the bodies of human beings or animals; a substance harmful to the public health, to animal or aquatic life or to the use of water for domestic water supply or for recreation; or a substance which constitutes pollution under The Clean Streams Law.

Sewage enforcement officer—An official of the local agency who reviews permit applications and sewage facilities planning modules and issues permits as authorized by the act and conducts the investigations and inspections that are necessary to implement the act and regulations thereunder.

Sewage facilities—A system of sewage collection, conveyance, treatment and disposal that will prevent the discharge of untreated or inadequately treated sewage or other waste into waters of this Commonwealth or otherwise provide for the safe and sanitary treatment and disposal of sewage or other waste. The term includes:

(i) *Individual sewage system*—A system of piping, tanks or other facilities serving a single lot and collecting and disposing of sewage in whole or in part into the soil or into waters of this Commonwealth or by means of conveyance to another site for final disposal. The term includes:

(A) *Individual onlot sewage system*—An individual sewage system which uses a system of piping, tanks or other facilities for collecting, treating and disposing of sewage into a soil absorption area or spray field or by a method specified in Chapter 73a, Subchapter K (related to non-discharge systems).

(B) *Individual sewerage system*—An individual sewage system which uses a method of sewage collection, conveyance, treatment and disposal other than renovation in a soil absorption area, or a method specified in Chapter 73a, Subchapter K (related to non-discharge systems).

(ii) C*ommunity sewage system*—A sewage facility, whether publicly or privately owned, for the collection of sewage from two or more lots, or two or more equivalent dwelling units and the treatment or disposal, or both, of the sewage on one or more of the lots or at another site. The term includes:

(A) *Community onlot sewage system*— A community sewage system with design flows less than or equal to 10,000 gallons per day and disposing of sewage into a soil absorption area or by a method specified in Subchapter K (related to non-discharge systems).

(B) *Community sewerage system*—A publicly or privately-owned community sewage system which uses a method of sewage collection, conveyance, treatment and disposal other than renovation in a soil absorption area or a method specified in Subchapter K (related to non-discharge systems).

Sinkhole—A closed topographic depression or basin, generally draining underground, including, but not restricted to, a doline, uvala, blind valley or sink.

Small flow treatment facility—An individual or community sewerage system designed to adequately treat sewage flows not greater than 2,000 gallons per day for final disposal using a stream discharge or other methods approved by the Department.

Soil horizon—A layer of soil approximately parallel to the soil surface, the chemical and physical characteristics of which are distinguishable by observation or other method of analysis, from the chemical and physical characteristics in adjacent layers of soil.

Soil mottling (redoximorphic features)—A soil color pattern consisting of patches of different colors or shades of color interspersed with the dominant soil color that results from prolonged saturation of the soil.

Soil profile—The collection of soil horizons, including the natural organic layers on the surface.

Solids retainer—A deflection device at the outlet tee or baffle of a septic tank designed to deflect buoyed solids from escaping the tank.

Spray field—Piping, spray heads and ground surface to the outside edges of the wetted perimeter, used for the application and treatment of the sewage effluent in an individual residential spray irrigation system.

Spray irrigation—Spraying effluent into the air to create droplets that simulate natural precipitation falling on vegetation and the ground surface for further renovation of the effluent.

Surface drainage way—A natural or man-made surface topographic feature that conveys water along the surface of the ground.

System designer—The person responsible for the design of the treatment system and ensuring all applicable standards are met.

Total suspended solids—The total weight of solids that are visible and in suspension in a given volume of effluent.

Treatment tank—A watertight tank designed to retain sewage long enough for satisfactory bacterial decomposition of the solids to take place. The term includes the following:

(i) *Septic tank*—A treatment tank that provides for anaerobic decomposition of sewage prior to its discharge to another treatment component or an absorption area.

(ii) *Aerobic sewage treatment tank*—An aerated treatment tank that provides aerobic biochemical stabilization of sewage prior to its discharge to another treatment component or an absorption area.

Undisturbed soil—A soil or soil profile, unaltered by removal, compaction or other man-induced changes, except for normal agricultural activities performed for the specific purpose of crop production. Any change to the soil profile that would adversely affect the soil's hydraulic or renovative capacities shall be considered a soil disturbance. Excavating soil to system installation depth for the purpose of installing the system may not be considered disturbing the soil.

Vertical isolation distance—The minimum distance from the lowest point in the absorption area to the highest point of the limiting zone.

Water of this Commonwealth—All rivers, streams, creeks, rivulets, impoundments, ditches, water courses, storm sewers, lakes, dammed water, ponds, springs and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

Zero discharge system—A system which receives sewage or treated wastewater and is designed for ultimate disposal of the sewage at another site or through evapotranspiration. The term includes the following:

(i) *Evapotranspiration system*—A system designed so the combined loss of water from the system due to evaporation from the enclosed soils and transpiration from the plants equals the volume of applied effluent, on a maximum daily basis.

(ii) *Retaining tank* – A watertight receptacle that receives and retains sewage and is designed and constructed for the purpose of temporary storage of sewage until such time as the contents can be pumped out and transported to another location for disposal.

(A) *Chemical toilet*—A permanent or portable nonflushing toilet, using chemical treatment for odor control, and employing a tank for the purpose of temporary storage of sewage.

(B) *Composting toilet*—A device for holding and processing human and organic kitchen waste employing the process of biological degradation through the action of microorganisms to produce a stable, humus-like material.

(C) *Holding tank*—A watertight tank, whether permanent or temporary, to which sewage is conveyed by a water-carrying system.

(D) *Incinerating toilet*—A device capable of reducing waste materials to ashes.

(E) *Privy*—A tank designed to receive sewage where water under pressure is not available.

(F) *Recycling toilet*—A device in which the flushing medium is restored to a condition suitable for reuse in flushing and the remaining wastes are stored until such time as they can be removed and transported to another location for disposal.

§ 73a.2. Purpose.

(a) This chapter applies to sewage enforcement officers administering the act, as well as to persons designing and installing individual onlot sewage systems or community onlot sewage systems treating domestic wastewater as defined in this chapter and permitted by the local agency.

(b) This chapter is separated into twelve subchapters:

(1) Subchapter A (relating to general) provides general background information.

(2) Subchapter B (relating to site evaluation) provides detailed instructions on the methods to determine site suitability for onlot sewage treatment systems.

(3) Subchapter C (relating to building sewer) provides specifications on the design and construction of building sewers.

(4) Subchapter D (relating to primary treatment) provides specifications on the capacity, construction and maintenance of septic tanks.

(5) Subchapter E (relating to secondary treatment) provides specifications on the design, construction and maintenance of secondary treatment components.

(6) Subchapter F (relating to advanced treatment) provides specifications on the design, construction and maintenance of advanced treatment components.

(7) Subchapter G (relating to nutrient removal) provides specifications on the design, construction and maintenance of nutrient removal components.

(8) Subchapter H (relating to disinfection) provides specifications on the design, construction and maintenance of disinfection components.

(9) Subchapter I (relating to dosing and distribution) provides specifications on the design, construction and maintenance of dosing and distribution components.

(10) Subchapter J (relating to absorption area) provides specifications on the design, construction and maintenance of absorption areas.

(11) Subchapter K (relating to zero discharge components) provides specifications on zero discharge components.

(12) Subchapter L (relating to alternate and experimental systems) provides information on the use, design, construction and maintenance of alternate and experimental treatment components.

§ 73a.3. Minimum horizontal isolation distances

(a) Minimum horizontal isolation distances shown in subsections (b)—(e) shall be maintained between the sewage treatment system and the features itemized except as provided by § 72.33 (relating to well isolation distance exemption) and § 73a.7 (relating to repair of malfunctions). If conditions warrant, greater isolation distances may be required. All distances from stormwater retention and detention basins shall be measured from the toe of the berm.

(b) The minimum horizontal isolation distances between the features named and treatment tanks, dosing tanks, holding tanks, lift pump tanks, filter tanks, chlorine contact tanks and evapotranspiration systems shall comply with the following:

50 feet	An individual water supply
	Water supply system suction line
25 feet	Streams, lakes, other surface waters
	A cistern used as a water supply
10 feet	Property line, easement or right-of-way
	Buildings, swimming pools and driveways
	Water supply line under pressure

(c) The following minimum horizontal isolation distances shall be maintained between the features named and the perimeter of the aggregate in the absorption area:

100 feet	Mine subsidence areas, open boreholes drilled for any purpose, sinkholes
	Drinking and non-drinking water wells
	Springs currently used as a domestic water supply
	Geothermal heating system wells except wells sealed in accordance with the Department's well abandonment guidelines
	An individual water supply or water supply system suction line
50 feet	Streams, watercourses, lakes, ponds, or other surface water. For the purposes of this chapter wetlands are not surface waters.
	Stormwater seepage beds, retention basins or detention basins
	A cistern used as a water supply
25 feet	Surface drainage ways
	Roads or driveways
	Natural or manmade slope greater than 25%
10 feet	Property line, easement or right-of-way
	Buildings and swimming pools
	Water supply line under pressure
	Rock outcrop or identified shallow pinnacle
	Any "dry" percolation test hole
	Any unsuitable soil profile
	Properly abandoned wells or properly sealed geothermal heating system wells
5 feet	Other active onlot systems

(d) The following minimum horizontal isolation distances shall be maintained between the features named and the wetted perimeter of the spray field:

100 feet	Buildings and swimming pools
	An individual water supply or water supply suction line
	Mine subsidence areas, open boreholes drilled for any purpose, sinkholes
	Geothermal heating system wells except wells sealed in accordance with the Department's well abandonment guidelines
	Drinking and non-drinking water wells
	Springs currently used as a domestic water supply
50 feet	Property lines, easements or rights of way
	A cistern used as a water supply
	Streams, watercourses, lakes, ponds, or other surface water. For the purposes of this chapter wetlands are not surface waters.
	Roads or driveways
	Rock outcrop
	Stormwater seepage beds, retention basins or detention basins

10 feet	Water supply line under pressure
	Properly abandoned wells
	Properly sealed geothermal heating system wells
5 feet	Other active onlot systems

(e) The area within the wetted perimeter of the spray field may not be sited within 10 feet of an unsuitable soil profile.

Cross References

This section cited in 25 Pa. Code § 71.63 (relating to retaining tanks); 25 Pa. Code § 72.32 (relating to sales contracts); and 25 Pa. Code § 72.33 (relating to well isolation distance exemption).

§ 73a.4. Sewage flows.

(a) The flow figures in this subsection are maximum daily flows for the design of individual and community sewage systems with flows less than or equal to 10,000 gallons per day. The sewage flow shall exclude any industrial waste. The sewage flow shall be determined from the following table:

Residential	*Gallons/day*
Single family residences	400*
Hotels and motels (per unit)	100
Mobile home parks, independent (per space)	400
Multiple family dwellings and apartments, including townhouses, duplexes and condominiums (per unit)	400
Rooming houses (per unit)	200
Commercial	*Gallons/day*
Airline catering (per meal served)	3
Airports (per passenger—not including food)	5
Airports (per employee)	10
Beauty shops attached to a single family residence (one licensed operator/one chair)	200 additional
Bus service areas not including food (per patron and employee)	5
Country clubs not including food (per patron and employee)	30
Drive-in theaters (not including food—per space)	10
Factories and plants exclusive of industrial wastes (per employee)	35
Movie theaters (not including food, per auditorium seat)	5
Offices (per employee)	10
Restaurants (toilet and kitchen wastes per patron)	10
(Additional for bars and cocktail lounges)	2

Restaurants (kitchen and toilet wastes, single-service utensils/person)	8.5
Restaurants (kitchen waste only, single-service utensils/patron)	3
Stores (per public toilet)	400
Warehouses (per employee)	35
Work or construction camps (semi permanent) with flush toilets (per employee)	50
Work or construction camps (semi permanent) without flush toilets (per employee)	35
Institutional	*Gallons/day*
Churches (per seat)	3
Churches (additional kitchen waste per meal served)	3
Churches (additional with paper service per meal served)	1.5
Hospitals (per bed space, with laundry)	300
Hospitals (per bed space, without laundry)	220
Institutional food service (per meal)	20
Institutions other than hospitals (per bed space)	125
Schools, boarding (per resident)	100
Schools, day (without cafeterias, gyms or showers per student and employee)	15
Schools, day (with cafeterias, but no gym or showers per student and employee)	20
Schools, day (with cafeterias, gym and showers per student and employee)	25
Recreational and Seasonal	*Gallons/day*
Camps, day (no meals served)	10
Camps, hunting and summer residential (night and day) with limited plumbing including water-carried toilet wastes (per person-4 person minimum)	100
Campgrounds, with individual sewer and water hookup (per space)	100
Campgrounds with water hookup only and/or central comfort station which includes water-carried toilet wastes (per space)	50
Fairgrounds and parks, picnic—with bathhouses, showers, and flush toilets (per person)	15
Fairgrounds and parks, picnic (toilet wastes only, per person)	5
Swimming pools and bathhouses (per person)	10

*For units of 3 bedrooms or less. For each bedroom over 3, add 100 gallons.

(b) For nonresidential establishments, a volume of 200 gallons per day shall be the minimum volume used in calculating the size of the absorption area.

(c) Actual water meter or sewer meter flow data indicating maximum daily flows different than those shown in this section over a 1-year period for a similar nonresidential establishment may be accepted for use in sizing the onlot treatment system. If average daily flows are used, the maximum daily flow shall be calculated by multiplying the average daily flow of the maximum month by two.

(d) Establishments with food preparation facilities are required to install adequately designed pretreatment units and traps to reduce greases and biological oxygen demand (BOD_5) prior to discharge to an individual or community sewage system.

(e) A person planning or designing a facility or intending to utilize individual or community sewage systems is advised of the importance of good water conservation practices and the potential value of water conservation, recycle or reuse systems as a means of prolonging the life of the sewage system, as well as ensuring the availability of adequate water supplies in the future.

Cross References

This section cited in 25 Pa. Code § 71.52 (relating to content requirements—new land development revisions); 25 Pa. Code § 72.22 (relating to permit issuance); 25 Pa. Code § 73a.31 (relating to standards for septic tanks); 25 Pa. Code § 73a.41 (relating to aerobic treatment units); 25 Pa. Code § 73a.42 (relating to free access media filters); 25 Pa. Code § 73a.43 (relating to buried media filters); 25 Pa. Code § 73a.61 (relating to recirculating subsurface filter); 25 Pa. Code § 73a.101 (relating to chlorination); 25 Pa. Code § 73a.116 (relating to flow equalization); 25 Pa. Code § 73a.121 (relating to general); and 25 Pa. Code § 73.127 (relating to drip distribution system).

§ 73a.5. General requirements for bonded disposal systems.

(a) If the sole reason for a property not meeting the requirements for the installation of an individual residential onlot sewage system is the presence of soil mottling within 20 inches of the mineral soil surface, the local agency shall authorize the performance of a percolation test, at the owner's expense, when one is requested in writing by the owner of the property.

(b) If the sole reason for a property not meeting the requirements for the installation of an individual residential onlot sewage system is the presence of soil mottling, the local agency shall issue a permit for an individual residential onlot sewage system designed to meet the Department's standards when the property owner meets the following conditions:

(1) A qualified soil scientist, qualified registered professional geologist, certified sewage enforcement officer or qualified registered professional engineer, not employed by the local agency with jurisdiction over the property in question, confirms in writing that the soil mottling observed in the test pits is not an indication of either a regional or perched seasonal high water table.

(2) The property owner provides evidence of financial assurance satisfactory to the local agency in an amount equal to the cost of replacement of the individual residential sewage system proposed and the reasonably anticipated cost of remedial measures to clean up contaminated groundwater to replace any contaminated water supplies and to repair or replace a malfunction of the onlot system. The local agency may not approve financial assurance in an amount less than $20,000 or 15% of the appraised value of the lot and proposed residential dwelling. The terms of the financial

assurances shall be for up to 3 years. The local agency may require a continuation of up to 2 additional years of financial assurance. The local agency may terminate the financial assurance requirement at the end of its term consistent with the act.

(3) The property owner provides notification to the local agency 7 working days prior to conducting soil evaluations under this section and a representative of the local agency may observe the soil evaluations and may review resulting reports and correspondence.

(4) The property owner produces evidence of a clause in the deed to the property that clearly indicates soil mottling is present on the property and that an individual residential onlot sewage system meeting the requirements of this section was installed on the property.

Cross References

This section cited in 25 Pa. Code § 72.21 (relating to general); 25 Pa. Code § 72.42 (relating to powers and duties of local agencies); 25 Pa. Code § 73a.6 (relating to standards for financial assurances); 25 Pa. Code § 73a.12 (relating to limiting zone); and 25 Pa. Code § 73a.14 (relating to morphological evaluation).

§ 73a.6. Standards for financial assurances for bonded disposal systems.

(a) Financial assurance shall be sufficient to meet the requirements of section 7.2 of the act (35 P. S. § 750.7b).

(b) The local agency may establish an amount of financial assurance above the minimum established by § 73a.5(b)(2) (relating to general requirements for bonded disposal systems).

(c) A local agency may accept forms of financial assurance that establish, to the satisfaction of the local agency, its full and unconditional right to demand and receive any sum due it under section 7.2 of the act. A local agency may authorize a property owner to use the financial assurance for the sole purpose of repair or replacement of the onlot system, for remedial measures to clean up contaminated groundwater and to replace contaminated water supplies.

(d) The property owner shall forfeit to the local agency the financial assurance when the local agency determines that one or more of the following apply:

(1) The property owner or permittee has violated or continues to violate one or more of the terms or conditions pertaining to the financial assurance.

(2) The system has malfunctioned.

(3) The property owner or permittee has violated a condition of the permit or submitted false information.

(4) The property owner or permittee has failed to properly perform the remedial action required.

Cross References

This section cited in 25 Pa. Code § 72.42 (relating to powers and duties of local agencies); and 25 Pa. Code § 72.42 (relating to powers and duties of local agencies).

§ 73a.7. Repair of malfunctions.

(a) When considering corrective measures for the repair of malfunctioning onlot sewage disposal systems, the local agency shall be guided by the following procedure.

(1) *Step 1:* Consider all onlot sewage systems or components described in this chapter, except zero discharge systems described in Subchapter K.

(2) *Step 2:* Consider the use of pre-classified alternate sewage systems or components described in §73a.152 (relating to alternate sewage systems).

(3) *Step 3:* Consider a sewage system not specifically pre-classified by the Department as an alternate sewage system described in § 73a.152 (relating to alternate sewage systems), or for the use of a Small Flow Treatment Facility. Facilities permitted by the Department under the Clean Streams Law may be used in correcting malfunctions when authorized under § 71.64 (relating to small flow treatment facilities).

(4) *Step 4:* Consider selectively encroaching upon horizontal isolation distances described in § 73a.4 (relating to minimum horizontal isolation distances) provided that the malfunctioning system has been constructed in accordance with this chapter or applicable regulations at the time of construction. The efforts of the local agency and the Department will not necessarily be restricted by this chapter. When encroaching upon horizontal isolation distances the following shall apply:

(i) The local agency has determined that a repair system or component physically cannot be sited in accordance with this chapter.

(ii) Where an isolation distance can be met, it shall be met.

(iii) Where an isolation distance must be reduced, the resulting isolation distance shall be maximized to the extent possible.

(iv) When a reduction in a horizontal isolation distance results in an absorption area or spray field encroaching on the minimum horizontal isolation distance from a well, the local agency shall consider proper well abandonment procedures and relocation of the well. The minimum horizontal isolation distance from a well may be waived in writing at the discretion of the local agency in accordance with § 72.33 (relating to well isolation distance exemption).

(5) *Step 5:* Consider the use of an experimental sewage system or component as provided for in § 73a.153 (relating to experimental sewage systems).

(6) *Step 6:* Consider the use of holding tanks described in § 73a.142 (relating to standards for holding tanks) when the previously listed alternatives are not available or not considered practical.

(b) Except as set forth below, any onlot sewage system not designed or sited in accordance with this chapter shall be submitted to the Department in accordance with § 72.25(a)(6) for appropriate classification under § § 73a.152 and 73a.153 (relating to alternate and experimental sewage systems). The exceptions are:

(1) Systems or component designs meeting the requirements of subsection (a)(2).

(2) Systems or components that are sited under the provisions of subsection (a)(4) but meet the requirements of this chapter in all other respects.

Cross References

This section cited in 25 Pa. Code § 72.33 (relating to well isolation distance exemption).

Subchapter B. SITE EVALUATION

Sec.
73a.11. General.
73a.12. Limiting zone.
73a.13. Percolation testing.
73a.14. Morphological evaluation.
73a.15. Treatment requirements.

