

Commonwealth of Pennsylvania
Department of Environmental Protection (DEP)
Bureau of Clean Water
Harrisburg, PA

Issued to: Generic

Technology: At-Grade Absorption Area

Classification Type: Alternate technology (A2014-0019-0003)

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In accordance with Title 25, Chapter 73, Section 73.72, DEP classifies the at-grade absorption area for use as an alternate onlot sewage treatment system. This classification permits the use of the at-grade as an absorption area capable of receiving sewage effluent at either the primary treatment level (exceeding 25 mg/l CBOD₅ and exceeding 30 mg/l TSS), the secondary treatment level (not exceeding 25 mg/l CBOD₅ and not exceeding 30 mg/l TSS), or the advanced treatment level (not exceeding 10 mg/l CBOD₅ and not exceeding 10 mg/l TSS).

I. Technology Description

The at-grade is an absorption area that is designed and installed such that all or part of the absorption area is located at or above original ground elevation. The dimensions of the absorption area are determined by percolation rates and conformance to either a 4:1 or 6:1 length to width ratio. The absorption area consists of an aggregate bed with a pressurized piping distribution system. A final cover of suitable soil stabilizes the completed installation and supports suitable vegetative growth. Discharge of effluent at either the primary or secondary treatment levels will require greater than or equal to 48 inches of suitable soil as described in Chapter 73. Utilizing of a subsequent filter treatment unit shown in Table 1 can reduce the amount of suitable soil to greater than or equal to 20 inches of suitable soil. The at-grade absorption area may be designed using either the sloped at-grade or the level at-grade. Either option will require distribution of effluent to a minimum of two sets of opposing laterals by a central manifold.

II. Design Requirements

- A. Location: The at-grade absorption area may be installed for the treatment of domestic strength wastewater (as defined by Table 1 of Miscellaneous Data to be used in Conjunction with PA DEP listings) serving a new construction or as a repair.
- B. Siting:
 - (1) The slope of the installation must not exceed 15%.
 - (2) The percolation tests must be conducted in accordance with Chapter 73, Section 73.15 and the absorption area must be sized in accordance with the requirements of Section 73.16(c) (Table A), using the column under "Subsurface

Sand Filters and Elevated Sand Mounds.” No size reduction is permitted for use of an aerobic tank.

- (3) ***For onlot systems designed for discharge at either the primary or secondary treatment levels only.*** Evaluation of the soil profile must show that there is greater than or equal to 48 inches of suitable soil as described in Chapter 73. The soil profile must show that there is a minimum of 48 inches of suitable soil between the bottom of the proposed absorption area and the limiting zone.
- (4) ***For onlot treatment systems designed for discharge with either primary, secondary or advanced treatment levels.*** Evaluation of the soil profile must show that there is greater than or equal to 20 inches of suitable soil. The soil profile must show that there is a minimum of 20 inches of suitable soil between the bottom of the proposed absorption area and the limiting zone. The following specifications must be adhered:
- Utilization of a subsequent filter treatment units listed in Table 1 is required prior to discharge to the absorption area. The major components of the treatment sequence includes (1) a septic tank or an aerobic tank and (2) a subsequent filter.
 - Refer to each individual listing to determine if reduced absorption area sizing or other specifications are allowed.

Table 1

Subsequent Filter Treatment Units
Anua Puraflo Peat Filter
Norweco Singulair 960-HKBFR
Orenco AdvanTex
Premier Tech Aqua Ecoflo Coco/Peat Filter

C. Construction:

- (1) Tank installations must consist of either a two-compartment rectangular tank, two rectangular tanks in series, and otherwise conform to meet the requirements of Section 73.31. Vertically aligned circular (round) tanks are not permitted. Aerobic treatment tanks must be in compliance with Section 73.32.
- (2) Lateral Specifications:
- Design requirements for the laterals must conform to the pressure distribution design requirements provided by Section 73.44.
 - Distribution of effluent to the individual laterals shall be by a central manifold extending into the absorption area from the delivery pipe. A minimum of 2 pairs of laterals are required. The pressure distribution system must utilize a central manifold. The distribution system must include a minimum of 3 feet of head at the terminal ends of the laterals.
 - The distribution system shall have all laterals terminating 2 to 5 feet from the ends of the aggregate.