73a.11. General.

(a) No person may install, and no sewage enforcement officer may issue a permit for or approve, a sewage system that violates this chapter.

(b) A structure may not be occupied before the sewage system is finally inspected, approved and covered, except when the sewage enforcement officer requires a change to the installation schedule because of weather and soil conditions. Under these circumstances the permit may be modified with conditions established by the local agency, to allow use of a septic tank as a temporary holding tank. In these instances, § § 71.61 and 71.63(b)(1) and (2), (c)(1) and (2), 73a.141 and 73a.142(b) do not apply. Absorption areas shall be covered by the permittee within 5-calendar days after final inspection and approval to prevent damage.

(c) Liquid wastes, including kitchen and laundry wastes and water softener backwash, shall be discharged to a treatment tank. Sewage facilities shall not discharge untreated or partially treated sewage to the surface of the ground or into the waters of this Commonwealth except as specifically permitted under sections 202 and 207 of the Clean Streams Law (35 P. S. § § 691.202 and 691.207) and individual residential spray irrigation systems permitted by local agencies under section 7.3 of the act (35 P. S. § 750.7c).

(d) Where additional absorption area is installed to increase the total area of an existing system and flows are generated from a common treatment tank, loading per square foot of the new area and the existing area shall be equal.

(e) Discharge from roof gutters, foundation drainage, floor drains not from sewage generating connections and surface runoff may not be discharged to a treatment tank; nor may the discharges be permitted to flow over any part of the system. Final grading after system installation shall assure that stormwater and surface water is diverted away from all treatment tanks and absorption areas.

(f) The discharge of inadequately disinfected effluent or the discharge of effluent in a manner inconsistent with the system design specifications shall constitute a nuisance.

(g) A proposed absorption area or spray field having the following characteristics shall be considered unsuitable for the installation of an onlot system or an individual residential spray irrigation system and a permit shall be denied where:

(1) The slope of the proposed absorption area or spray field is greater than 25%.

(2) The area is identified by completed Federal Flood Insurance mapping as a floodway. Where there is no detailed Federal Flood Insurance mapping, a floodway extends 50 feet from the top of the stream bank as determined by the local agency.

(3) One or more rock outcrops exist within the proposed absorption area.

(4) In areas underlain by limestone, depressions left by earlier sinkholes exist either in whole or in part within the proposed absorption area or spray field.

(h) Absorption areas or spray fields may not be placed in or on fill unless the fill has remained in place for a minimum of 4 years to allow restoration of natural permeability. The fill shall be composed of clean mineral soil and meet the provisions of § § 73a.12 and 73a.13 (relating to limiting zone and percolation testing). A qualified soil scientist shall conduct a complete morphological evaluation and submit a report that states that the fill has developed a soil structure and natural drainage pattern, without evidence of a limiting zone.

(i) Absorption areas or spray fields shall be sited only in or on undisturbed soils.

(j) Absorption areas with a vertical isolation distance of less than 20 inches shall not be placed on concave slopes.

Cross References

This section cited in 25 Pa. Code § 71.63 (relating to retaining tanks).

73a.12. Limiting zone.

(a) *Absorption area.* Soil tests to determine the presence of a limiting zone and the capacity of the soil to permit the passage of water shall be conducted prior to permit issuance.

(1) On all locations where the installation of an absorption area is proposed, two or more excavations for the examination of a soil profile shall be provided. At a minimum, two excavations should bracket the proposed absorption area and the on-contour spacing of excavations shall not exceed 100 feet. Where absorption area length exceeds 100 feet, additional soil profile evaluations shall be required. When variable soil conditions exist on a proposed system site, or when large flow volumes or system sizes are proposed, additional soil profile evaluations may be required.

(2) The depth of the excavation shall be to the top of the limiting zone, or a maximum of 7 feet.

(3) All soil profile excavations used for siting and sizing the absorption area must bracket the area and at least one soil profile excavation shall be conducted within 10 feet of the proposed absorption area. Soil profile excavations shall not be located within the proposed absorption area. A description of the soil profile shall be recorded on the site investigation and percolation test report form for onlot treatment of sewage issued by the Department.

(4) Where examination of the soil profile reveals the absence of a limiting zone within 20 inches of the mineral soil surface, percolation tests shall be performed in accordance with § 73a.13 (relating to percolation tests) within the proposed absorption area except as provided in § § 73a.127, 128, and 129 (relating to shallow limiting zone at-grade absorption area, drip distribution and individual residence spray irrigation system). A soil morphological evaluation shall be conducted by a qualified soil scientist for those systems specified in § § 73a.127, 128 and 129.

(5) When the examination of the soil profile reveals a limiting zone between 10 and 20 inches of the mineral soil surface, percolation tests shall not be conducted except as provided in § 73a.6 (relating to general requirements for bonded disposal systems). A soil morphological evaluation shall be conducted in accordance with § 73a.14 (relating to morphological evaluation) by a qualified soil scientist except as provided in § 73a.129 (relating to individual residence spray irrigation system).

(6) When the examination of the soil profile reveals a limiting zone of a seasonal high water table within 10 inches of the mineral soil surface or a limiting zone as indicated by bedrock or coarse fragments with insufficient fine soil to fill voids that are located within 16 inches of the mineral soil surface, the site shall be deemed unsuitable for onlot sewage disposal and the permit shall be denied.

(7) The location and depth to the limiting zone of all soil profile excavations and the location of all percolation tests conducted on a lot shall be indicated on the plot plan of the Application for Sewage Disposal System issued by the Department or attached diagram.

(b) *Spray field.*

(1) Soil tests to determine the presence of a limiting zone shall be conducted prior to permit issuance.

(2) Spray fields shall be evaluated by evenly spacing the soil profiles within 10 feet of the perimeter of the proposed spray field at intervals of 100 feet or less.

(3) The soil profile information collected within the proposed spray field area shall be considered in the design and permitting of the system. Additional soils profiles, both

on the perimeter or within the proposed spray field, may be required when the sewage enforcement officer identifies trends in the soils profiles or surface features which document variable soils conditions in the area of the proposed spray field. These trends include, but are not limited to, unsuitable soil areas mixed with suitable soils within the proposed site and surface features such as rock outcrops, mine subsidence, boreholes and sinkholes.

(4) Soil profiles shall be evaluated to the depth of bedrock, or rock formation or 40 inches whichever is shallower.

(5) When the examination of the soil profile reveals any of the following limiting zone conditions, the site shall be deemed unsuitable for onlot sewage disposal and the permit for an individual residential spray irrigation system shall be denied.

(i) A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil redoximorphic features within 10 inches of the mineral soil surface.

(ii) A rock formation with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments within 16 inches of the mineral soil surface.

(iii) A rock formation that is so slowly permeable that it effectively limits downward passage of effluent within 10 inches of the mineral soil surface.

(iv) Any stratum or soil condition that is so slowly permeable that it effectively limits downward passage of effluent within 10 inches of the mineral soil surface.

(v) Saprolite within 16 inches of the mineral soil surface.

§ 73a.13. Percolation tests.

When the examination of the soil profile reveals a limiting zone between 10 and 20 inches of the mineral soil surface, percolation tests shall not be conducted except as provided in § 73a.6 (relating to general requirements for bonded disposal systems). Percolation tests shall be conducted in accordance with the following procedure:

(a) *Number and location*. Six or more tests that achieve measurable rates shall be made in separate test holes spaced uniformly over the proposed absorption area site.

(b) *Results.* Percolation holes located within the proposed absorption area shall be used in the calculation of the arithmetic average percolation rate. The final average percolation rate must have a minimum of 6 valid test holes.

(c) *Type of hole*. Holes having a uniform diameter of 6 to 10 inches shall be bored or dug as follows:

(1) To the depth of the proposed absorption area, where the limiting zone is 60 inches or more from the mineral soil surface.

(2) To a depth of 20 inches if the limiting zone is identified as seasonal high water table, whether perched or regional; rock formation; other stratum; or other soil condition that is so slowly permeable that it effectively limits downward passage of effluent, occurring at less than 60 inches from the mineral soil surface.

(3) To a depth of 8 inches above the limiting zone or 20 inches, whichever is less, if the limiting zone is identified as rock with open joints or with fractures or solution channels, or as masses of loose rock fragments including gravel with insufficient fine soil to fill the voids between the fragments, occurring at less than 60 inches from the mineral soil surface.

(d) *Preparation.* The bottom and sides of the hole shall be scarified with a knife blade or sharp-pointed instrument to completely remove any smeared soil surfaces and to provide a natural soil interface into which water may percolate. Loose material shall be removed from the hole. Two inches of coarse sand or fine gravel shall be placed in the bottom of the hole to protect the soil from scouring and clogging of the pores.

(e) *Procedure for presoaking.* Holes shall be presoaked, according to the following procedure, to approximate normal wet weather or in-use conditions in the soil:

(1) *Initial presoak.* Holes shall be filled with water to a minimum depth of 12 inches above the bottom of the hole and allowed to stand undisturbed for 8 to 24 hours prior to the percolation test.

(2) *Final presoak*. Immediately before the percolation test, water shall be placed in the hole to a minimum depth of 6 inches over the gravel and readjusted every 30 minutes for 1 hour.

(f) *Determination of measurement interval*. The drop in the water level during the last 30 minutes of the final presoaking period shall be applied to the following standard to determine the time interval between readings for each percolation hole:

(1) If water remains in the hole, the interval for readings during the percolation test shall be 30 minutes.

(2) If no water remains in the hole, the interval for readings during the percolation test may be reduced to 10 minutes.

(g) *Measurement.* After the final presoaking period, water in the hole shall again be adjusted to approximately 6 inches over the gravel and readjusted when necessary after each reading.

(1) Measurement to the water level in the individual percolation holes shall be made from a fixed reference point and shall continue at the interval determined from paragraph (f) for each individual percolation hole until a minimum of eight readings are completed or until a stabilized rate of drop is obtained whichever occurs first. A stabilized rate of drop means a difference of 1/4 inch or less of drop between the highest and lowest readings of four consecutive readings.

(2) The drop that occurs in the final period in percolation test holes, expressed as minutes per inch, shall be used to calculate the arithmetic average percolation rate.

(3) When the rate of drop in a percolation test is too slow to obtain a measurable rate, the rate of 240 minutes per inch shall be assigned to that hole for use in calculating the arithmetic average percolation rate. The absorption area may be placed over holes with no measurable rate when the average percolation rate for the proposed absorption area is within the limits established in subchapter J.

(4) When a percolation test hole is dry at the end of a 10-minute testing interval, that hole shall be disregarded and may not be used in the calculation of the arithmetic average percolation rate. The absorption area shall not be placed within 10 feet of any "dry" percolation hole.

§ 73a.14. Morphological evaluation.

Where the absorption area is proposed for installation on sites with soils having limiting zones within 20 inches of the mineral soil surface or a drip distribution absorption area is proposed, a qualified soil scientist shall conduct the necessary morphological evaluation except as provided in § § 73a.6 and 73a.129 (relating to general requirements for bonded disposal systems and individual residence spray irrigation systems). A report including soil profile descriptions for all soils evaluated, the soil drainage classification determination, and confirmation that the appropriate loading rate and horizontal linear load from the hydraulic linear loading rate table are met, shall be signed by the qualified soil scientist. The following procedure shall be followed:

(a) At a minimum, the depth to any limiting zone shall be:

(1) Greater than or equal to 10 inches to a seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil redoximorphic features.

(2) Greater than or equal to 16 inches to a rock formation with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments.

(3) Greater than or equal to 10 inches to a rock formation that is so slowly permeable that it effectively limits downward passage of effluent.

(4) Greater than or equal to 10 inches to any stratum or soil condition that is so slowly permeable that it effectively limits downward passage of effluent.

(5) Greater than or equal to 16 inches to saprolite.

(b) Distribution of the effluent in the absorption area will be determined by the soil profile evaluations and vertical distance between the bottom of the aggregate and the top of the seasonal high water table or rock formation.

(c) For sites that do not show evidence of seasonal high water tables, or a rock formation or other stratum or soil condition, which effectively limits the downward passage of effluent, a minimum of two soil profile evaluations shall be evaluated, on contour, bracketing the proposed absorption area.

(1) The on-contour spacing of the soil profile evaluations shall not exceed 100 feet in length.

(2) In cases where the site conditions require an aggregate area that exceeds 100 feet in length, additional test pit evaluations shall be required to verify the soil morphology of the absorption area. No down gradient area test pits are required unless the qualified soil scientist, or Department soil scientist, determines that site conditions warrant their evaluation.

(3) Overall site suitability will be limited by the most restrictive depth to rock formation and the soil morphology from all of the test pits evaluated.

(4) System sizing will be based on the infiltration loading rate (ILR) of the most restrictive horizon in all the soil test pits evaluated, or 670 square feet, whichever is greater.

(d) For sites that have seasonal high water tables or restrictive horizons a minimum of four soil profile test pits shall be evaluated to verify the morphology of the proposed absorption site.

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(1) At a minimum, two soil profile evaluations upslope and two soil profile evaluations down slope and shall bracket the proposed absorption area.

(2) The on-contour spacing of the soil profile evaluations shall not exceed 100 feet in length.

(3) The down slope spacing of the soil profile evaluations shall be a minimum of 50 feet from the down slope edge of the absorption area.

(4) In cases where the calculated aggregate area length exceeds 100 feet, additional test pit evaluations shall be required to verify the soil morphology of both the absorption area and the downgradient area.

(5) Overall site suitability will be limited by the most restrictive depth to the seasonal high water table, depth to rock formation and soil morphology from all of the soil test pits evaluated.

Cross References

This section cited in 25 Pa. Code § 71.63 (relating to retaining tanks).

§ 73a.15. Treatment requirements.

(a) Minimum required treatment levels before going into the soil absorption area shall conform to the following table. Additional levels of treatment may be used in excess of the minimum required.

Vertical Isolation Distance (inches)	Minimum Treatment Level
≥48	Primary
≥20-<48	Secondary
≥10-<20 to seasonal high water table	Advanced with disinfection
≥16-<20 to rock	Advanced with disinfection

(b) Advanced treatment with nutrient removal is required on sites where the Department has documented that the quality of water supplies within 1/4 mile exceeds 10 mg/L nitrate-nitrogen and/or the Department or local agency has determined that known geological conditions may contribute to the potential for groundwater pollution from the system.

Subchapter C. BUILDING SEWERS

Sec.
73a.21. Specifications.

§ 73a.21. Specifications.

(a) Building sewers shall be constructed of pipe with a minimum 2,500 pound crush test specification or meeting the requirements of ASTM D 2665 for polyvinyl chloride (PVC) drain, waste and vent (DWV) pipe.

(b) The local agency may restrict the type of materials used by code, ordinance or resolution and shall notify the applicant when restrictions are imposed.

(c) When the maximum daily flow of sewage from an establishment is 1,000 gallons or less, building sewers shall be at least 3 inches in diameter unless otherwise specified by local plumbing or building codes. When the maximum daily flow exceeds 1,000 gallons per day, all building sewers shall be at least 6 inches in diameter unless otherwise specified by local plumbing or building codes.

(d) Cleanouts shall be provided at the junction of the building drain and building sewer.

(e) Cleanouts shall be provided at intervals of not more than 100 feet.

(f) Bends ahead of the treatment tank shall be limited to 45° or less where possible. If 90° bends cannot be avoided, they shall be made with two 45° bends. A cleanout shall be provided at the bend.

(g) The grade of the building sewer shall be at least 1/8 inch per foot; however, the grade of the 10 feet of building sewer immediately preceding the treatment tank may not exceed 1/4 inch per foot.

(h) Building sewers shall be constructed with watertight joints, shall be of sufficient strength to withstand imposed loads and installed on material suitable for preventing damage from settling.

(i) The building sewer shall be installed to allow continuous venting of the treatment tank through the main building stack unless otherwise specified by local plumbing or building codes.

(j) Building sewers shall be connected to treatment tanks by means of watertight mechanical seals. Use of any grouting is not permitted.

Subchapter D. PRIMARY TREATMENT

Sec.
73a.31. Standards for septic tanks.

§ 73a.31. Standards for septic tanks.

(a) *Capacity.*

(1) The minimum liquid septic tank capacity for any installation shall be 1000 gallons.

(2) The septic tank capacity shall have a minimum hydraulic retention time of 2.5 days using estimated maximum daily sewage flows from § 73a.4 (relating to sewage flows).

(3) A septic tank consists of a dual compartment tank or 2 single compartment tanks connected in series. Two single compartment tanks connected in series shall be equivalent to one dual compartment tank.

(4) Where more than one septic tank is used to attain the total required hydraulic capacity, the septic tanks shall be connected in parallel. All tank sets shall have equal capacity and receive equal loading.

(b) *Construction.*

(1) Septic tanks shall be constructed of sound and durable material not subject to excessive corrosion or decay.

(i) Precast concrete tanks shall have a minimum wall thickness of 2 1/2 inches and be adequately reinforced.

(ii) Precast slabs used as covers shall have a thickness of at least 3 inches and be adequately reinforced.

(iii) Tanks having a liquid capacity of 5,000 gallons or less may not be constructed of blocks, bricks or similar masonry construction.

(iv) Tanks having a capacity in excess of 5,000 gallons may be constructed onsite to meet the standards of the National Concrete Masonry Association for reinforcement and waterproofing. These standards are contained in *Basement Manual*, Design and Construction Using Concrete Masonry, TR 149. National Concrete Masonry Association, 2001, *Concrete Masonry Basement Wall Construction*, TEK 3-11. National Concrete Masonry Association, 2001 and

Preventing Water Penetration in Below-Grade Concrete Masonry Walls, TEK 19-3A. National Concrete Masonry Association, 2001.

(v) Steel tanks shall meet the requirements of Underwriters Laboratory (UL) standards 1746 or 70.

(2) The tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(i) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and allowed to stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(ii) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90% of the applied vacuum is held for a minimum of 5 minutes.

(3) The depth of liquid in any tank or its compartments shall be:

(i) Not less than 2 1/2 nor more than 5 feet for tanks having a liquid capacity of 600 gallons or less.

(ii) Not less than 3 feet nor more than 7 feet for tanks having a liquid capacity of more than 600 gallons.

(4) No tank or compartment may have an inside horizontal dimension less than 36 inches.

(5) A septic tank shall consist of a single tank with 2 compartments or 2 single compartment tanks connected in series. The first compartment or first tank shall have at least the same capacity as the second but may not exceed twice the capacity of the second. Multiple tank sets connected for the purpose of achieving the required hydraulic capacity shall only be permitted where the sets are connected in parallel. All tank sets shall have equal capacity and receive equal loading.

(6) Measures to control floatation of the tank shall be implemented when the tank is installed in areas below any indication of a water table.

(7) Septic tanks used with secondary and advanced treatment systems shall be rectangular or cylindrical in shape.

(c) *Inlet and outlet connections.*

(1) The bottom of the inlet shall be a minimum of 3 inches above the bottom of the outlet of the individual tank.

(2) Inlet baffles or vented tees shall extend below the liquid level at least 6 inches. Penetration of the inlet device may not exceed that of the outlet device.

(3) The outlet baffles or vented tees of each tank or compartment shall extend below the liquid surface to a distance equal to 40% of the liquid depth. Penetration of outlet baffles or tees in horizontal cylindrical tanks shall be equal to 35% of the liquid depth.

(4) The inlet and outlet baffles or vented tees shall extend above liquid depth to approximately 1 inch from the top of the tank. Venting shall be provided between compartments and each tank.

(5) The outlet baffles or vented tees of the last compartment or tank shall be equipped with a solids retainer.

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

(7) All inlet and outlet pipes shall be connected to tanks by means of a sealed flexible joint connector. Use of any grouting is not permitted.

(d) *Treatment tank access.*

(1) Access to each tank or compartment of the tank shall be provided by a manhole with an inside dimension of at least 20 inches square (20 x 20) or in diameter, with a removable cover. The top of the tank containing the manhole or the top of a manhole extension may not be more than 12 inches below grade level. If access is extended to grade, the access cover shall be airtight. Grade level access covers shall be secured by bolts or locking mechanisms, or have sufficient weight to prevent unauthorized access.

(2) The ground shall slope away from any access extended to grade level.

(3) Covers, connections and piping shall be designed and constructed so as to withstand an anticipated minimum AASHTO H-10 loading.

(e) *Inspection port.* A maximum 4-inch diameter inspection port with sealed cover shall be installed to grade level above the inlet tee. The treatment tank access may be used as the inspection port provided the access is extended to grade and gives a clear and unobstructed view of the baffles.

(f) The septic tank shall be installed using a minimum of 4 inches of sand, pea gravel or other similar suitable aggregate to bed the tank.

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(g) *Maintenance.*

(1) The depth of sludge and scum in the septic tank shall be measured at least once every 3 years. Removal of septage or other solids from treatment tanks shall be done whenever an inspection program reveals that the treatment tanks are filled with solids in excess of 1/3 of the liquid depth of the tank or with scum in excess of 1/3 of the liquid depth of the tank. Pumping may be substituted for measurement.

(2) The tank and inlet and outlet baffles shall be inspected every 3 years for structural integrity.

(3) The effluent filter shall be cleaned or replaced according to the manufacturer's recommended maintenance schedule.

Subchapter E. SECONDARY TREATMENT

Sec.

§ 73a.41. Performance standards

(a) Secondary treatment components shall have demonstrated a treatment level of less than 30 milligrams per liter (mg/L) biochemical oxygen demand (BOD_5) and total suspended solids (TSS) based upon the 95^{th} percentile.

(b) Secondary treatment components shall be constructed in accordance with this subchapter unless one of the following conditions is met:

(1) The component design has been submitted for review and classification under § 73a.152 (relating to alternate sewage systems) or § 73a.153(a)(1)-(4) (relating to experimental sewage systems).

(2) The component is permitted under the technology verification process outlined in § 73a.153(a)(5) (relating to experimental sewage systems).

(c) The minimum maintenance standards for each component in a treatment system shall be listed on the permit issued by the local agency for the sewage facilities under § 72.25 (relating to issuance of permits). Any treatment system for which a permit was issued prior to [insert the effective date of these amendments] must be operated and maintained, at a minimum, in accordance with the minimum maintenance standards applicable to the components of that system as detailed in this chapter.

(d) The plans, specifications, reports and supporting documentation submitted as part of the permit application shall become part of the permit.

§ 73a.42. Aerobic treatment unit.

(a) Capacity shall comply with the following:

(1) The rated treatment capacity of an aerobic treatment unit shall be specified by the manufacturer.

(2) The minimum manufacturer's rated treatment capacity of an aerobic treatment unit approved under this section is 400 gallons per day. The maximum manufacturer's rated treatment capacity of an aerobic treatment unit approved under this section is 1,500 gallons per day.

(3) For all installations, the rated treatment capacity shall meet or exceed the maximum daily sewage flow as determined from § 73a.4 (relating to sewage flows).

(b) Aerobic treatment units shall bear the seal of the NSF indicating testing and approval by that agency under Standard No. 40. NSF maintains a current list of aerobic treatment units that have been found to be in conformance with this standard.

(c) Multiple aerobic treatment units connected for the purpose of achieving required hydraulic capacity shall only be permitted where the units are connected in parallel. All units shall have equal capacity and receive equal loading.

(d) Every aerobic treatment unit shall be equipped with a visual and audible alarm system that shall be designed to respond to any electrical or mechanical failure or malfunction of the unit or any component thereof.

(e) Aerobic tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(1) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and allowed to stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(2) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90 % of the applied vacuum is held for a minimum of 5 minutes.

(f) An effluent filter bearing the seal of NSF indicating testing and approval by that agency under Standard No. 46 shall be installed on the outlet of the aerobic treatment unit

(g) The aerobic tank shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the tank.

(h) Covers, connections and piping shall be designed and constructed so as to withstand an anticipated minimum AASHTO H-10 loading.

(i) *Maintenance*.

(1) An annual inspection of the system and pumping of the tank is required.

(2) The effluent filter shall be cleaned or replaced according to the manufacturer's maintenance schedule.

(3) An annual sample for BOD_5 and TSS shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

§ 73a.43. Free access media filters.

(a) *Filter.* Free access media filters shall be considered secondary treatment technologies when they receive effluent from primary treatment unit operations. The filter shall be constructed in a tank meeting the following specifications:

(1) The filter shall have a maximum loading rate of 5 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using a septic tank for primary treatment.

(2) The filter shall have a maximum loading rate of 10 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using an aerobic tank for primary treatment.

(3) Filter tanks shall be watertight and made of a sound, durable material that is not subject to excessive corrosion or decay.

(4) The filter tank tank shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the tank.

(5) Concrete filter tanks shall have a minimum wall thickness of 2 1/2 inches and be adequately reinforced.

(6) If precast slabs are used as filter tank tops to support the access covers, the slabs shall have a thickness of at least 3 inches and be adequately reinforced.

(7) Filter tanks shall be designed and constructed so that the depth from the cover to the top of the media layer provides sufficient freeboard to allow for maintenance of the media surface.

(8) If the filter tank access is provided by a minimum of two round or square access openings, these access openings shall be a minimum of 1,600 square inches in size and provide access to the entire surface of the filter. The tank wall may be set a maximum of 12 inches below final grade.

A single rectangular access opening may be used if the following requirements are met:

(i) The minimum dimension of any access opening is greater than or equal to 36 inches.

(ii) For access openings with a dimension less than 60 inches, the inside of the tank wall is no greater than 18 inches from the edge of the opening in the direction of that dimension.

(iii) For access openings with a dimension greater than or equal to 60 inches, the inside of the tank wall is no greater than 36 inches from the edge of the opening in the direction of that dimension.

(iv) If more than one access opening is used, the distance between the openings is no greater than 36 inches.

(9) The access openings shall be extended a minimum of 6 inches above final grade.

(10) Access covers shall be insulated against severe weather, secured by bolts or locking mechanisms, prevent water infiltration and the entrance of debris, and be lightweight to facilitate routine maintenance.

(11) All inlet and outlet pipes shall be connected to the filter tank by means of a sealed flexible joint connector. Use of any grouting is not permitted.

(b) *Media.* A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, the testing results, the testing date, the amount of material purchased under this certification and the delivery date. All testing shall be conducted within 90 days of the delivery date. The media to be supplied shall meet the following specifications:

(1) The media shall have an effective size of between 0.3 to 0.6 mm, a uniformity coefficient of less than 3.5 and less than 4% of the media passing the #100 sieve. The sieve analysis shall be conducted in accordance with the most recent revision of ASTM C 136 or AASHTO No. T27.

(2) The media may not contain more than 3% by weight materials finer than #200 sieve as determined using the most recent revision of ASTM C 117 or AASHTO No. T11.

(c) *Construction.* The media filter shall be constructed according to the following standards:

(1) A minimum 3-inch diameter perforated underdrain pipe with a minimum 2,500 pound crush test specification or meeting the requirements of the most recent revision of ASTM D 2665 for polyvinyl chloride (PVC) drain, waste and vent (DWV) pipe shall be placed on the bottom of the tank.

(2) Two rows of perforations between 1/2 to 3/4 inch in diameter shall be drilled in the underdrain pipe at 6-inch intervals and the pipe shall be placed so the perforations face downward and the rows are approximately 22.5° from bottom dead center.

(3) All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iii) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(iv) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(v) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(vi) Coarse aggregate shall be placed around the underdrain to a total depth of 5 inches from the bottom of the tank. The coarse aggregate shall meet AASHTO No. 3, 467, 5 or 57 size and grading requirements. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(vii) A minimum depth of 4 inches of aggregate meeting the uniform size and grading requirements of AASHTO No. 8 shall be placed over the aggregate underdrain material.

(viii) The coarse aggregate shall be covered be a geotextile material prior to placing the filter media.

(4) Media shall be placed over the coarse aggregate to a depth of at least 24 inches.

(5) The media in the filter may not be greater than 36 inches deep.

(6) A high water alarm shall be installed in the filter tank that produces an audible and visual alarm when effluent backs up on the filter surface to 12 inches above the surface of the media.

(7) When two filters or chambers are required to treat septic tank effluent, the duplicate units shall, at the discretion of the designer, be flooded alternately, periodically by using valves, or simultaneously.

(8) The central distribution piping may not be more than 2 inches in diameter when using pressure distribution and shall be designed and installed to convey a minimum 2-inch flood dose of effluent to the surface of the media filter. When using gravity distribution, the central distribution piping shall be a minimum of 3 inches in diameter and installed level.

(9) The height of the central distribution system's effluent outlet above the media surface shall allow for the installation of a splash plate. When using pressure distribution, the height of the central distribution system's effluent outlet above the media surface shall also allow for the maximum flooding depth of the media filter.

(10) A concrete splash plate or other suitable material shall be located under each effluent outlet to prevent scouring of the media surface.

(11) The filter shall be capable of being isolated from the system by valves to perform maintenance.

(12) The tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(i) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and allowed to stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(ii) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90 % of the applied vacuum is held for a minimum of 5 minutes.

(d) *Maintenance.* The filter shall be inspected at least annually and shall be in compliance with the following standards:

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(1) Solids may not be accumulated on the surface of the media in the free access media filter nor may 12 inches of effluent be ponded over the media. The high water alarm must be functional.

(2) The surface of the free access media filter shall be raked and porous, and any media removed must be replaced with sufficient media to maintain the depth at a minimum of 24 inches.

(3) The plumbing in the free access media filter tank shall be functional and free of leaks, and the splash plates must be in place.

(4) The filter tank and cover shall be structurally sound and secured to inhibit unauthorized access. Any insulation must be in place and in good condition.

(5) The area around the outside of the filter tank shall be free of ponded effluent and downgradient seepage.

(6) An annual sample for BOD_5 and TSS shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

§ 73a.44. Buried media filters.

(a) *Location.*

(1) When buried media filters are proposed to be installed in areas where bedrock is encountered above the proposed depth of the media filter, or where the seasonal high groundwater table rises above the proposed depth of the media filter, the designer should consider measures to prevent filter and liner damage and groundwater infiltration.

(2) A buried media filter shall be constructed in excavated native soil or clean stabilized fill.

(b) *Size.*

(1) The filter shall have a maximum loading rate of 0.8 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using a septic tank for primary treatment.

(2) The filter shall have a maximum loading rate of 1.2 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using an aerobic tank for primary treatment.

(c) *Coarse aggregate.* All coarse aggregate shall meet the following specifications:

(1) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(2) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(3) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(4) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(5) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(6) At least 2 inches of clean coarse aggregate shall be placed surrounding underdrains and distribution pipes. The coarse aggregate shall meet AASHTO No. 3, 467, 5 or 57 size and grading requirements. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(7) A minimum depth of 4 inches of coarse aggregate shall be placed over the aggregate underdrain material. Coarse aggregate used in the transition layer shall meet the uniform size and grading requirements of AASHTO No. 8. A layer of geotextile material may be placed on top of both layers of aggregate to prevent migration of soil or media into the aggregate.

(8) The coarse aggregate shall be covered with geotextile material prior to placing the filter media.

(d) *Media.* At least 24 inches of clean media shall be placed over the underdrain aggregate. All media shall meet the following specifications:

(1) All media testing shall be conducted within 90 days of the delivery date.

(2) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(3) The media shall consist of fine aggregate meeting the uniform size and grading requirements for fine aggregate in the most recent revision of ASTM C 33.

(4) The media may not contain more than 3% by weight materials finer than #200 sieve as determined using the most recent revision of ASTM C 117 or AASHTO No. T11.

(e) The minimum depth of earth cover over the coarse aggregate in all installations shall be 12 inches. When the top of the aggregate is less than 12 inches from the undisturbed soil surface, the soil cover shall extend beyond the filter area by at least 3 feet on all sides. The soil over the media filter shall be so graded that surface water will run off, consist of soil suitable for the growth of vegetation and be seeded to control erosion.

(f) *Underdrain piping.*

(1) A minimum 3-inch diameter perforated underdrain pipe with a minimum 2,500 pound crush test specification or meeting the requirements of the most recent revision of ASTM D 2665 for polyvinyl chloride (PVC) drain, waste and vent pipe shall be placed on the bottom of the tank.

(2) Underdrain piping shall be laid on a grade of 3 to 6 inches per 100 feet sloped to the outfall pipe.

(3) Underdrain piping shall be positioned between the distribution laterals to maximize effluent travel through the filter media.

(4) Underdrain piping holes shall be equal or greater in number and size to the distribution piping holes.

(5) Underdrain piping shall have two rows of holes placed at approximately 22.5° angle from bottom dead center along the bottom half of the pipe.

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(6) The outfall pipe from the underdrain header shall have an antiseep collar and bentonite clay plug or a leak proof boot sealed as per manufacturer's instructions to the subsurface media filter liner.

(g) *Filter base and liner.* The base of the filter shall be sloped to the underdrain pipe a maximum of 1%. An impervious liner of hyplon, polyvinyl chloride or polyethylene sheeting of 20 mil (0.020 inch) thickness or equal shall be installed on a tamped earth base to prevent seepage to the groundwater. A concrete bottom and sides may also be used at the discretion of the designer. A 2-inch layer of sand or a layer of 10-ounce porous geotextile material shall be provided on each side of the liner to prevent punctures and tears. Any seams shall be made according to manufacturer's specifications.

(h) *Distribution of effluent.* The buried media filter shall use pressure distribution meeting the requirements of Subchapter I (relating to dosing and distribution requirements).

(i) *Maintenance.*

(1) The area around the media filter shall be inspected annually to be free of ponded effluent and downgradient seepage.

(2) An annual sample for BOD_5 and TSS shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

§ 73a.60. Proprietary components.

(a) The Department shall enter into an agreement with an independent entity for the maintenance of a list of proprietary onlot sewage system components found to be in conformance with the requirements of this subchapter, including review under the technology verification process specified in § 73a.153.

(b) Components shall be maintained in accordance with the manufacturer's specifications approved by the Department and shall include a minimum annual inspection of the component.

(c) An annual sample for BOD_5 and TSS shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

(d) All treatment units previously allowed under this subchapter shall be NSF Standard 40 certified within 3 years after [insert the effective date of these amendments].

(e) A sewage enforcement officer who has successfully completed an appropriate Department sponsored training course that included the specific technology or has received review delegation in writing from the Department may independently review the design and issue the permit for system designs approved under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

Subchapter F. ADVANCED TREATMENT

Sec.

§ 73a.61. Performance standards.

(a) Advanced treatment components shall have demonstrated a treatment level of less than 10 milligrams per liter (mg/L) biochemical oxygen demand (BOD_5) and total suspended solids (TSS) based upon the 95th percentile.

(b) Advanced treatment components shall be constructed in accordance with this subchapter unless one of the following conditions is met:

(1) The component design has been submitted for review and classification under § 73a.152 (relating to alternate sewage systems) or § 73a.153(a)(1)-(4) (relating to experimental sewage systems).

(2) The component is permitted under the technology verification process outlined in § 73a.153(a)(5) (relating to experimental sewage systems).

(c) The minimum maintenance standards for each component in a treatment system shall be listed on the permit issued by the local agency for the sewage facilities under § 72.25 (relating to issuance of permits). Any treatment system for which a permit was issued prior to [insert the effective date of these amendments] must be operated and maintained, at a minimum, in accordance with the minimum maintenance standards applicable to the components of that system as detailed in this chapter.

(d) The plans, specifications, reports and supporting documentation submitted as part of the permit application shall become part of the permit.

§ 73a.62. Recirculating subsurface filter

A sewage enforcement officer 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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

The recirculating subsurface filter (RSF) shall be designed as set forth below.

(a) *Location*:

An RSF shall not be installed in areas where bedrock is found at a depth less than the proposed depth of the media filter. However, an RSF can be installed when the seasonal high groundwater table rises above the bottom of the media filter if a suitable synthetic liner which will prevent sewage exfiltration or groundwater infiltration is included in the design.

(b) *Size*:

(1) The filter shall have a maximum loading rate of 1.3 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using a septic tank for primary treatment.

(2) The filter shall have a maximum loading rate of 2 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using an aerobic tank for primary treatment.

(c) *Media*:

(1) *Coarse aggregate*: All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iii) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(iv) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(v) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(vi) At least 2 inches of clean coarse aggregate shall surround underdrains and distribution pipes. The aggregate shall meet AASHTO No. 3, 467, 5 or 57 size and grading requirements. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(vii) A 3-inch layer of clean coarse aggregate must be placed on the top of the underdrain aggregate to help prevent migration of the media into the aggregate. The aggregate shall meet AASHTO No. 8 size and grading requirements.

(viii) The coarse aggregate shall be covered with geotextile material prior to placing the filter media.

(2) *Media*: At least 24 inches of media must be used. All media shall meet the following specifications:

(i) All media testing shall be conducted within 90 days of the delivery date.

(ii) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(iii) The media shall consist of fine aggregate meeting the uniform size and grading requirements for fine aggregate in ASTM C 33.

(iv) The media may not contain more than 3% by weight materials finer than #200 sieve as determined using the most recent revision of ASTM C 117 or AASHTO No. T11.

(3) *Cover Soil*: A layer of geotextile material must be placed over the coarse aggregate followed by a minimum of 12 inches of cover soil material in all installations. Ponding observation ports shall be installed to the top of the coarse aggregate through the cover soil material. The cover soil over the media filter must consist of soil suitable for growth of vegetation, be seeded to control erosion, and be graded so that surface water will run off.

(d) *Underdrain Piping:*

(1) A minimum 3-inch diameter perforated underdrain pipe with a minimum 2,500 pound crush test specification or meeting the requirements of the most recent revision of ASTM D 2665 for polyvinyl chloride (PVC) drain, waste and vent pipe shall be placed on the bottom of the tank.

(2) Underdrain piping shall be laid on a grade of 3 to 6 inches per 100 feet, sloped to the outfall pipe. Piping shall be placed between the distribution laterals to optimize effluent travel through the filter media.

(3) Underdrain piping holes shall be equal to or greater in number and size to the distribution piping holes. The underdrain piping shall have two rows of holes placed at approximately 22.5° angles from bottom dead center along the bottom half of the pipe.

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(4) The required effluent recirculation to outfall drain ratio is 3:1. This ratio can be achieved by one of the following methods or equivalent:

(i) The underdrain is divided by an 8-inch high baffle placed under the liner and perpendicular to the long sidewall of the filter. Seventy-five percent of the effluent collected by the underdrain shall be recirculated back to the RSF dose tank through a T-configured underdrain pipe and gravity discharge pipe. The remaining 25% of the effluent shall be collected by an underdrain pipe set parallel to the baffle with gravity discharge to the disinfection unit if required or to the absorption area.

(ii) A typical flow splitter may be installed so that 75% of the effluent collected by the underdrain is recirculated back to the RSF dose tank. The remaining 25% shall be conveyed by gravity to the disinfection unit if required or to the absorption area.

(5) Underdrain piping shall have a cleanout extended to grade at a minimum of 1 foot from the sidewall and baffle.

(e) *Filter Base and Liner*: The base of the filter shall be sloped at a 1% minimum slope to the underdrain pipe. An impervious liner of hyplon, polyvinyl chloride (PVC) or polyethylene sheeting of a minimum of 20 mil thickness or equal must be installed on a tamped earth base to prevent seepage to the groundwater. A 2-inch layer of sand or a layer of 10-ounce porous geotextile material must be placed on each side of the liner to prevent punctures and tears. Seams must be made according to the liner manufacturer's specifications.

(f) The tank shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the tank.

(g) All inlet and outlet pipes shall be connected to tanks by means of a sealed flexible joint connector. Use of any grouting is not permitted.

(h) The tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(1) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and allowed to

stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(2) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90 % of the applied vacuum is held for a minimum of 5 minutes.

(i) *Maintenance*.

(1) The area around the outside of media filter shall be inspected annually to be free of ponded effluent and downgradient seepage.

(2) An annual sample for BOD_5 and TSS shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

§ 73a.63. Free access media filters.

A sewage enforcement officer 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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

The free access media filter shall be designed as set forth below.

(a) *Filter*. Free access media filters shall be considered advanced treatment technologies when they receive effluent from primary treatment unit operations. The filter shall be constructed in a tank meeting the following specifications:

(1) The filter shall have a maximum loading rate of 1.25 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using a septic tank for primary treatment.

(2) The filter shall have a maximum loading rate of 2 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using an aerobic tank for primary treatment.

(3) Filter tanks shall be watertight and made of a sound, durable material that is not subject to excessive corrosion or decay.

(4) The tank shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the tank.

(5) Concrete filter tanks shall have a minimum wall thickness of 2 1/2 inches and be adequately reinforced.

(6) If precast slabs are used as filter tank tops to support the access covers, the slabs shall have a thickness of at least 3 inches and be adequately reinforced.

(7) Filter tanks shall be designed and constructed so that the depth from the cover to the top of the media layer provides sufficient freeboard to allow for maintenance of the media surface.

(8) If the filter tank access is provided by a minimum of two round or square access openings, these access openings shall be a minimum of 1,600 square inches in size and provide access to the entire surface of the filter. The tank wall shall be set at a maximum of 12 inches below final grade.

A single rectangular access opening may be used if the following requirements are met:

(i) The minimum dimension of any access opening is greater than or equal to 36 inches.

(ii) For access openings with a dimension less than 60 inches, the inside of the tank wall is no greater than 18 inches from the edge of the opening in the direction of that dimension.

(iii) For access openings with a dimension greater than or equal to 60 inches, the inside of the tank wall is no greater than 36 inches from the edge of the opening in the direction of that dimension.

(iv) If more than one access opening is used, the distance between the openings is no greater than 36 inches.

(9) The access openings shall be extended a minimum of 6 inches above final grade.

(10) Access covers shall be insulated against severe weather, secured by bolts or locking mechanisms, prevent water infiltration and the entrance of debris, and be lightweight to facilitate routine maintenance.

(11) All inlet and outlet pipes shall be connected to tanks by means of a sealed flexible joint connector. Use of any grouting is not permitted.

(b) *Media.* The media to be supplied shall meet the following specifications:

(1) All media testing shall be conducted within 90 days of the delivery date.

(2) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(3) Have an effective size of between 0.3 to 0.6 mm, a uniformity coefficient of less than 3.5 and less than 4% of the aggregate passing the #100 sieve. The sieve analysis shall be conducted in accordance with the most recent revision of ASTM C 136 or AASHTO No. T27.

(4) Not contain more than 3% by weight materials finer than #200 sieve as determined using the most recent revision of ASTM C 117 or AASHTO No. T11.

(c) *Construction.* The media filter shall be constructed according to the following standards:

(1) A minimum 3-inch diameter perforated underdrain pipe with a minimum 2,500 pound crush test specification or meeting the requirements of the most recent revision of ASTM D 2665 for polyvinyl chloride (PVC) drain, waste and vent (DWV) pipe shall be placed on the bottom of the tank.

(2) Two rows of perforations between 1/2 to 3/4 inch in diameter shall be drilled in the underdrain pipe at 6-inch intervals and the pipe shall be placed so the perforations face downward and the rows are approximately 22.5° from bottom dead center.

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(3) All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iii) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(iv) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(v) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(vi) Coarse aggregate shall be placed around the underdrain to a total depth of 5 inches from the bottom of the tank. The coarse aggregate shall meet AASHTO No. 3, 467, 5 or 57 size and grading requirements. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(vii) A minimum depth of 4 inches of aggregate meeting the uniform size and grading requirements of AASHTO No. 8 shall be placed over the aggregate underdrain material.

(viii) The coarse aggregate shall be covered be a geotextile material prior to placing the filter media.

(4) Media shall be placed over the coarse aggregate to a depth of at least 24 inches.

(5) The media in the filter may not be greater than 36 inches deep.

(6) A high water alarm that produces an audible and visual alarm when effluent backs up on the filter surface to 12 inches above the surface of the media shall be installed in the filter tank.

(7) When two filters or chambers are required to treat septic tank effluent, the duplicate units shall, at the discretion of the designer, be flooded alternately, periodically by using valves, or simultaneously.

(8) The central distribution piping may not be more than 2 inches in diameter when using pressure distribution and shall be designed and installed to convey a minimum 2-inch flood dose of effluent to the surface of the media filter. When using gravity distribution, the central distribution piping shall be a minimum of 3 inches in diameter and installed level.

(9) The height of the central distribution system's effluent outlet above the media surface shall allow for the installation of a splash plate. When using pressure distribution, the height of the central distribution system's effluent outlet above the media surface shall also allow for the maximum flooding depth of the media filter.

(10) A concrete splash plate or other suitable material shall be located under each effluent outlet to prevent scouring of the media surface.

(11) The filter shall be able to be isolated from the system to perform maintenance.

(12) The tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(i) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and

allowed to stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(ii) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90 % of the applied vacuum is held for a minimum of 5 minutes.

(d) *Maintenance.* The filter shall be inspected a minimum of annually and shall be in compliance with the following standards:

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(1) Solids do not accumulate on the surface of the media in the free access media filter nor is 12 inches of effluent be ponded over the media. The high water alarm must be functional.

(2) The surface of the free access media filter is raked and porous, and any media removed must be replaced with sufficient media to maintain the depth at a minimum of 24 inches.

(3) The plumbing in the free access media filter tank is functional and free of leaks, and the splash plates must be in place.

(4) The filter tank and cover is structurally sound and secured to inhibit unauthorized access. Any insulation must be in place and in good condition.

(5) The area around the outside of the filter tank is free of ponded effluent and downgradient seepage.

(6) An annual sample for BOD_5 and TSS shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

§ 73a.64. Buried media filters.

A sewage enforcement officer 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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

The buried media filter shall be designed as set forth below.

(a) *Location.*

(1) When buried media filters are proposed to be installed in areas where bedrock is encountered above the proposed depth of the media filter, or where the seasonal high groundwater table rises above the proposed depth of the media filter, the designer should consider measures to prevent filter and liner damage and groundwater infiltration.

(2) A buried media filter shall be constructed in excavated native soil or clean stabilized fill.

(b) *Size.*

(1) The filter shall have a maximum loading rate of 0.67 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using a septic tank for primary treatment.

(2) The filter shall have a maximum loading rate of 1.0 gallons per day per square foot of filter surface area based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows) when using an aerobic tank for primary treatment.

(c) *Media.*

(1) All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iv) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(v) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(vi) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(vii) At least 2 inches of clean coarse aggregate shall be placed surrounding underdrains and distribution pipes. The coarse aggregate shall meet AASHTO No. 3, 467, 5 or 57 size and grading requirements. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(viii) A minimum depth of 4 inches of aggregate shall be placed over the aggregate underdrain material. Coarse aggregate used in the transition layer shall meet the uniform size and grading requirements of AASHTO No. 8. A layer of porous geotextile material may be placed on top of both layers of aggregate to prevent migration of soil or media into the aggregate.

(ix) The coarse aggregate shall be covered be a geotextile material prior to placing the filter media.

(4) At least 24 inches of media must be used. All media shall meet the following specifications:

(i) All media testing shall be conducted within 90 days of the delivery date.

(ii) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(iii) The media shall consist of fine aggregate meeting the uniform size and grading requirements for fine aggregate in the most recent revision of ASTM C 33.

(iv) The media may not contain more than 3% by weight materials finer than #200 sieve as determined using the most recent revision of ASTM C 117 or AASHTO No. T11.

(5) The minimum depth of earth cover over the coarse aggregate in all installations shall be 12 inches. When the top of the aggregate is less than 12 inches from the undisturbed soil surface, the soil cover shall extend beyond the filter area by at least 3 feet on all sides. The soil over the media filter shall be so graded that surface water will run off, consist of soil suitable for the growth of vegetation and be seeded to control erosion.

(d) *Underdrain piping.*

(1) A minimum 3-inch diameter perforated underdrain pipe with a minimum 2,500 pound crush test specification or meeting the requirements of the most recent revision of ASTM D 2665 for polyvinyl chloride (PVC) drain, waste and vent pipe shall be placed on the bottom of the tank.

(2) Underdrain piping shall be laid on a grade of 3 to 6 inches per 100 feet sloped to the outfall pipe.

(3) Underdrain piping shall be positioned between the distribution laterals to maximize effluent travel through the filter media.

(4) Underdrain piping holes shall be equal or greater in number and size to the distribution piping holes.

(5) Underdrain piping shall have two rows of holes placed at approximately 22.5° angle from bottom dead center along the bottom half of the pipe.

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(6) The outfall pipe from the underdrain header shall have an antiseep collar and bentonite clay plug or a leak proof boot sealed as per manufacturer's instructions to the subsurface media filter liner.

(e) *Filter base and liner.* The base of the filter shall be sloped to the underdrain pipe a maximum of 1%. An impervious liner of hyplon, polyvinyl chloride or polyethylene sheeting of 20 mil thickness or equal shall be installed on a tamped earth base to prevent seepage to the groundwater. A concrete bottom and sides may also be used at the discretion of the designer. A 2-inch layer of sand or a layer of 10-ounce porous geotextile material shall be provided on each side of the liner to prevent punctures and tears. Seams shall be made according to manufacturer's specifications.

(f) *Distribution of effluent.* The buried media filter shall use pressure distribution.

(g) *Maintenance.*

(1) The area around the outside of the media filter shall be inspected annually to be free of ponded effluent and downgradient seepage.

(2) An annual sample for BOD_5 and TSS shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

§ 73a.80. Proprietary components.

(a) The Department shall enter into an agreement with an independent entity for the maintenance of a list of proprietary onlot sewage system components found to be in conformance with the requirements of this subchapter, including review under the technology verification process specified in section § 73a.153.

(b) Components shall be maintained in accordance with the manufacturer's specifications approved by the Department and shall include a minimum annual inspection of the component.

(c) An annual sample for BOD_5 and TSS shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

(d) All treatment units previously allowed under this subchapter shall be NSF Standard 40 certified within 3 years after [insert the effective date of these amendments].

(e) A sewage enforcement officer 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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

Subchapter G. NUTRIENT REMOVAL

Sec.

§ 73a.81. Performance standards.

(a) Nitrogen removal components shall have demonstrated through the technology verification process a treatment level of less than 10 milligrams per liter (mg/L) total nitrogen based upon the 95th percentile.

(b) Phosphorus removal components shall have demonstrated through the technology verification process a treatment level of less than 1.0 milligram per liter (mg/L) total phosphorus based upon the 95th percentile.

(c) Nutrient removal components shall be constructed in accordance with this subchapter unless one of the following conditions is met:

(1) The component design has been submitted for review and classification under § 73a.152 (relating to alternate sewage systems) or § 73a.153(a)(1)-(4) (relating to experimental sewage systems).

(2) The component is permitted under the technology verification process outlined in § 73a.153(a)(5) (relating to experimental sewage systems).

(d) The minimum maintenance standards for each component in a treatment system shall be listed on the permit issued by the local agency for the sewage facilities under § 72.25 (relating to issuance of permits). Any treatment system for which a permit was issued prior to [insert the effective date of these amendments] must be operated and maintained, at a minimum, in accordance with the minimum maintenance standards applicable to the components of that system as detailed in this chapter.

(e) The plans, specifications, reports and supporting documentation submitted as part of the permit application shall become part of the permit.

§ 73a.100. Proprietary components.

(a) The Department shall enter into an agreement with an independent entity for the maintenance of a list of proprietary onlot sewage system components found to be in conformance with the requirements of this subchapter, including review under the technology verification process specified in section § 73a.153.

(b) Components shall be maintained in accordance with the manufacturer's specifications approved by the Department and shall include a minimum annual inspection of the component.

(c) An annual sample for total nitrogen and phosphorus shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

(d) All treatment units previously allowed under this subchapter shall be NSF certified within 3 years after an NSF standard for nutrient removal is developed.

(e) A sewage enforcement officer 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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

Subchapter H. DISINFECTION

Sec.

§ 73a.101. Performance standards.

(a) Disinfection components shall have demonstrated a treatment level of less than 200 fecal coliform organisms per 100 milliliters in a single sample based upon the 95th percentile.

(b) Disinfection components shall be constructed in accordance with this subchapter unless one of the following conditions is met:

(1) The component design has been submitted for review and classification under § 73a.152 (relating to alternate sewage systems) or § 73a.153 (relating to experimental sewage systems).

(2) The component is permitted under the technology verification process outlined in § 73a.153 (relating to experimental sewage systems).

(c) The minimum maintenance standards for each component in a treatment system shall be listed on the permit issued by the local agency for the sewage facilities under § 72.25 (relating to issuance of permits). Any treatment system for which a permit was issued prior to [insert the effective date of these amendments] must be operated and maintained, at a minimum, in accordance with the minimum maintenance standards applicable to the components of that system as detailed in this chapter.

(d) The plans, specifications, reports and supporting documentation submitted as part of the permit application shall become part of the permit.

§ 73a.102. Chlorination.

(a) Chlorination shall only be used with absorption areas using drip distribution and spray irrigation.

(b) Chlorination shall produce an effluent that will contain a concentration not greater than 200 fecal coliform organisms per 100 milliliters in a single sample. Disinfection units shall be installed in accordance with the manufacturer's specifications. Disinfection units shall be reliable, able to disinfect sewage effluent and be easily maintained by the property owner.

(c) A chlorinator shall be designed to maintain a chlorine residual of 0.2 mg/L to 2 mg/L and provide for a minimum of 30 minute contact time.

(1) When an erosion chlorinator is proposed, the base of the unit may be placed no deeper than 36 inches below finished grade.

(2) When a lift pump is used to keep the unit no deeper than 36 inches below finished grade, the pump shall have a discharge rate that does not exceed the manufacturer's specifications for the erosion chlorinator and shall meet the appropriate specification of Subchapter I (relating to dosing and distribution requirements).

(3) Chlorine contact time may be obtained using a separate chlorine contact tank or in-line chlorination followed by the storage tank.

(4) Chlorinators shall be housed separately from chlorine contact tanks or storage tanks unless the tanks are specifically designed to house chlorinators.

(d) *Chlorine contact tank.*

(1) The minimum liquid capacity of a chlorine contact tank shall be based on 12 hours of contact based on the maximum daily sewage flows as determined from § 73a.4 (relating to sewage flows).

(2) Sufficient space shall be provided for electrical connections and proper pump control operation.

(3) Unless otherwise regulated by local electrical codes, all electrical connections shall be moisture resistant and at a point higher than the inlet pipe, or mounted above grade outside of the dosing tank or manhole extension within a tamper resistant, lockable control box.

(4) A watertight manhole with a removable cover at least 20 inches square or 24 inches in diameter, extended to grade, shall be provided for access to the chlorine contact tank. Access covers shall be secured by bolts or locking mechanisms, or have sufficient weight to prevent unauthorized access.

(5) Chlorine contact tanks shall constructed of sound and durable material not subject to excessive corrosion or decay.

(i) Precast concrete tanks shall have a minimum wall thickness of 2 1/2 inches and be adequately reinforced.

(ii) Precast slabs used as covers shall have a thickness of at least 3 inches and be adequately reinforced.

(iii) Tanks having a liquid capacity of 5,000 gallons or less may not be constructed of blocks, bricks or similar masonry construction.

(iv) Tanks having a capacity in excess of 5,000 gallons may be constructed onsite to meet the standards of the National Concrete Masonry Association for reinforcement and waterproofing. These standards are contained in *Basement Manual*, *Design and Construction Using Concrete Masonry*, TR 149, National Concrete Masonry Association, 2001, *Concrete Masonry Basement Wall Construction*, TEK 3-11, National Concrete Masonry Association, 2001 and *Preventing Water Penetration in Below-Grade Concrete Masonry Walls,* TEK 19-3A, National Concrete Masonry Association, 2001.

(v) Steel tanks shall meet the requirements of Underwriters Laboratory (UL) standards 1746 or 70.

(6) The tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(i) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and allowed to stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(ii) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90 % of the applied vacuum is held for a minimum of 5 minutes.

(7) The tank shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the tank.

(8) No tank may have an inside horizontal dimension less than 36 inches.

(9) When more than one tank is used, the tanks shall be connected together at the bottom to equalize the liquid level in the tanks.

(10) All inlet and outlet pipes shall be connected to the tank by means of a sealed flexible joint connector. Use of any grouting is not permitted.

(11) Covers, connections and piping shall be designed and constructed so as to withstand an anticipated minimum AASHTO H-10 loading.

(e) *Maintenance*

(1) Monthly inspection and refilling of the erosion chlorinator shall be performed by the operator.

(2) Monthly sampling from the chlorine contact tank or sampling port for chlorine residual is required by the property owner to ensure the chlorine residual is maintained between 0.2 and 2 mg/L.

(3) Annual inspection and sampling from the chlorine contact tank or sampling port for chlorine residual is required by a maintenance provider to ensure the chlorine residual in the chlorine contact tank is maintained between 0.2 and 2 mg/L.

(4) An annual sample for fecal coliforms shall be taken from the chlorine contact tank or sampling port by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

§ 73a.103. Ultraviolet Radiation Equipment.

(a) Ultraviolet radiation at a level of 254 nanometers shall be applied at a minimum dosage of 25,000 microwatt-seconds per square centimeter at all points throughout the water disinfection chamber. However, a higher dosage may be required based on the specific transmittance of the wastewater. In lieu of determining the specific transmittance level of the wastewater, a dosage of 30,000 to 35,000 microwatt-seconds per square centimeter should be provided.

(b) The maximum water depth in the chamber, measured from the tube surface to the chamber wall, shall not exceed 3 inches.

(c) The ultraviolet tubes shall be jacketed so that a proper operating tube temperature of about 104°F is maintained. The jacket shall be made of quartz or high-silica glass with similar optical characteristics.

(d) The units shall be designed to permit frequent mechanical cleaning of the water contact surface of the jacket without disassembly of the unit.

(e) An automatic flow control valve, accurate within the expected pressure range, shall be installed to restrict flow to the maximum design flow of the treatment unit.

(f) *Maintenance*.

(1) Mechanical cleaning of the water contact surface shall be performed monthly.

(2) Ultraviolet tubes shall be replaced at least annually. To ensure that appropriate ultraviolet dose levels are maintained, a warning alarm must be installed to ensure prompt replacement of a burned-out tube. To ensure continued optical performance

of the unit, an accurately calibrated ultraviolet intensity meter, properly filtered to restrict its sensitivity to the point of the disinfection spectrum, may also be installed in the wall of the disinfection chamber at the point of greatest water depth from the tube.

(3) A spare ultraviolet tube and other necessary equipment shall be available to allow prompt repair of the ultraviolet unit by qualified personnel instructed in the operation and maintenance of the equipment.

(4) An annual sample for fecal coliforms shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

§ 73a.110. Proprietary components.

(a) The Department shall enter into an agreement with an independent entity for the maintenance of a list of proprietary onlot sewage system components found to be in conformance with the requirements of this subchapter, including review under the technology verification process specified in section § 73a.153.

(b) Components shall be maintained in accordance with the manufacturer's specifications approved by the Department and shall include a minimum annual inspection of the component.

(c) An annual sample for fecal coliforms shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

(d) A sewage enforcement officer 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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

Subchapter I. DOSING AND DISTRIBUTION REQUIREMENTS

Sec.

§ 73a.111. General.

(a) Effluent from the treatment unit shall be discharged to a dosing tank, to a distribution box or directly to an absorption area through a watertight line a minimum of 3 inches in diameter unless otherwise specified by local plumbing or building codes.

(b) All lines shall be placed on a minimum grade of at least 1/4 inch per foot, sloping away from the treatment unit. Where a distribution box is used, the lines from that box to the laterals shall meet this same standard.

(c) Connections of lines to tanks and distribution boxes shall be made using watertight mechanical seals. Use of any grouting material is not permitted.

(d) All distribution piping shall meet a minimum 2,500 pound crush test specification or meet the requirements of the most recent revision of ASTM D 2665 for polyvinyl chloride (PVC) drain, waste and vent pipe.

(e) The minimum maintenance standards for each component in a treatment system shall be listed on the permit issued by the local agency for the sewage facilities under § 72.25 (relating to issuance of permits). Any treatment system for which a permit was issued prior to [insert the effective date of these amendments] must be operated and maintained, at a minimum, in accordance with the minimum maintenance standards applicable to the components of that system as detailed in this chapter.

(f) The plans, specifications, reports and supporting documentation submitted as part of the permit application shall become part of the permit.

§ 73a.112. Gravity distribution.

(a) Gravity distribution may be used in all instances, except where prohibited by § 73a.113 (relating to pressurized distribution).

(b) The distribution system shall be arranged to provide for uniform distribution of the effluent.

(c) The flow shall be equally divided between individual laterals of a trench system or between seepage beds by use of a distribution box.

(d) The flow shall be divided between individual laterals in a seepage bed by a distribution box or by an unperforated pipe header connecting all laterals within the bed. Where distribution is via an unperforated pipe header, the terminal ends of all individual laterals shall also be connected with unperforated pipe.

(e) Distribution boxes shall comply with the following:

(1) When a distribution box is used, it shall be installed level to provide equal distribution of treatment tank effluent to each line. For testing purposes, the person responsible for the installation shall provide an adequate amount of water to check the level of the inlet and outlet lines.

(2) Construction shall comply with the following:

(i) Distribution boxes shall have removable covers and be extended to grade.

(ii) Each lateral shall be connected separately to the distribution box.

(iii) The bottom of all outlets shall be at the same elevation, and the bottom of the inlet shall be at least 1 inch above the bottom of the outlet. The bottom of the outlet shall be at least 4 inches above the bottom of the distribution box.

(iv) Baffles shall comply with the following:

(A) A baffle shall be installed in the distribution box in the event that treatment tank effluent is discharged to the distribution box by a pump or siphon.

(B) The baffle shall be perpendicular to the inlet, be secured to the bottom of the box and extend vertically to a point level with the crown of the inlet pipe.

(v) A tee or elbow directed toward the bottom of the distribution box may be substituted for the baffle required by subparagraph (iv).

(3) Distribution boxes shall be installed on an adequate base of undisturbed or properly compacted earth or aggregate outside of the absorption area. Lightweight nonconcrete distribution boxes shall be anchored or otherwise secured to prevent shifting after installation. Adjustable distribution box weirs may be used on the outlet of the box.

(f) Laterals shall be a minimum of 3 inches in diameter unless a larger diameter is specified by local plumbing or building codes. Bends used in the treatment absorption field shall be made with standard fittings.

(g) The maximum length of individual laterals employing gravity distribution is 100 feet.

(h) *Maintenance*.

(1) Gravity distribution systems shall be inspected a minimum of every 3 years.

(2) The distribution box shall be inspected every 3 years by the maintenance provider and leveled as necessary to ensure equal distribution to each lateral.

§ 73a.113. Pressurized distribution.

(a) Pressurized distribution is required in the following instances:

(1) All elevated sand mounds.

(2) When the percolation rate of the proposed absorption area exceeds 60 minutes/inch.

(3) All systems having a total absorption area in excess of 2,500 square feet.

(4) Individual residential spray irrigation system spray fields.

(5) At-grade absorption areas.

(6) Buried media filters.

(7) All advanced treatment filters.

(8) Drip distribution systems.

(9) All absorption areas with less than 48 inches vertical isolation distance.

(10) Proprietary systems as required in accordance with the manufacturer's instructions.

(b) General design requirements are as follows:

(1) The piping used in a pressurized effluent system shall have watertight joints.

(2) Delivery pipes from dosing pumps shall be installed to facilitate drainage of the distribution piping back to the dosing tank between doses.

(3) Seepage areas requiring greater than 2,500 square feet shall be divided into multiple zones with each zone 2,500 square feet or less. The zones shall receive equal loading.

(4) The pressurized distribution system shall be designed to discharge to the absorption area or filter at least twice daily.

(c) Seepage areas (filter surface or absorption area) shall meet the following design standards:

(1) Conveyance of effluent from the dosing tank to the seepage area shall be through a delivery pipe sized to minimize friction loss. Check valves shall be prohibited on delivery pipes. Where the system designer determines that water hammer may be a problem, thrust blocks may be installed on delivery pipes.

(2) When equally sized seepage areas are dosed simultaneously, a header pipe shall be used to connect the delivery pipe from the tank to the manifolds. The header pipe shall be sized to minimize friction loss. Effluent application rates per square foot of seepage area served by a common header shall have a maximum design variation of 10%. If the distance from the treatment unit to the seepage area would cause excessive backflow into the dosing tank, a transfer tank may be used between the treatment unit or storage tank and dosing tank.

(3) Distribution of effluent to the individual laterals shall be by a central manifold extending into the seepage area from the delivery pipe or header. The manifold shall have the following minimum diameters:

Sq. ft. of Seepage Area	*Minimum Manifold Diameter*
40 to 1,199	1 1/2"
1,200 to 2,500	2"

(4) Laterals shall be extended from both sides of the manifold by opposing tees or a double sanitary tee.

(5) Laterals shall consist of 1 1/2 inch diameter pipe, with holes placed along the bottom of the pipe; a cleanout shall be provided on the terminal end of the lateral. Minimum hole size shall be 1/4 inch. When siphons are used in a pressure distribution system, each discharge hole shall be at least 5/16 inch in diameter. The discharge from all of the holes in the distribution system may not be less than the minimum rate of the siphon and may not vary from the average discharge rate of the siphon by more than 20%.

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(6) The first hole in the lateral shall be 3 feet from the manifold. Additional holes shall be placed 6 feet on center with the last hole placed directly in the end cap.

(7) The maximum length of a lateral from the manifold to the end cap shall be 100 feet.

(8) The bed shall contain a minimum of two laterals or two opposing sets of laterals.

(9) Laterals shall be equally spaced a maximum of 6 feet on center.

(10) Laterals shall be placed no further than 5 feet nor less than 2 feet from the sidewalls of the seepage area except as provided for in § 73a.125 (relating to at-grade absorption areas).

(11) Laterals shall be placed in the seepage area so that the first and last discharge holes may be no more than 5 feet nor less than 2 feet from the ends of the seepage area.

(12) Opposing laterals may not differ in length by more than 6 feet.

(13) When less than the maximum length of lateral is used, the lateral shall be shortened in 6-foot sections with hole spacing maintained as required in paragraph (6).

(14) All systems shall be designed to maintain a minimum of 3 feet of head at the terminal end of each lateral.

(15) Discharge rates from the individual holes of the lateral at design head shall be calculated using the sharp-edged discharge hole equation:

gallons per minute (gpm)=$11.99(d^2)(\sqrt{h})$
(d)=diameter of hole (inches)
(h)=head to be maintained at the terminal ends of the lateral (in feet).

(16) The minimum pump capacity in gallons per minute (gpm) shall be calculated by multiplying the total number of discharge holes contained in the laterals of a proposed distribution layout by the gpm factor determined by the hole size at the design head level.

(17) Total pump head shall be calculated by addition of all losses incurred due to elevation changes, pipe and fitting friction losses, and the head level to be maintained at the terminal end of the lateral as specified in paragraph (14).

(18) For purposes of calculating head loss due to friction, head loss in the standard lateral shall be assumed to be 0. Head loss due to friction in pipe and fittings used in construction of the pressure system shall be calculated using a friction loss table for smooth-walled plastic pipe (C=150). The head loss due to friction from the beginning of the distribution manifold to the terminal end of the last lateral may not exceed 15% of the head level to be maintained at the terminal end of the lateral.

(19) The permittee shall conduct a test pressurization of the completed distribution system in the presence of the sewage enforcement officer prior to covering the piping system from view. During the test, the permittee shall confirm that all joints are watertight and that a discharge is occurring from each hole.

(d) Design of pressure distribution in trenches shall comply with the following:

(1) The diameter of individual laterals, size and spacing of discharge holes, and minimum diameter of the distribution manifold may not be restricted except that no discharge hole may be less than 1/4 inch for systems using pumps or 5/16 inch for systems using siphons.

(2) The maximum length of a lateral shall be 100 feet.

(3) Discharge rates from the individual holes of the lateral at design head shall be calculated using the sharp-edged discharge hole equation:

gallons per minute=$11.99(d^2)(\sqrt{h})$
(d)=diameter of hole (inches)
(h)=head to be maintained at the terminal ends of the lateral (in feet).

(4) Variation in head in the laterals caused by differences in elevation or friction losses shall be compensated for by individual design of the laterals.

(5) The effluent application rate per square foot of any two trenches served by a common dosing tank shall have a maximum design variation of 10%.

(6) Equalization of loading may be accomplished by variation of discharge hole diameter between trenches, variation of spacing of discharge holes between trenches or another method approved by the Department or sewage enforcement officer.

(7) The maximum spacing between discharge holes is 10 feet.

(8) The manifold for a trench system shall be placed on undisturbed soil a minimum of 6 inches above the trench bottom.

(9) A minimum isolation distance of 3 feet shall be maintained between the manifold and the beginning of any trench. The individual laterals in the trench shall be connected to the manifold using unperforated pipe. The area beneath the manifold and connecting pipe shall consist of undisturbed or compacted soil.

(10) The design head at the terminal end of each lateral shall be at least 3 feet.

(11) The permittee shall conduct a test pressurization of the completed distribution system in the presence of the sewage enforcement officer prior to covering the piping system from view. During the test, the permittee shall confirm that all joints are watertight and that a discharge is occurring from each hole.

Cross References

This section cited in 25 Pa. Code § 73a.112 (relating to gravity distribution); 25 Pa. Code § 73a.115 (relating to dosing pumps); 25 Pa. Code § 73a.125 (relating to at-grade absorption area); and 25 Pa. Code § 73a.126 (relating to shallow limiting zone at-grade absorption area).

§ 73a.114. Dosing tanks.

(a) Dosing tanks shall be constructed to the following specifications:

(1) Dosing tanks shall be constructed of sound and durable material not subject to excessive corrosion or decay.

(i) Precast concrete dosing tanks shall have a minimum wall thickness of 2 1/2 inches and be adequately reinforced.

(ii) Precast slabs used as covers shall have a thickness of at least 3 inches and be adequately reinforced.

(iii) Dosing tanks having a liquid capacity of 5,000 gallons or less may not be constructed of blocks, bricks or similar masonry construction.

(iv) Dosing tanks having a capacity in excess of 5,000 gallons may be constructed onsite to meet the standards of the National Concrete Masonry Association for reinforcement and waterproofing. These standards are contained in *Basement Manual*, *Design and Construction Using Concrete Masonry*, TR 149, National Concrete Masonry Association, 2001, *Concrete Masonry Basement Wall Construction*, TEK 3-11, National Concrete Masonry Association, 2001 and *Preventing Water Penetration in Below-Grade Concrete Masonry Walls,* TEK 19-3A, National Concrete Masonry Association, 2001.

(v) Steel dosing tanks shall meet the requirements of Underwriters Laboratory (UL) standards 1746 or 70.

(2) The tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(i) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and allowed to stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(ii) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90 % of the applied vacuum is held for a minimum of 5 minutes.

(3) The tank shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the tank.

(4) For all systems other than individual residential spray irrigation systems, the dosing tank shall be designed so that the estimated daily flow shall be discharged to the absorption area in two or more doses. The dose volume shall be five times the internal liquid capacity of the manifold and laterals plus the internal liquid capacity of the delivery line. When a siphon is used in a pressure distribution system, the minimum dose volume shall be large enough to keep the entire distribution system full for at least 3 to 5 minutes.

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(5) The dosing tank shall have a minimum liquid capacity equal to or greater than two times the designed dose volume.

(6) Sufficient space shall be provided for electrical connections and proper pump control operation.

(7) Unless otherwise regulated by local electrical codes, all electrical connections shall be contained within moisture resistant electrical boxes at a point higher than the inlet pipe, or mounted above grade outside of the dosing tank or manhole extension within a tamper resistant, lockable control box.

(8) Access to the dose tank shall be provided by a manhole with an inside dimension of at least 20 inches square (20 x 20) or 24 inches in diameter, with a removable cover. The access cover shall be extended to grade and the access cover shall be airtight. Grade level access covers shall be secured by bolts or locking mechanisms, or have sufficient weight to prevent unauthorized access.

(9) The ground shall slope away from any access extended to grade level.

(10) All inlet and outlet pipes shall be connected to tanks by means of a sealed flexible joint connector. Use of any grouting is not permitted.

(11) Covers, connections and piping shall be designed and constructed so as to withstand an anticipated minimum AASHTO H-10 loading.

(b) *Maintenance*.

(1) The maintenance provider shall inspect the dosing tank annually for structural integrity.

(2) The dose tank shall be pumped whenever the septic tank or aerobic tank is pumped to prevent the carryover of solids.

Cross References

This section cited in 25 Pa. Code § 73a.115 (relating to dosing pumps, siphons and lift pumps).

§ 73a.115. Dosing pumps, siphons and lift pumps.

(a) All dosing pumps, siphons and lift pumps used for all onlot sewage treatment systems shall meet the following specifications:

(1) The intake of the pump shall be at least 6 inches from the bottom of the tank. The intake of any dosing pump shall be at a lower elevation than the lowest lateral.

(2) Pumps may not be suspended above the bottom of the tank by chains or similar equipment.

(3) A disconnect, other than a pitless adapter, shall be incorporated into the piping within the tank for ease of pump removal. The disconnect shall be located no lower than 18 inches below the top of the tank cover.

(4) An effective warning device shall be installed in the dosing tank to indicate failure of the pump or siphon. The warning device shall be equipped to indicate when the dose tank is filled to within 75% of its capacity. The warning device shall create an audible and visual signal at a location frequented by the homeowner or responsible individual. Electrically operated warning systems shall be on a circuit and breaker separate from the pump.

(5) A copy of the performance curve of the pump or discharge specifications for the siphon to be used shall be attached to the system design. A copy of the manufacturer's specification showing that the pump is designed to handle sewage or sewage effluent shall also be attached to the system design.

(b) Dosing pumps for all onlot sewage treatment systems except individual residential spray irrigation systems shall meet the following additional specifications:

(1) The pump shall be sized to deliver a flow in gallons per minute equal to or greater than the combined flows from all discharge holes in the laterals when operating at designed level of head and shall be rated by the manufacturer for handling of sewage effluent.

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(2) A siphon or other discharge mechanism may be substituted for a pump where site conditions permit the use of a gravity flow device, provided the average discharge rate of the device in gallons per minute is equal to or greater than the combined flows from all discharge holes in the laterals when operating at designed level of head.

(3) When an aerobic treatment unit is used which results in a periodic pump discharge from the treatment tank, the discharge mechanism may be substituted for a dosing tank and pump if the periodic discharge rate meets the criteria in § 73a.113 (relating to pressurized distribution).

(4) When a non-residential establishment produces more than 50% of its total daily flow during a maximum flow period, the minimum dose volume shall equal the anticipated flow during the maximum period unless flow equalization is used in accordance with § 73a.116 (relating to flow equalization).

(5) Pumps employed for the purpose of lifting effluent to a higher elevation may not be deemed dosing pumps when the system does not meet the criteria of § 73a.113 (relating to pressurized distribution). Pumps for this purpose shall have a discharge capacity at least two times the estimated maximum flow of the facility served when operating at designed level of head, but at least 5 gallons per minute and shall be rated by the manufacturer for handling sewage effluent.

(6) Siphon discharge lines shall be equipped with an observation port. The access to the observation port shall be extended to grade, capped and secured to prevent unauthorized entry.

(d) *Maintenance.*

(1) The maintenance provider shall inspect all pumps and siphons installed in the system annually.

(2) The maintenance provider shall test all operation level switches and all alarms associated with the distribution system annually.

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§ 73a.116. Flow Equalization

Non-residential facilities with regular, predictable, fluctuating flows (alternating high and low flows) may benefit from this design. Tanks, controls and dosing equipment are used to equalize the maximum flows. The following conditions apply:

(a) Flow equalization tanks shall be constructed of sound and durable material not subject to excessive corrosion or decay.

(1) Precast concrete tanks shall have a minimum wall thickness of 2 1/2 inches and be adequately reinforced.

(2) Precast slabs used as covers shall have a thickness of at least 3 inches and be adequately reinforced.

(3) Tanks having a liquid capacity of 5,000 gallons or less may not be constructed of blocks, bricks or similar masonry construction.

(4) Tanks having a capacity in excess of 5,000 gallons may be constructed onsite to meet the standards of the National Concrete Masonry Association for reinforcement and waterproofing. These standards are contained in *Basement Manual, Design and Construction Using Concrete Masonry*, TR 149, National Concrete Masonry Association, 2001, *Concrete Masonry Basement Wall Construction*, TEK 3-11, National Concrete Masonry Association, 2001 and *Preventing Water Penetration in Below-Grade Concrete Masonry Walls,* TEK 19-3A, National Concrete Masonry Association, 2001.

(5) Steel tanks shall meet the requirements of Underwriters Laboratory (UL) standards 1746 or 70.

(b) The tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(1) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and allowed to stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(2) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90 % of the applied vacuum is held for a minimum of 5 minutes.

(c) The tank shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the tank.

(d) The system designer has flexibility regarding where in the treatment process the flow equalization will occur (preceding or following the treatment tank). If flow equalization occurs before the treatment tank, the treatment tank capacity may be reduced appropriately. If equalization is to occur following the treatment tank, all flows shall be treated in a septic or aerobic tank system that is designed for maximum flow (no size reduction) and shall be discharged to an equalization tank specifically designed to meet the needs of the proposed facility.

(e) The effluent is discharged from the tank in a timed, controlled volume that is lower than the maximum flow for the facility but sufficient to balance inflow and outflow over an extended period.

(f) The equalization tank and discharge rate shall be designed and established based upon the flow pattern of the facility; discharging a stabilized daily rate to the absorption area allows for reduction of the absorption area.

(g) Since the effects of sustained maximum usage of an absorption area are unknown, the absorption area shall be sized for the controlled daily volume plus 15-20%.

(h) If flow equalization is proposed for an existing facility, proposals shall include maximum daily water consumption volumes collected over a 1-year period with the highest consecutive 7-day period highlighted. If the proposal is for a new facility, flow data from an equivalent facility is also acceptable. If flow data from an equivalent facility are not available for a new facility, flows are calculated using § 73a.4 (relating to sewage flows). Where § 73a.4 does not list flow figures for the specific facility type, flows may be calculated using normally accepted engineering practices.

(i) All inlet and outlet pipes shall be connected to tanks by means of a sealed flexible joint connector. Use of any grouting is not permitted.

(j) Covers, connections and piping shall be designed and constructed so as to withstand an anticipated minimum AASHTO H-10 loading.

(k) All flow equalization systems shall be designed by a qualified registered professional engineer.

(l) The local agency's qualified registered professional engineer shall review and approve all flow equalization designs prior to the local agency issuing a permit for the system.

(m) *Maintenance*. The maintenance provider shall inspect the flow equalization tank annually for structural integrity.

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§ 73a.120. Proprietary components

(a) The Department shall enter into an agreement with an independent entity for the maintenance of a list of proprietary onlot sewage system components found to be in conformance with the requirements of this subchapter, including review under the technology verification process specified in section § 73a.153.

(b) Components shall be maintained in accordance with the manufacturer's specifications approved by the Department and shall include a minimum annual inspection of the component.

Subchapter J. ABSORPTION AREAS

Sec.

§ 73a.121. General.

(a) Care shall be exercised during construction to prevent compaction and damage to the system and the downslope area. Before and after installation, equipment and vehicles shall be kept off the proposed absorption area, including the downslope area, to prevent compaction of the soil.

(b) Soil moisture levels during construction of the absorption area shall be such that a sample of natural mineral soil taken from the level of the proposed installation will crumble if compressed into a ball.

(c) The area surrounding any mound shall be sloped to provide for diversion of surface runoff waters.

(d) Absorption areas with a vertical isolation distance of less than 20 inches shall not be placed on concave topography.

(e) Only the bottom of the aggregate area of a bed or trench shall be used in calculating absorption area requirements.

(f) Absorption area requirements for single family dwellings served by an individual onlot or community onlot sewage system shall be designed based on flows listed in § 73a.4 (relating to sewage flows) for the type of facility to be served.

(g) For nonresidential establishments, a volume of 200 gallons per day shall be the minimum volume used in calculating the size of the absorption area.

(h) All distribution piping in the system shall be marked with utility tape or other similar material detectable using a metal detector as a means of identifying the exact location of the distribution piping after the final cover is placed over the area.

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(i) All piping used in the absorption area shall meet a minimum 2,500 pound crush test specification or meet the requirements of the most recent revision of ASTM D 2665 for polyvinyl chloride (PVC) drain, waste and vent pipe.

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(j) Leaching chambers shall be constructed of plastic and may be installed in trenches or beds as a substitute for aggregate. No additional size reduction is allowed for leaching chamber designs when these chambers are used in conjunction with secondary treatment units, advanced treatment units, composting toilets or other system components that would otherwise allow for sizing reductions.

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If a site is otherwise suitable for installation of an onlot system using an absorption area for treatment and disposal of sewage (including elevated sand mounds), leaching chambers may be installed with an up to 1/3 reduction in the size of the absorption areas when all of the following standards are met:

(1) Soil profile evaluation and percolation tests must document that there is sufficient area for installation of a full-sized absorption area (prior to the calculation of the up to 1/3 reduction).

(2) The property owner is provided with a 5-year warranty from the manufacturer of the unit.

(3) The leaching chamber system is installed in accordance with all applicable specifications and appropriate general installation requirements listed in the manufacturer's chamber design guidelines.

(4) No cutting, drilling or otherwise damaging a chamber is allowed. Endplates may be drilled according to manufacturer's installation guidelines to accept pressurized distribution pipe.

(5) All chambers shall be surrounded by a geotextile material to prevent fine particles from entering the chamber prior to covering the chamber.

(6) All chambers in absorption areas shall be marked with utility tape or other similar material detectable using a metal detector as a means of identifying the exact location of the chamber after the final cover is placed over the area.

(k) *Required absorption area.*

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(1) Table A shall be used in calculating the square footage of absorption area required for final treatment of primary effluent when using percolation test results.

TABLE A
Minimum Aggregate Absorption Area Requirements for Primary Effluent

	Square Feet of Aggregate Area Per Gallon Per Day	
Average Percolation Rate (APR) Expressed as Minutes Per Inch	*All Systems Except Elevated Sand Mounds and At-grade Absorption Areas*	*Elevated Sand Mounds[A] and At-grade Absorption Areas [A]*
< 3.0	Unsuitable	Unsuitable
≥3 - ≤6	Unsuitable	2.5[B]
>6 - ≤60	2.5[B]	2.5[B]
>60 - ≤90	(APR - 60) x (0.023) + 2.66[A]	(APR - 60) x (0.020) + 2.66
>90 - ≤120	Unsuitable	(APR - 90) x (0.017) + 3.26
>120 - ≤150	Unsuitable	((APR - 120) x (0.015) + 3.77) (1.05)
>150 - ≤180	Unsuitable	((APR - 150) x (0.014) + 4.19) (1.10)
>180	Unsuitable	Unsuitable

A Pressure dosing required.
B One third reduction may be permitted for use of leaching chambers.

(2) Table B shall be used in calculating the square footage of absorption area required for final treatment of secondary and advanced effluent with greater than 48 inches vertical isolation distance when using percolation test results.

TABLE B
Minimum Aggregate Absorption Area Requirements for Secondary and Advanced Effluent with Greater Than or Equal to 48 Inch Vertical Isolation Distance

	Square Feet of Aggregate Area Per Gallon Per Day	
Average Percolation Rate (APR) Expressed as Minutes Per Inch	*All Systems except At-grade Absorption Areas*	*At-grade Absorption Areas*
< 3.0	Unsuitable	Unsuitable
≥3 - ≤6	Unsuitable	1.0
>6 - ≤15	1.0	1.0
>15 - ≤30	(APR - 15) x (0.040) + 1.0	(APR - 15) x (0.040) + 1.0
>30 - ≤45	(APR - 30) x (0.030) + 1.6	(APR - 30) x (0.030) + 1.6
>45 - ≤60	(APR - 45) x (0.028) + 2.05	(APR - 45) x (0.028) + 2.05
>60 - ≤90	(APR - 60) x (0.023) + 2.47	(APR - 60) x (0.023) + 2.47
>90 - ≤120	Unsuitable	(APR - 90) x (0.017) + 3.16
>120 - ≤150	Unsuitable	((APR - 120) x (0.015) + 3.67) (1.05)
>150 - ≤180	Unsuitable	((APR - 150) x (0.014) + 4.33) (1.10)
>180	Unsuitable	Unsuitable

(3) Table C shall be used in calculating the square footage of absorption area required for final treatment of secondary and advanced effluent with less than 48 inches and greater than 20 inches vertical isolation distance when using percolation test results.

TABLE C
Minimum Aggregate Absorption Area Requirements for Secondary and Advanced Effluent with Less Than 48 Inch Vertical Isolation Distance

	Square Feet of Aggregate Area Per Gallon Per Day	
Average Percolation Rate (APR) Expressed as Minute Per Inch	*All Systems Except At-grade Absorption Areas*	*At-grade Absorption Areas*
Less than 3.0	Unsuitable	Unsuitable
3 - 5	Unsuitable	1.50
6 - 15	1.19	1.50
16 - 30	(APR - 15) x (0.040) + 1.19	1.50
31 - 45	(APR - 30) x (0.030) + 1.79	(APR - 30) x (0.026) + 1.50
46 - 60	(APR - 45) x (0.028) + 2.24	(APR - 45) x (0.022) + 1.89
61 - 90	(APR - 60) x (0.023) + 2.66	(APR - 60) x (0.020) + 2.22
91 - 120	Unsuitable	(APR - 90) x (0.017) + 2.82
121 - 150	Unsuitable	((APR - 120) x (0.015) + 3.33) (1.05)
151 - 180	Unsuitable	((APR - 150) x (0.014) + 3.78) (1.10)
Greater than 181[CD]	Unsuitable	Unsuitable

(4) Table D shall be used in calculating the square footage of absorption area required when using soil morphological evaluations.

TABLE D
Hydraulic Linear Loading Rate Table

Soil Characteristics			Infiltration Loading Rate (ILR), gal/ft²/d	Hydraulic Linear Loading Rate (HLLR), gal/ft/d					
				Slope					
				0 - <5%		≥5 - ≤10%		>10%	
Texture	Structure			Infiltration Distance, Inch		Infiltration Distance, Inch		Infiltration Distance, Inch	
	Shape	Grade		≥10 - ≤12	>12 - ≤20	≥10 - ≤12	>12 - ≤20	≥10 - ≤12	>12 - ≤20
COS, S, LCOS, LS	--	0SG	1.6	4.0	5.0	5.0	6.0	6.0	7.0
FS, VFS, LFS, LVFS	--	0SG	1.0	3.5	4.5	4.0	5.0	5.0	6.0
CSL, SL	--	0M	0.6	3.0	3.5	3.6	4.1	5.0	6.0
	PL	1	0.5	3.0	3.5	3.6	4.1	4.0	5.0
		2, 3	May not be used.						
	PR/BK /GR	1	0.7	3.5	4.5	4.0	5.0	5.0	6.0
		2, 3	1.0	3.5	4.5	4.0	5.0	5.0	6.0
FSL, VFSL	--	0M	0.5	2.0	2.3	2.4	2.7	2.7	3.2
	PL	1, 2, 3	May not be used.						
	PR/BK /GR	1	0.6	3.0	3.5	3.3	3.8	3.6	4.1
		2, 3	0.8	3.3	3.8	3.6	4.1	3.9	4.4
L	--	0M	0.5	2.0	2.3	2.4	2.7	2.7	3.2
	PL	1, 2, 3	May not be used.						
	PR/BK /GR	1	0.6	3.0	3.5	3.3	3.8	3.6	4.1
		2, 3	0.8	3.3	3.8	3.6	4.1	3.9	4.4
SIL	--	0M	0.2	2.0	2.5	2.2	2.7	2.4	2.9
	PL	1, 2, 3	May not be used.						
	PR/BK /GR	1	0.6	2.4	2.7	2.7	3.0	3.0	3.5
		2, 3	0.8	2.7	3.0	3.0	3.5	3.3	3.8
SCL, CL, SICL	--	0M	May not be used.						
	PL	1, 2, 3	May not be used.						
	PR/BK /GR	1	0.3	2.0	2.5	2.2	2.7	2.4	2.9
		2, 3	0.6	2.4	2.9	2.7	3.0	3.0	3.5
SC, C, SIC	--	0M	May not be used.						
	PL	1, 2, 3	May not be used.						
	PR/BK /GR	1	May not be used.						
		2, 3	0.3	2.0	2.5	2.2	2.7	2.4	2.9

Adapted from Tyler, 2000.

(k) The minimum maintenance standards for each component in a treatment system shall be listed on the permit issued by the local agency for the sewage facilities under § 72.25 (relating to issuance of permits). Any treatment system for which a permit was issued prior to [insert the effective date of these amendments] must be operated and maintained, at a minimum, in accordance with the minimum maintenance standards applicable to the components of that system as detailed in this chapter.

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(l) The plans, reports, specifications and supporting documentation submitted as part of the permit application shall become part of the permit.

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Cross References

This section cited in 25 Pa. Code § 73a.126 (relating to shallow limiting zone at-grade absorption area).

§ 73a.122. Trenches.

(a) *Siting.*

(1) The maximum slope of the undisturbed soil of a proposed absorption area where a trench system may be permitted is 25%.

(2) For slopes between 15% and 25%, detailed design in relationship to elevation shall be provided.

(b) *Design.*

(1) There shall be a minimum of two trenches per field.

(2) The width of the bottom of the individual trench shall be 12 to 72 inches.

(3) The minimum width of undisturbed earth between trenches shall be 5 feet.

(4) The minimum depth of coarse aggregate material under laterals shall be 6 inches.

(5) The minimum depth of coarse aggregate material over the laterals shall be 2 inches.

(6) All laterals shall have end cleanouts extended to the soil surface and be constructed using two 45-degree bends.

(7) Trench laterals shall be fitted with end caps.

(8) Copies of the plans and specifications and the designer's report are to be attached to the applicant's copy, sewage enforcement officer's copy and the Department's copy of the application for sewage permit.

(9) The system designer shall inspect the installation and verify that, to the best of his knowledge and belief, the system was installed in accordance with the plans and specifications.

(c) *Construction.*

(1) Trenches shall follow approximately the ground surface contours so that variations in trench depth shall be minimized.

(2) There shall be at least 6 feet of soil between the treatment tank or dosing tank and the nearest trench.

(3) The depth to the bottom of the absorption area shall be 10 to 24 inches.

(4) The bottom of the absorption area shall be level to a tolerance of 2 inches per 100 feet.

(5) All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iii) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(iv) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(v) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(iv) The coarse aggregate shall meet AASHTO No. 3, 467, 5 or 57 size and grading requirements. The aggregate may meet the characteristics of an individual

category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(6) Laterals shall be placed in the center of the trench. The first or last discharge hole of a lateral may be no more than 5 feet nor less than 2 feet from the ends of the trench.

(7) Laterals shall be level to a maximum tolerance of 4 inches of fall per 100 feet toward the terminal end of the lateral.

(8) The depth of coarse aggregate shall be uniform throughout the absorption area.

(9) The top of the coarse aggregate material shall be covered with geotextile material to prevent backfill material from settling into the aggregate.

(10) The minimum depth of earth cover over the coarse aggregate in all installations shall be 8 inches. Where the top of the coarse aggregate is less than 8 inches from the undisturbed soil surface, the soil cover shall extend beyond the absorption area by at least 3 feet on all sides.

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(11) The backfill material shall consist of soil suitable for the growth of vegetation, and be seeded to control erosion.

(d) *Maintenance*. The owner shall inspect the absorption area at least annually for ponding of effluent and any downgradient seepage.

§ 73a.123. Seepage beds.

(a) *Siting*. The maximum slope of the undisturbed soil of a proposed absorption area where a seepage bed may be permitted is 8%.

(b) *Design*.

(1) The required absorption area may be provided by one or more seepage beds:

(2) The individual beds of a single onlot system shall be separated by a minimum of 5 feet.

(3) The depth to the bottom of the absorption area shall be 10 to 24 inches.

(4) The minimum depth of coarse aggregate material under laterals shall be 6 inches.

(5) The minimum depth of coarse aggregate material over the laterals shall be 2 inches.

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(6) Laterals shall be equally spaced a maximum of 6 feet on center. Deleted: 7

(7) Laterals shall be placed no further than 5 feet nor less than 2 feet from the sidewalls of the bed. Deleted: 8

(98) All laterals shall have end cleanouts extended to the soil surface and be constructed using two 45-degree bends.

(9) Laterals shall be fitted with end caps. Deleted: 10

(c) *Construction*.

(1) The bottom of the absorption area shall be level to a tolerance of 2 inches per 100 feet.

(2) All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iii) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(iv) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(v) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(iv) The coarse aggregate shall meet AASHTO No. 3, 467, 5 or 57 size and grading requirements. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(3) Laterals shall be level to a maximum tolerance of 4 inches of fall per 100 feet toward the terminal end of the lateral.

(4) The depth of coarse aggregate shall be uniform throughout the absorption area.

(5) The top of the coarse aggregate material shall be covered with geotextile material to prevent backfill material from settling into the aggregate.

(6) The minimum depth of earth cover over the coarse aggregate in all installations shall be 8 inches. Where the top of the coarse aggregate is less than 8 inches from the undisturbed soil surface, the soil cover shall extend beyond the absorption area by at least 3 feet on all sides.

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(7) The backfill material shall consist of soil suitable for the growth of vegetation, and be seeded to control erosion.

(8) Laterals shall be placed in the bed so that the first and last discharge holes may be no more than 5 feet nor less than 2 feet from the ends of the bed.

(d) *Maintenance*. The owner shall inspect the absorption area at least annually for ponding of effluent and any downgradient seepage.

Cross References

This section cited in 25 Pa. Code § 71.63 (relating to retaining tanks); and 25 Pa. Code § 73a.124 (relating to elevated sand mounds).

§ 73a.124. Elevated sand mounds.

(a) *Siting.*

The maximum slope of the undisturbed soil, to the extremities of the berm, of a proposed absorption area where an elevated sand mound bed may be permitted is 15% with a 3 to 90 minute per inch percolation rate and 12% with a 3 to 180 minute per inch percolation rate.

(b) *Design.*

(1) The limiting zone is the base elevation for measuring the required depth of fine aggregate to achieve a minimum of 4 feet of suitable soil between the bottom of the coarse aggregate and the top of the limiting zone.

(2) A minimum of 1 foot of fine aggregate shall be placed under the coarse aggregate in all elevated sand mound systems.

(3) All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iii) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(iv) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(v) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(iv) The aggregate shall meet AASHTO No. 3, 467, 5 or 57 size and grading requirements. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(4) The minimum depth of coarse aggregate material under laterals shall be 6 inches.

(5) The minimum depth of coarse aggregate material over the laterals shall be 2 inches.

(6) The required absorption area may be provided by one or more absorption areas.

(i) The distance between beds shall be measured from the toe of the fine aggregate of each absorption area.

(ii) The individual absorption areas of a single onlot system shall be separated by a minimum of 5 feet.

(iii) The absorption area shall contain a minimum of two laterals or two opposing sets of laterals when pressure distribution is used.

(iv) Laterals shall be equally spaced a maximum of 6 feet on center.

(v) Laterals shall be placed no further than 5 feet nor less than 2 feet from the sidewalls of the absorption area.

(vi) Laterals shall be placed in the absorption area so that the first and last discharge holes may be no more than 5 feet nor less than 2 feet from the ends of the absorption area.

(7) Designing the location of multiple absorption areas so that one absorption area is placed hydraulically upgradient or downgradient from the other may cause the lower absorption area to fail because of excessive hydraulic loading from the upper absorption area. Unless the potential for such an impact is shown to be nonexistent by the applicant through the experimental system process, this type of absorption area placement is prohibited.

(8) All laterals shall have end cleanouts extended to the soil surface and be constructed using two 45-degree bends.

(9) The absorption area shall have a minimum length to width ratio of 4 to 1 on sites having slopes less than or equal to 12%. On sites having greater than 12% slope, the minimum length to width ratio shall be 6 to 1.

(10) The long axis of the absorption area shall be perpendicular to the slope. The bed construction shall follow the ground surface contours.

(11) Laterals shall be fitted with end caps.

(c) *Construction.*

(1) Vegetation shall be cut close to the ground throughout the area to be utilized for the absorption area and berm. Bushes and trees shall be cut flush with the ground surface; roots shall be left in place. Cut vegetation or organic litter shall be raked and removed from the absorption and berm areas.

(2) The proposed absorption area shall not obstructed by stumps or other obstacles and shall be roughed or plowed parallel with the contour to a maximum depth of 6 inches, using a multiple share chisel plow or similar implement attached to light-weight equipment to scarify the soil surface without smearing the soil or breaking down the soil structure. Rotary tilling is prohibited.

(3) Under no circumstances may equipment travel on the plowed soil surface until the fine aggregate is in place.

(4) Immediately after plowing, fine aggregate shall be placed over the exposed plowed surface. The fine aggregate shall be placed from the upslope side of the bed using only lightweight equipment.

(5) The slope of the fine aggregate not directly beneath the coarse aggregate area shall be approximately 50%.

(6) The top of the fine aggregate directly beneath the coarse aggregate shall be level to a tolerance of ±2 inches per 100 feet.

(7) The mound shall be surrounded by a berm consisting of mineral soil containing less than 20% coarse fragments with no coarse fragments greater than 4 inches in diameter, more stable and less permeable than the fine aggregate, and lightly compacted during construction to contain and protect the mound interior. The width of this berm shall be a minimum of 3 feet at the top of the aggregate.

(8) The cover over the coarse aggregate shall be a minimum of 8 inches of soil suitable for the growth of vegetation.

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(9) The depth of coarse aggregate shall be uniform throughout the absorption area.

(10) Existing mineral soil shall be utilized. No mineral soil in the area of the elevated sand mound may be removed or disturbed.

(11) No equipment may be permitted on the downslope side of the mound with the exception of lightweight equipment that is used to form the downslope berm. To the greatest extent possible, all aggregate and cover material shall be placed from the upslope side of the mound.

(12) Laterals shall be level to a maximum tolerance of 4 inches of fall per 100 feet toward the terminal end of the lateral.

(13) The top of the coarse aggregate material shall be covered with geotextile material to prevent backfill material from settling into the aggregate.

(14) The backfill material shall consist of soil suitable for the growth of vegetation, and be seeded to control erosion.

(15) Upon completion, the outside slope of the berm may be no greater than 33.3% (3:1) for sites with 0 to 12% slopes. On sites with greater than12% slopes, the outside slope of the berm may be no greater than 25% (4:1) downslope and no greater than 33.3% (3:1) upslope. The minimum berm should remain within the property. If a berm extends on to a neighbor's property, a formal easement, recorded in both deeds and filed at the County Courthouse, must be established to the satisfaction of the local agency before the permit can be issued.

(16) *Media*: All media shall meet the following specifications:

(i) All media testing shall be conducted by the supplier within 90 days of the delivery date.

(ii) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing

results, testing date, amount of material purchased under this certification and the delivery date.

(iii) The media shall consist of fine aggregate meeting the uniform size and grading requirements for fine aggregate in the most recent revision of ASTM C 33.

(iv) The media may not contain more than 3% by weight materials finer than #200 sieve as determined using the most recent revision of ASTM C 117 or AASHTO No. T11.

(d) *Maintenance*. The owner shall inspect the elevated sand mound at least annually for ponding of effluent and any downgradient seepage.

Cross References

This section cited in 25 Pa. Code § 71.63 (relating to retaining tanks).

§ 73a.125. Open bottom media filter beds and trenches

(a) *Siting*.

(1) Subsurface sand filters may not be utilized on soils where the limiting zone occurs at less than 6 feet below the mineral soil surface.

(2) The average percolation rate, as determined by § 73a.13 (relating to percolation tests), shall be greater than 90 minutes per inch.

(3) The average percolation rate at a depth between 36 and 60 inches shall be within the range of 3-90 minutes per inch.

(b) Design.

(1) The average percolation rate obtained from paragraph (3) shall be applied to Table A in § 73a.121 (relating to general) for determination of the absorption area and other system requirements.

(2) System design shall meet the requirements of § 73a.122 (relating to standard trenches) or § 73a.123 (relating to seepage beds) except as modified by subsection (c).

(c) Construction.

(1) The maximum depth of the excavation shall be 5 feet.

(2) Media meeting the following specifications shall be placed in the entire bed or trench to a minimum depth of 12 inches:

(i) All media testing shall be conducted by the supplier within 90 days of the delivery date.

(ii) A written certification from the supplier shall be provided to the sewage enforcement officer and the permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(iii) The media shall consist of fine aggregate meeting the uniform size and grading requirements for fine aggregate in the most recent revision of ASTM C 33.

(iv) The media may not contain more than 3% by weight materials finer than #200 sieve as determined using the most recent revision of ASTM C 117 or AASHTO No. T11.

(d) *Maintenance*. The owner shall inspect the absorption area at least annually for ponding of effluent and any downgradient seepage.

§ 73a.126. At-grade absorption area

(a) *Siting*.

(1) The slope of the installation site must be less than or equal to 15%.

(2) The percolation rate must rate must be greater than or equal to 3 and less than 181 min/in on 0 to 12% slopes. The percolation rate must be greater than or equal to 3 and less than or equal to 90 min/in on greater than 12 to 15% slopes.

(b) *Design*.

(1) Pressure dosing is required.

(2) The absorption area shall have a minimum length to width ratio of 4 to 1 on sites with 0 to 12% slopes. On sites with greater than 12 to 15% slopes the minimum length to width ratio shall be 6 to 1.

(3) All laterals shall have end cleanouts extended to the soil surface and be constructed using two 45 degree bends.

(4) Laterals shall be fitted with end caps.

(5) All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iii) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(iv) All coarse aggregate testing shall be conducted within 1 year of the delivery date.

(v) A written certification from the supplier shall be provided to the sewage enforcement officer and permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(vi) A minimum of a total of 10 inches of coarse aggregate meeting AASHTO No. 3, 467, 5 or 57 size and grading requirements shall be used. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(6) The absorption area shall be constructed in accordance with one of the two following options, at the discretion of the designer.

(i) Coarse aggregate shall be placed over the laterals to a uniform depth of 2 inches. The aggregate shall be placed beneath the laterals on contour to a uniform depth throughout the absorption area. The laterals shall be designed in accordance with § 73a.113(c) (relating to pressurized distribution). The upslope laterals shall be placed 1 foot from the upper edge of the aggregate. The downslope laterals shall be placed a minimum of 6 feet from the downslope edge of the aggregate. Laterals shall be placed a maximum of 6 feet on center. There is no minimum distance between the upslope and downslope laterals. All laterals must terminate 2 to 5 feet from the ends of the aggregate. The design shall include a 3-foot subsoil berm around the ends and downslope side of the aggregate area in addition to the berm described in subsection (c)(5). A 2:1 slope shall be maintained on the subsoil berm.

- OR -

(ii) The laterals shall be installed on contour, level and spaced evenly over the absorption area. Coarse aggregate shall be placed over the laterals to a uniform depth of 2 inches. Sufficient coarse aggregate shall be placed beneath the laterals so that they are level.

(7) A 2:1 coarse aggregate slope shall be maintained on all sides of the aggregate.

(8) Designing the location of multiple absorption areas so that one absorption area is placed hydraulically upgradient or downgradient from the other may cause the lower absorption area to fail because of excessive hydraulic loading from the upper absorption area. Unless the applicant shows the potential for such an impact is nonexistent through the experimental system process, this type of absorption area placement is prohibited.

(c) *Construction*.

(1) The proposed absorption area shall not be obstructed by stumps or other obstacles and shall be roughed or plowed parallel with the contour to a maximum depth of 6 inches, using a multiple share chisel plow or similar implement attached to light-weight equipment to scarify the soil surface without smearing the soil or breaking down the soil structure. Rotary tilling is prohibited.

(2) Immediately after plowing, aggregate shall be placed over the exposed plowed surface. The aggregate shall be placed from the upslope side of the bed using only lightweight equipment. Under no circumstances may equipment travel on the plowed soil surface until the aggregate is in place.

(3) The top of the coarse aggregate material shall be covered with geotextile material to prevent backfill material from settling into the aggregate.

(4) The at-grade shall be surrounded by a berm consisting of mineral soil containing less than 20% coarse fragments with no coarse fragments greater than 4 inches in diameter, more stable and less permeable than the fine aggregate, and lightly compacted during construction to contain and protect the absorption area interior. The width of this berm shall be a minimum of 3 feet at the top of the aggregate.

(5) Upon completion, the outside slope of the berm may be no greater than 33.3 % (3:1) for sites with 0 to 12% slopes. On sites with greater than12 to 15% slopes the outside slope of the berm may be no greater than 25% (4:1) down slope and no greater than 33.3% (3:1) upslope. The minimum berm should remain within the property. If a berm extends on to a neighbor's property, a formal easement, recorded in both deeds and filed at the County Courthouse, must be established to the satisfaction of the local agency before the permit can be issued.

(6) The cover over the aggregate shall be 8 inches of soil suitable for the growth of vegetation and shall be seeded to assure the stability of the berm.

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(d) *Maintenance*. The owner shall inspect the absorption area at least annually for ponding of effluent and any downgradient seepage.

§ 73a.127. Shallow limiting zone at-grade absorption area

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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

The shallow limiting zone at-grade absorption area shall be designed as set forth below.

(a) *Siting.*

(1) The minimum vertical isolation distances for this final treatment option are greater than or equal to 10 inches to the seasonal high water table, or greater than or equal to 16 inches to rock formation.

(2) The slope of the site must be less than or equal to 15%.

(b) *Design*.

(1) The treatment and disposal distribution configuration is based on the horizontal linear loading rate derived from the soil morphological evaluation conducted in accordance with § 73a.14 (relating to soil morphological evaluations) and the Hydraulic Linear Loading Rate (HLLR) chart in Table D of § 73a.121 (relating to general).

(2) Pressure dosing is required.

(3) For sites that do not have seasonal high water tables, or a rock formation or other stratum or soil condition that effectively limits the downward passage of effluent, the at-grade absorption areas may be constructed in a bed configuration. These absorption areas shall have a minimum length to width ratio of 4 to 1 on sites with less than or equal to 12% slopes. On sites with greater than 12% slopes, the minimum length to width ratio shall be 6 to 1.

(4) For sites that have seasonal high water tables or restrictive horizons, the at-grade absorption areas shall be constructed in an at-grade trench configuration. Trench design shall be determined by the figures in the Hydraulic Linear Loading in Table D of § 73a.121 (relating to general) using the following calculations:

Width of Infiltration Field = HLLR ÷ ILR
(HLLR)=Hydraulic Linear Loading Rate

(ILR)=Infiltration Loading Rate

Length of Infiltration Field = Peak daily sewage flow ÷ HLLR
(HLLR)=Hydraulic Linear Loading Rate

(5) All laterals shall have end cleanouts extended to the soil surface and be constructed using two 45-degree bends.

(6) Laterals shall be fitted with end caps.

(7) All coarse aggregate shall meet the following specifications:

(i) The aggregate shall not contain more than 15% by weight total deleterious material. Deleterious material is any material that will adversely affect the structural soundness or storage capacity of the aggregate including material finer than No. 200 sieve, clay lumps and friable particles.

(ii) The aggregate shall not contain more than 5% by weight clay lumps and friable particles. Testing shall be performed using the most recent revision of ASTM C 142.

(iii) The aggregate shall not contain more than 5% by weight material finer than No. 200 sieve. Testing shall be performed using the most recent revision of ASTM C 117 or PMT No. 100.

(iv) All coarse aggregate testing shall be conducted by the supplier within 1 year of the delivery date.

(v) A written certification from the supplier shall be provided to the sewage enforcement officer and the permittee including the name of the supplier, testing results, testing date, amount of material purchased under this certification and the delivery date.

(vi) A minimum of a total of 10 inches of coarse aggregate meeting AASHTO No. 3, 467, 5 or 57 size and grading requirements shall be used. The aggregate may meet the characteristics of an individual category (3, 467, 5 or 57) or fall within the outer boundaries of sieve testing for each sieve category.

(8) At-grade bed absorption areas shall be constructed in accordance with one of the following two options, at the discretion of the designer.

(i) Coarse aggregate shall be placed over the laterals to a uniform depth of 2 inches. The aggregate shall be placed beneath the laterals on contour to a uniform depth throughout the absorption area. The laterals shall be designed in accordance with § 73a.113(c) (relating to pressurized distribution). The upslope laterals shall be placed 1 foot from the upper edge of the aggregate. The

downslope laterals shall be placed a minimum of 6 feet from the downslope edge of the aggregate. Laterals shall be placed a maximum of 6 feet on center. There is no minimum distance between the upslope and downslope laterals. All laterals must terminate 2 to 5 feet from the ends of the aggregate. The design shall include a 3-foot subsoil berm around the ends and downslope side of the aggregate area in addition to the berm described in Subsection ©(4). A 2:1 slope shall be maintained on the subsoil berm.

- OR -

(ii) The laterals shall be installed level and spaced evenly over the absorption area. Coarse aggregate shall be placed over the laterals to a uniform depth of 2 inches. Sufficient coarse aggregate shall be placed beneath the laterals so that they are level.

(9) A 2:1 coarse aggregate slope shall be maintained on all sides of the aggregate.

(10) The at-grade absorption area shall be surrounded by a berm consisting of mineral soil containing less than 20% coarse fragments with no coarse fragments greater than 4 inches in diameter, more stable and less permeable than the fine aggregate, and lightly compacted during construction to contain and protect the absorption area interior. The width of this berm shall be a minimum of 3 feet at the top of the aggregate.

(b) *Construction*.

(1) The proposed absorption area shall not be obstructed by stumps or other obstacles and shall be roughed or plowed parallel with the contour to a maximum depth of 6 inches, using a multiple share chisel plow or similar implement attached to light-weight equipment to scarify the soil surface without smearing the soil or breaking down the soil structure. Rotary tilling is prohibited.

(2) Immediately after plowing, aggregate shall be placed over the exposed plowed surface. The fine aggregate shall be placed from the upslope side of the bed using only lightweight equipment. Under no circumstances may equipment travel on the plowed soil surface until the fine aggregate is in place.

(3) The top of the coarse aggregate material shall be covered with geotextile fabric to prevent backfill material from settling into the aggregate.

(4) Upon completion, the outside slope of the berm may be no greater than 33.3 % (3:1) for sites with 0 to 12% slopes. On sites with greater than12 to 15% slopes the outside slope of the berm may be no greater than 25% (4:1) down slope and no greater than 33.3% (3:1) upslope. The minimum berm should remain within the property. If a berm extends on to a neighbor's property, a formal easement, recorded in both deeds

and filed at the County Courthouse, must be established to the satisfaction of the local agency before the permit can be issued.

(5) The cover over the aggregate shall be 8 inches of soil suitable for the growth of vegetation and shall be seeded to assure the stability of the berm.

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(6) Designing the location of multiple absorption areas so that one absorption area is placed hydraulically upgradient or downgradient from the other may cause the lower absorption area to fail because of excessive hydraulic loading from the upper absorption area. Unless the applicant shows the potential for such an impact is nonexistent through the experimental system process, this type of absorption area placement is prohibited.

(d) *Maintenance*. The owner shall inspect the absorption area at least annually for ponding of effluent and any downgradient seepage.

§ 73a.128. Drip distribution system

A sewage enforcement officer 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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

The drip distribution system shall be designed as set forth below.

(a) *Siting.*

(1) The soils must be classified morphologically as either well drained or moderately well drained as determined by a soil scientist. A report regarding the soil drainage classification determination and assigning of the appropriate loading rate consistent with Table C of § 73a.121 (relating to general) and the horizontal linear load must be signed by the qualified soil scientist and must be attached to the permit application. The soil scientist who signs the soils report shall determine the number and placement of soil profile descriptions required to conduct the morphological evaluation of soils in the proposed drip zones. The profiles may be supplemented with the use of a hand auger to confirm soil conditions between profiles. Excessive disturbance of soils within the proposed drip zone must be avoided.

(2) The slope in each drip distribution zone must be between 0 and 25%.

(3) Isolation distances must be measured from a perimeter extending two feet beyond the outermost drip tubing in a drip distribution zone.

(b) *Design.*

(1) Treatment: If an aerobic treatment unit is proposed, the specific aerobic tank proposed for use must be identified, and the application must include a letter from the drip system manufacturer stating that they have evaluated this specific unit for compatibility with their system and have accepted it for this use.

(2) Filtration:

(i) Final filtration must be provided by a hydraulic unit fitted with in-line filters.

(ii) The filter must have a maximum size openings of 150 microns.

(iii) The filters must include a mechanism to automatically or continuously flush the filters. The filters using automatic backwashing must backwash before each dose.

(iv) Backwash from the filters must be returned to the first compartment of the septic tank or to the inlet of the aerobic treatment tank.

(v) The hydraulic unit must be protected from temperatures below freezing in accordance with the manufacturer's specifications.

(3) Each zone must either be automatically flushed a minimum of each 50 cycles or be continuously flushed to clean the drip tubing, maintaining a scouring velocity of 1 foot per second at the distal end of each lateral connection.

(4) The system must be equipped with a dosing tank alarm to alert the operator of problems with the system.

(5) Drip Distribution Zone:

(i) A minimum of two zones are required for each system, with adequate flow equalization provided to accommodate time dosing of the zones.

(ii) The drip tubing must follow the contour of the land.

(iii) The loading rate must be no more than 0.34 gallons per day per lineal foot of tubing.

(iv) The tubing must have pressure-compensating emitters every 2 feet with spacing between tubing ranging between 2 and 3 feet unless justification for different spacing is provided (such as trees, irregular topography, etc.). All emitters within the zone shall provide equal distribution between plus or minus 10%.

(v) The horizontal linear load (the gallons per foot along the topographic contour) must not exceed 4.6 gallons per day as calculated on the average daily flow of the onlot system. The average daily flow is 50% of the maximum design flow as listed in § 73a.4 (relating to sewage flows). Where the vertical isolation distance is greater than 20 inches, the horizontal linear load may be increased based on the evaluation of a combination of factors including, but not limited to, increased depth over limiting zone, permeability and slope.

(vi) The horizontal linear load equals the average daily gallons per day divided by the length of the system.

(vii) The minimum horizontal length required is the average daily flow divided by 4.6.

(viii) The sewage enforcement officer may require the site plan for the drip distribution zones to be developed by or in consultation with the manufacturer or a representative of the manufacturer of the drip distribution system being installed. All drip distribution systems with less than 20 inches vertical isolation distance shall be developed by or in consultation with the manufacturer or a representative of the manufacturer of the drip distribution system being installed.

(ix) On slopes greater than 5%, top-feed supply and return manifolds shall be used.

(c) *Construction.*

(1) Drip lines must be installed below the soil surface using a vibratory plow, a standard trencher or by manual or hand installation to a maximum depth of 12 inches from the soil surface, with 6 inches being the optimum installation depth. Cable pullers shall not be used. Where installation depths less than 6 inches from the soil surface are necessary due to stoniness, additional cover shall be required to provide 6 to 12 inches of cover. Cover may be either clean mineral soil or native soil. Imported mulch is permissible in wooded areas of passive activity with established forest litter. For installation less than 6 inches, the tubing may not be installed on the ground surface without adequate soil and tubing interface being created.

(2) The manufacturer's representative must be present to oversee the installation of the system. The current list of representatives is available from the manufacturer. As an alternative, contractors who have completed a training course provided by the manufacturer before installing drip tubing may install the system independently of oversight by the manufacturer.

(3) Installation of the drip distribution system shall meet the specifications provided by the manufacturer.

(4) Drip tubing is susceptible to freezing when sufficient turf cover is not established in non-wooded areas prior to winter operation. When turf cover will not be established prior to winter operation, other measures, such as a temporary cover of mulch or straw, should be used to insulate the tubing.

(d) *Operation and Maintenance:* The following operation and maintenance conditions must be attached to the permit issued by the local agency:

(1) The manufacturer's representative must meet with the property owner within 1 month of system start-up and/or occupancy of the dwelling and with the local agency's SEO upon request, to explain the operation and maintenance of the system and provide written instructions to the property owner that includes:

(i) Instructions on the operation and maintenance of the system.

(ii) The locations of all parts of the system.

(iii) A caution notice regarding disturbance of the drip zones that may cause system damage (i.e., excavation for trees, fencing, etc.).

(iv) An explanation of the automatic alarm system.

(v) A statement requiring that the manufacturer's representative be contacted if the alarm system is activated.

(2) The manufacturer of the drip distribution system must provide a minimum 2-year warranty on all defects due to materials or workmanship.

(3) The owner shall inspect the absorption area at least annually for ponding of effluent and any downgradient seepage.

Cross References

This section cited in 25 Pa. Code § 73a.12 (relating to limiting zone).

§ 73a.129. Individual residential spray irrigation system

A sewage enforcement officer 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 components designed under this listing. All other system proposals under this listing must be submitted to the Department for review and comment.

The individual residence spray irrigation system shall be designed as set forth below.

(a) *Siting.*

(1) The maximum slope of the undisturbed soil where a spray field may be permitted is 25%.

(2) Individual residential spray irrigation system spray fields are not permitted on:

(i) Soils with evidence of a seasonal high water table at less than 10 inches from the surface.

(ii) Soils with rock formations at less than 16 inches from the surface.

(iii) Floodplain soils or flood prone areas unless any required encroachment permits have been obtained from the Department and the encroachment is in compliance with local ordinances pertaining to flood areas.

(iv) Agricultural areas in active production of food for human consumption.

(3) Slopes shall be as follows:

(i) Open, grassed areas—limited to 12%.

(ii) Forested areas—limited to 25%.

(iii) Nonfood producing agricultural areas—limited to 4%.

(b) *Design.*

(1) Spray field sizing based upon soils characteristics shall be in accordance with Table F:

Table F
Individual Residential Spray Irrigation Spray Field

Soil Characteristics		Slope	Required Spray Field Area (ft^2)	
Depth To Rock	*Depth To Water Table*		*3 Bedroom Home*	*Additional Area Per Bedroom*
16 to 20 inches	10 to 40 inches	≤12%	40,000	10,000
		>12%	80,000	20,000
	>40 inches	≤12%	15,000	3,750
		>12%	30,000	7,500
>20 inches	10 to 20 inches	≤12%	20,000	5,000
		>12%	40,000	10,000
	>20 inches	≤12%	10,000	2,500
		>12%	20,000	5,000

(2) Copies of the plans and specifications along with the designer's report shall be attached to the applicant's copy, local agency's copy and the Department's copy of the application for sewage permit.

(3) Individual residential spray irrigation systems require a minimum treatment level of secondary plus disinfection.

(4) Conveyance of effluent from the storage tank to the spray field shall be through a delivery pipe sized to minimize friction loss.

(5) Check valves shall be prohibited on delivery lines. Air relief valves may be placed at high points in the delivery lines to prevent air locks.

(6) The delivery line and laterals shall be designed so that the effluent will drain back to the storage tank or otherwise designed to prevent freezing of the lines and sprinkler heads.

(7) Individual laterals shall be sized to minimize friction loss. The hydraulic loss (friction and elevation changes) within a lateral shall be less than 20% of the operating head of the sprinklers.

(8) Design of laterals should include consideration of measures to prevent freezing of lines.

(9) Spacing of laterals and sprinklers shall provide for distribution of the effluent over the spray field using a design nozzle pattern that does not overlap adjacent spray nozzle wetted perimeters.

(10) Design of the spray field shall be based on the manufacturer's sprinkler specifications listing operating head, wetted diameter, nozzle size and discharge rate that shall be attached to the system design.

(11) The design head of the sprinkler may not exceed the manufacturer's specifications for each system component.

(12) The minimum pump capacity shall equal the total discharge from all sprinklers when operating at design head.

(13) Total pump head shall be calculated by addition of all losses incurred due to elevation changes, pipe and fitting friction losses and the design head of the sprinkler.

(14) The effluent shall be discharged to the spray field at least once per day. A manual override shall be installed in the system to allow interruption of this spray cycle when weather conditions are not conducive to spraying.

(15) The minimum liquid capacity of an individual residential spray irrigation system storage tank serving a three-bedroom dwelling, excluding chlorine contact volume, is 2,000 gallons. The tank size shall be increased an additional 500 gallons for each additional bedroom over three. Additional increases in size may be required where more than 5 days storage is needed due to climatic conditions or when spray fields are located in floodplain or flood prone areas. Local climatic records, as well as nationally available climatic data, such as the National Oceanic and Atmospheric Administration's database, should be evaluated to determine if additional storage is required.

(c) *Construction.*

(1) The area upslope of the spray field shall be graded or bermed to divert upland drainage from the spray field site.

(2) The downslope portion of the permitted spray field shall be graded or bermed to retain effluent on the permitted spray site.

(3) The permitted spray field shall be covered with vegetation.

(4) Construction activity within the spray field site shall be conducted in a manner that will minimize earth disturbance and compaction.

(5) Sprinklers shall be installed on risers 18 inches to 5 feet above grade level.

(6) Sprinklers shall be kept clear of obstructing vegetation for a radius of 5 feet.

(7) The permittee shall conduct a test pressurization of the completed spray field in the presence of the sewage enforcement officer prior to covering the piping system from

view. During the test, the sewage enforcement officer shall confirm that all joints are watertight, the design head is achieved and the manual override is functional.

(d) *Operation and maintenance*. The system designer shall provide an operation and maintenance manual, which may be supplemented with manufacturer's manuals and instructions, to the permittee that includes, as a minimum, the following required standards for operation and maintenance to be met by the permittee:

(1) The plumbing to the spray field shall be functional and free of leaks.

(2) The spray nozzles shall be functioning within the design specifications and the extent of the designed wetted perimeter and each nozzle.

(3) A laboratory shall test the discharge to the system for fecal coliforms, carbonaceous biochemical oxygen demand ($CBOD_5$), suspended solids and chlorine residual to determine compliance with Chapter 72 (relating to the administration of sewage facilities permitting program). When UV disinfection is used in place of chlorination, documentation of annual replacement of the UV bulb shall be substituted for the free chlorine residual test required under the Act. At least annually, a copy of the tests results along with the most recent inspection of the system by the maintenance provider established under § 72.25(h) (relating to issuance of permits) shall be sent to the local agency.

Cross References

This section cited in 25 Pa. Code § 71.63 (relating to retaining tanks); 25 Pa. Code § 72.25 (relating to issuance of permits); 25 Pa. Code § 72.42 (relating to powers and duties of local agencies); 25 Pa. Code § 73a.12 (relating to limiting zone);. and 25 Pa. Code § 73a.14 (relating to morphological evaluation).

Subchapter K. ZERO DISCHARGE COMPONENTS

Sec.

§ 73a.141. General.

Zero discharge sewage components require permits. They shall only be used where the Department finds and gives written notice to the approving body that the requirements of Chapter 71 (relating to administration of sewage facilities planning program) have been met.

Cross References

This section cited in 25 Pa. Code § 73a.11 (relating to limiting zone).

§ 73a.142. Standards for holding tanks.

(a) A holding tank shall be constructed of sound and durable material not subject to excessive corrosion or decay.

(1) Precast concrete holding tanks shall have a minimum wall thickness of 2 1/2 inches and be adequately reinforced.

(2) Precast slabs used as covers shall have a thickness of at least 3 inches and be adequately reinforced.

(3) Holding tanks having a liquid capacity of 5,000 gallons or less may not be constructed of blocks, bricks or similar masonry construction.

(4) Holding tanks having a capacity in excess of 5,000 gallons may be constructed onsite to meet the standards of the National Concrete Masonry Association for reinforcement and waterproofing. These standards are contained in *Basement Manual*, *Design and Construction Using Concrete Mason*ry, TR 149, National Concrete Masonry Association, 2001, *Concrete Masonry Basement Wall Construction*, TEK 3-11, National Concrete Masonry Association, 2001 and

Preventing Water Penetration in Below-Grade Concrete Masonry Walls, TEK 19-3A, National Concrete Masonry Association, 2001.

(5) Steel holding tanks shall meet the requirements of Underwriters Laboratory (UL) standards 1746 or 70.

(b) The tanks shall be watertight after installation. The installer shall demonstrate and certify in writing that the tank is watertight using one of the following methods:

(1) *Water-Pressure Testing*-The tank shall be sealed. The tank shall be filled with water to a minimum level of 2 inches above the highest joint on the risers and allowed to stand for 24 hours. After the 24 hours have elapsed, the tank shall be refilled to the original level and allowed to stand for 1 hour. The tank shall meet the requirements of this section if the water level remains constant for a minimum of 1 hour.

(2) *Vacuum Testing*- The vacuum test shall be performed prior to backfilling around the tank. The tank shall be sealed. A vacuum equal to 4 inches (100 mm) of mercury shall be applied to the tank. The tank shall meet the requirements of this section and be approved if 90 % of the applied vacuum is held for a minimum of 5 minutes.

(c) The holding tank shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the tank.

(d) The minimum capacity of a holding tank is 1,000 gallons or a volume equal to the quantity of waste generated in 3 days, whichever is larger.

(e) The holding tank shall be equipped with a warning device to indicate when the tank is filled to within 75% of its capacity. The warning device shall create an audible and visual signal at a location frequented by the homeowner or responsible individual.

(f) All inlet and outlet pipes shall be connected to tanks by means of a sealed flexible joint connector. Use of any grouting is not permitted.

(g) Disposal of waste from a holding tank shall be at a site approved by the Department.

Cross References

This section cited in 25 Pa. Code § 73a.11 (relating to limiting zone).

§ 73a.143. Standards for privies.

(a) *Location.*

(1) The privy shall be located so as to minimize any danger of contamination of water supplies. Where possible, the privy shall be downgradient and at least 50 feet from any source of water supply.

(2) The structure shall be accessible to the user, and at least 10 feet away from any building served.

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(3) Consideration shall be given to the direction of prevailing winds to reduce odor nuisances.

(b) *Construction.*

(1) The superstructure shall be constructed of substantial materials.

(2) The vault shall be large enough to provide for several years use and be constructed to meet the following specifications:

(i) The vault shall be watertight and constructed of sound and durable material not subject to excessive corrosion or decay.

(ii) Precast concrete vaults shall have a minimum wall thickness of 2 1/2 inches and be adequately reinforced.

(iii) Precast slabs used as covers shall have a thickness of at least 3 inches and be adequately reinforced.

(iv) Vaults having a liquid capacity of 5,000 gallons or less may not be constructed of blocks, bricks or similar masonry construction.

(v) Vaults having a capacity in excess of 5,000 gallons may be constructed onsite to meet the standards of the National Concrete Masonry Association for reinforcement and waterproofing. These standards are contained in *Basement Manual*, *Design and Construction Using Concrete Masonry*, TR 149, National Concrete Masonry Association, 2001, *Concrete Masonry Basement Wall Construction*, TEK 3-11, National Concrete Masonry Association, 2001 and *Preventing Water Penetration in Below-Grade Concrete Masonry Walls,* TEK 19-3A, National Concrete Masonry Association, 2001.

(vi) Steel vaults shall meet the requirements of Underwriters Laboratory (UL) standards 1746 or 70.

(3) The vault shall be installed using a minimum of 4 inches of pea gravel, sand or other suitable aggregate to bed the vault.

(4) The vault shall be equipped with a roof-ventilating stack that is screened to prevent entrance of flies.

(5) An exterior cleanout shall be provided for the vault.

(6) The superstructure shall be flytight, well ventilated and fastened solidly to the vault.

(7) The door shall be self-closing and provided with weather-stripping to make it insect proof.

(8) The seat and cover shall be constructed of smooth and easily cleanable material, and the cover shall be self-closing.

(9) An earth mound shall be placed around the privy, or a surface water diversion shall be constructed to keep surface water from flooding the vault.

§ 73a.144. Chemical toilet or other portable toilet.

(a) Chemical toilets or other portable toilets intended for use at temporary construction sites, facilities providing temporary recreational or sporting activities (such as a special event) or temporary seasonal facilities other than those intended for human habitation, shall be sited, operated and maintained in accordance with the manufacturer's specifications and shall include a inspection of the toilet at the time of delivery.

(b) Improper installation, operation or maintenance of these toilets shall constitute a nuisance under section 14 of the act (35 P. S. § 750.14) and be enforceable by the local agency.

§ 73a.145. Recycling toilet, incinerating toilet or composting toilet.

(a) Recycling and composting toilets shall bear the seal of the NSF indicating testing and approval by that agency under Standard No. 41.

(b) Incinerating toilets shall bear the seal of the NSF indicating testing and approval by that agency under NSF Protocol P157.

(c) The device utilized shall meet the installation specifications of the manufacturer and shall be operated and maintained in a manner that will preclude any potential pollution or health hazards.

(d) When the installation of a recycling toilet, incinerating toilet or composting toilet is proposed for a new residence or establishment, an onlot sewage system or other approved method of sewage disposal shall be provided for treatment of wash water or excess liquid from the unit, except as provided in subsection (f). Both sewage disposal facilities shall be included under one permit.

(e) When the installation of a recycling toilet, incinerating toilet, composting toilet or another type of water conservation device is proposed for an existing residence or facility and no alteration of the onlot system is proposed, a permit is not required.

(f) When a composting toilet or incinerating toilet is proposed for installation on a lot meeting the requirements of § 71.63 (relating to retaining tanks), it shall be deemed equivalent to and permitted as a privy. The device shall be operated and maintained in accordance with the manufacturer's specifications. Discharges of liquids from these units, except to onlot sewage systems meeting the requirements of this part or other method of sewage disposal approved under this chapter or approved by the Department are prohibited.

§ 73a.146. Evapotranspiration system.

This technology consists of low flow plumbing fixtures inside the home, a minimum of secondary treatment, and specially modified passive solar greenhouse beds where the wastewater is eliminated through the process of evapotranspiration. These systems are often used where site limitations, such as shallow depth to seasonal high water table or excessive slope, make use of other soil based absorption systems difficult. The minimum requirements are as follows:

(a) Design and installation must follow the manufacturer's specifications.

(b) The bed must be contained in an enclosed, walled structure (usually cinder blocks) and insulated on the exterior to avoid contact with frozen ground. The bed must be lined to retain all effluent and avoid infiltration with the underlying soil.

(c) The bed must be sectionalized with a series of valves that control effluent flow to each section proportional to the evapotranspiration potential of the season.

(d) Temperature controls and humidity exchangers must be used to maintain the proper internal environment necessary to reach optimal evapotranspiration potential.

(e) Any application for the use of an evapotranspiration system must include the identity of the person responsible for the design.

(f) Each application for an evapotranspiration system shall be accompanied by a statement acknowledging the requirement that the sewage enforcement officer be notified of any malfunction or modification of the original system.

(g) These systems require regularly scheduled maintenance and monitoring to insure the long-term reliability of their performance. The sewage enforcement officer should include all operation and maintenance requirements in the permit.

(h) It is the responsibility of the sewage enforcement officer to ensure that all components of the systems have been installed in compliance with the above conditions.

(i) DEP's regional office must review the proposal prior to permitting by the sewage enforcement officer. If requested by the regional office, central office will also provide comments.

§ 73a.150. Proprietary components

(a) The Department shall enter into an agreement with an independent entity for the maintenance of a list of onlot sewage system components found to be in conformance with the requirements of this chapter, including review under the technology verification process specified in section 73a.153.

(b) Components shall be maintained in accordance with the manufacturer's specifications approved by the Department and shall include a minimum annual inspection of the component by the service provider.

Subchapter L. ALTERNATE AND EXPERIMENTAL SYSTEMS

Sec.

§ 73a.151. General.

The Department recognizes the existence of technologies related to onlot sewage treatment that are not specifically addressed in this chapter as well as technologies from other disciplines that may be applied to the design or construction of an onlot sewage system.

(a) Experimental sewage systems provide a method for the testing and evaluation of new and innovative concepts and technologies applicable to onlot sewage systems in this Commonwealth. For experiments conducted in accordance with § 73a.153(a)(1) – (4) (relating to experimental sewage systems), an experimental onlot sewage treatment system permit shall be required for all technologies, methods, system components, systems and designs the Department deems experimental. All other new or innovative concepts and technologies applicable to onlot treatment systems shall be subject to the provisions and requirements contained in §73a.153(a)(5) (relating to experimental sewage systems).

(b) Alternate sewage systems provide a classification for alternate technology that has been developed through the experimental program under § 73a.153(a)(5) (relating to experimental sewage systems), by application of existing technologies from other disciplines or through technological advances from other areas of the United States. The alternate sewage system permit will provide a method for utilizing proven technologies within this Commonwealth without constant changes to this chapter. Systems shall be permitted only where it is demonstrated that the proposed system consistently will achieve the performance standards required to protect the public health and prevent pollution of the waters of this Commonwealth.

(c) All sewage systems not designed in accordance with this chapter or previously classified as an alternate sewage system by the Department shall be submitted to the Department for review and classification.

§ 73a.152. Alternate sewage systems.

(a) Alternate systems shall be considered for individual onlot or community onlot systems in any of the following cases:

(1) To solve an existing pollution or public health problem.

(2) To overcome specific site suitability deficiencies, or as a substitute for systems described in this chapter on suitable lots.

(3) To overcome specific engineering problems related to the site or its proposed use.

(4) To utilize under varying site conditions an experimental design, either in whole or in part, which has been deemed successful by the Department.

(b) A person desiring to install an alternate sewage system shall submit complete preliminary design plans and specifications to the sewage enforcement officer and the Department for review and comment prior to submitting an application for a permit. The Department will determine if classification as an alternate system is appropriate, determine the appropriate permitting authority and provide review comments to the sewage enforcement officer.

(c) The following criteria shall be considered in the design of alternate systems:

(1) The volume and rate of sewage flow, including reductions attributed to water conservation devices and recycling devices.

(2) The chemical and bacteriological characteristics of the flow, including the varying nature, if any, of the contributing sources.

(3) The treatment of the sewage flow, including, if appropriate:

(i) The type of treatment—that is, aerobic, anaerobic, chemical or other.

(ii) The degree and extent of treatment afforded, including the chemical and biological characteristics of the effluent.

(iii) The hydraulic design, including flow rates, retention time, settling rates and sludge and scum storage.

(4) Materials of construction, including durability and chemical resistance of all system components.

(5) The characteristics and limitations of the disposal site, including, if appropriate:

(i) The depth, composition and projected effects of any limiting zone identified through extensive onsite evaluation of the soils present.

(ii) Determination of the soil permeability through percolation tests, hydraulic conductivity tests or other acceptable testing procedures conducted on the site.

(iii) The chemical and bacteriological characteristics of the subsurface or other waters.

(iv) The natural and modified slope of the disposal site and contiguous areas, with particular attention to downslope areas.

(v) The relationship of the disposal site to existing and proposed drainage patterns, including surface and subsurface flows.

(vi) The stability and renovative abilities of controlled fill areas.

(6) The design of the absorption area including:

(i) Dimensions.

(ii) Method of distribution and hydraulic design considerations of the distribution system.

(iii) Rate of application.

(iv) Relationship to other sewage disposal systems or features, water supply sources, surface waters, recharge areas, rock outcrops and other site improvements.

(v) Determination of hydraulic loading limitations—that is, interface acceptance rate or hydraulic conductivity of receiving soils in accordance with accepted principles of hydraulic flow.

(7) The effect upon the groundwater, including the following:

(i) Fecal coliform.

(ii) Chlorides.

(iii) Nitrates.

(iv) Nutrients.

(v) Other degrading material.

(8) Other considerations as may be appropriate to comply with the act.

(d) An application for an alternate system shall include the following:

(1) Detailed plans and specifications sufficient to comply with this section.

(2) A description of the system, device or process; its capabilities; and scheduled maintenance, if any, which is necessary for continued function.

(3) The identity of the person responsible for the design of the system and performance of scheduled maintenance, if required.

(e) Each application for an alternate system shall be accompanied by a statement acknowledging the requirement that the sewage enforcement officer be notified of any malfunction or modification of the original system design.

(f) Prior to issuing a permit for an alternate sewage system, the sewage enforcement officer shall consider the comments of the Department.

Cross References

This section cited in 25 Pa. Code § 73a.3 (relating to policy).

§ 73a.153. Experimental sewage systems.

(a) Experimental systems may be considered for individual or community systems in any of the following cases:

(1) To solve an existing pollution or public health problem.

(2) To overcome specific site suitability deficiencies, or as a substitute for systems described in this chapter on suitable lots.

(3) To overcome specific engineering problems related to the site or its proposed uses.

(4) To utilize under varying site conditions an experimental design, either in whole or in part, which the Department deems has a reasonable probability of success. The Department may reject any proposal for an experimental design that it believes does not have a reasonable probability of success..

(5) To verify the performance of technologies or system designs applicable to onlot disposal that are new in this Commonwealth. This includes established technologies or designs having been used in comparable applications in the field of engineering, and/or used in other jurisdictions under environmental conditions similar to or more restrictive than those in this Commonwealth.

(i) The Department may adopt a policy that outlines the technology verification process.

(ii) The verifications must be conducted by an experienced, nationally recognized organization acceptable to the Department. Verification organizations that are accredited by the American National Standards Institute as an independent third

party certification organization, and otherwise demonstrate that they are capable of implementing the evaluation are acceptable to the Department.

(iii) Testing must be conducted at a test center qualified by the verification organization and at an appropriate number of representative field sites across the Commonwealth acceptable to the Department, following technology specific and site specific test plans and protocols acceptable to the verification organization.

(iv) The verification organization shall maintain a list of technologies and system components tested, along with the performance of the tested technologies and components, and any design standards/site limitations for use of the technology.

(v) The verification organization shall maintain an ongoing quality assurance and quality control program that includes periodic audits of all facilities and production locations of tested and approved technologies, and retesting/reevaluation shall be conducted at a frequency determined by the verification organization.

(vi) The Department will determine acceptable use for technologies or components that complete the technology verification process.

(vii) The level of treatment the technology is capable of achieving will be based upon the following criteria:

(A) Components demonstrating a treatment level of less than 30 milligrams per liter (mg/L) biochemical oxygen demand (BOD_5) and total suspended solids (TSS), based upon the 95th percentile, shall be classified as secondary treatment components.

(B) Components demonstrating a treatment level of less than 10 milligrams per liter (mg/L) biochemical oxygen demand (BOD_5) and total suspended solids (TSS), based upon the 95th percentile, shall be classified as advanced treatment components.

(C) Components demonstrating a treatment level of less than 10 milligrams per liter (mg/L) total nitrogen, based upon the 95th percentile, shall be classified as nitrogen removal components.

(D) Components demonstrating a treatment level of less than 1.0 milligram per liter (mg/L) total phosphorus, based upon the 95th percentile, shall be classified as phosphorus removal components.

(E) Components demonstrating a performance level of less than 200 fecal coliform organisms per 100 milliliters, based upon the 95th percentile, shall be classified as disinfection components.

(b) The following criteria shall be considered in the design of experimental systems:

(1) The volume and rate of sewage flow, including reductions attributed to water conservation devices and recycling devices.

(2) The chemical and bacteriological characteristics of the flow, including the varying nature, if any, of the contributing sources.

(3) The treatment of the sewage flow, including, if appropriate:

(i) The type of treatment, that is aerobic, anaerobic, chemical, or other.

(ii) The degree and extent of treatment afforded, including the chemical and biological characteristics of the effluent.

(iii) The hydraulic design, including flow rates, retention time, settling rates, and sludge and scum storage.

(4) The materials of construction including durability and chemical resistance of all system components.

(5) The characteristics and limitations of the disposal site, including, if appropriate:

(i) The depth, composition and projected effects of any limiting zone identified through extensive onsite evaluation of the soils present.

(ii) The determination of the soil permeability through percolation tests, hydraulic conductivity tests or other acceptable testing procedures conducted on the site.

(iii) The chemical and bacteriological characteristics of the subsurface or other waters.

(iv) The natural and modified slope of the disposal site and contiguous areas, with particular attention to downslope areas.

(v) The relationship of the disposal site to existing and proposed drainage patterns, including surface and subsurface flows.

(vi) The stability and renovative abilities of controlled fill areas.

(6) The design of the absorption area, including:

(i) Dimensions.

(ii) Method of distribution and hydraulic design considerations of the distribution system.

(iii) Rate of application.

(iv) Relationship to other sewage disposal systems or features, water supply sources, surface waters, recharge areas, rock outcrops and other site improvements.

(v) Determination of hydraulic loading limitations—that is, interface acceptance rate of hydraulic conductivity of receiving soils—in accordance with accepted principles of hydraulic flow.

(7) The effect upon the groundwater, including:

(i) Fecal coliform.

(ii) Chlorides.

(iii) Nitrates.

(iv) Nutrients.

(v) Other degrading material.

(8) Other considerations as may be appropriate to comply with the act.

(c) Except as provided in subsection (e), all experimental onlot sewage systems shall have a flow measuring device installed.

(d) Except as provided in subsection (e), experimental designs will be approved for use only when it has been determined that an individual or community sewage disposal system meeting the requirements of this chapter or that sewerage services meeting the requirements of the Clean Streams Law and Article II (relating to water resources), may be installed if the experiment is deemed a failure.

(e) A replacement system, as specified in subsection (d), and flow measurement, as specified in subsection (c), may not be required where the experimental design is an attempt to solve an existing pollution or public health problem.

(f) A person desiring to install an experimental sewage system or alter a component of an existing system using an experimental method, technology or design shall submit complete preliminary design plans and specifications to the sewage enforcement officer and Department for review and comment at least 60 days prior to submitting an application for a permit. The Department will determine if classification as an experimental system, method, technology or design is appropriate for the submission and the appropriate permitting authority for the system.

(g) An application for an experimental system shall include the following:

(1) Detailed plans and specifications sufficient to comply with this section and the Clean Streams Law.

(2) A description of the system, device or process; its capabilities; and scheduled maintenance, if any, which are necessary for continued function.

(3) The identity of the person responsible for the design of the system; performance of scheduled maintenance, if required; and responsibility for repair or replacement in event of failure of the system.

(4) Each application for an experimental system shall be accompanied by a statement acknowledging the requirement that the Department and the sewage enforcement officer be notified of any malfunction or modification of the system design.

(h) Permitting of experimental systems, when the local agency has been determined to be the appropriate permitting authority, shall follow the procedure in § 72.25. The sewage enforcement officer shall obtain concurrence from the Department in writing prior to issuing a permit for any experimental onlot sewage treatment system.

(i) Monitoring, observation, testing or other requirements that are deemed necessary to verify the success of the experiment shall be required.

(1) All monitoring and observation requirements shall be listed in the permit.

(2) All monitoring and observation results shall be submitted to the local agency and to the Department annually.

(3) Upon completion of 3 years of monitoring, the Department will analyze all the monitoring data submitted. If the experiment is determined to be successful through the verification process specified in subsection (a)(5), the Department may issue a letter to the property owner and the local agency classifying that system as an alternate.

Cross References

This section cited in 25 Pa. Code § 73a.3 (relating to policy).