- d) All laterals shall have end cleanouts extended to the soil surface and be constructed using 45 degree bends. Laterals shall be fitted with end caps.
- (3) The absorption area shall have a minimum length to width ratio of 4 to 1 on sites not exceeding 12%. On sites ranging from 12% to 15% in slopes, the minimum length to width ratio shall be 6 to 1.
- (4) All coarse aggregate shall meet the following specifications (Reference: Section 73.51(a) or Pennsylvania Department of Transportation, Publication 408, Section 703.2(a) and (b)):
 - a) 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 coarse aggregate including material finer than No. 200 sieve, clay lumps, and friable particles.
 - b) The coarse 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 C142.
 - c) The coarse 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 C117 or PTM No. 100.
 - d) All coarse aggregate testing shall be conducted within 1 year prior to the delivery date.
 - e) A minimum of a total of 10 inches of coarse aggregate meeting the requirements of either Section 73.51(a) or the coarse aggregates meeting AASHTO No 3, 467, 5, or 57 described in the alternate aggregate listing must be used.
- (5) The absorption area shall be constructed in accordance with either Section II.C.(5).a. or II.C.(5).b at the discretion of the designer. Diagrams of both options can be found in the Figures section of this listing.
 - a) Option A- Sloped At-Grade.
 - (i) This option requires the slopes to be greater than 2%.
 - (ii) 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.
 - (iii) The laterals shall be designed in accordance with Chapter 73, Section 73.44(d). 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.
 - (iv) The design shall include a 3-foot subsoil berm around the ends and downslope side of the aggregate area in addition to the berm requirements described in Section II.D.6. A 2:1 slope shall be maintained on the subsoil berm.
 - b) Option B- Level At-Grade.
 - (i) Sufficient coarse aggregate shall be placed beneath the laterals so that they are level. The laterals shall be spaced evenly over the absorption area.

- (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.
- (6) A 2:1 aggregate slope shall be maintained on all sides of the aggregate.
- (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 applicant shows the potential for such an impact is nonexistent through the experimental system process, this type of absorption area placement is prohibited.

D. Installation:

- (1) An onsite preconstruction conference attended by the sewage enforcement officer, designer, installer, and the property owner prior to construction is recommended.
- (2) Construction of this system must comply with Chapter 73, Section 73.51(b) and 73.51(c)
- (3) The surface shall be chisel plowed across the slope, including the area under the berm, as described in Chapter 73, Section 73.55(b)(2).
- (4) As soon as possible after plowing and before the next rain event, aggregate shall be placed over the exposed plowed surface. The aggregate shall be placed from the upslope side of the bed using only equipment that will minimize compaction of the absorption area. Under no circumstance may equipment travel on the plowed soil surface until the aggregate is in place.
- (5) The top of the coarse aggregate shall be covered with geotextile material or similar barrier material to prevent backfill material from settling into the aggregate.
- (6) Berm Specifications:
 - a) 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 coarse 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. (Section 73.55(b)(7)).
 - b) Upon completion, the outside slope of the berm on slopes of 8% or less may be no greater than 2:1, on slopes of 8% to 12% the outside slope of the berm shall be no greater than 3:1. On sites with slopes ranging 12% to 15%, the outside slope of the berm may be no greater than 25% (4:1) downslope and no greater than 3:1 upslope.
- (7) The cover over the aggregate shall be a minimum of 8 inches of soil suitable for the growth of vegetation and shall be seeded to assure the stability of the berm.
- (8) The area around the absorption area and treatment tanks shall be graded for diversion of surface waters.

III. Minimum Maintenance Standards

- A. Inspection of the area around the soil absorption area every 6 months by the homeowner to ensure that there is no ponding of effluent or downgradient seepage.
- B. The manufacturer's representative must meet with the property owner within one (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, provide written instructions to the property owner, and to identify the locations of all parts of the system.
- C. The service provider shall inspect at least the following items at an interval frequency recommended by the manufacturer's recommendations:
 - (1) Inspect septic tanks, dosing tanks, and lift pump tanks for structural integrity of the tank, inlet and outlet baffles, solids retainer, pumps, siphons, and electrical connections;
 - (2) Inspect aerobic tanks for structural integrity of the tank, inlets, and outlet baffles, buoyed solids retainer, pumps, siphons, and electrical connections.
 - (3) Ensure that the pumping system is operational.
- D. The service provider shall inspect and pump excess solids in accordance with the manufacturer's requirements.

IV. Permitting Requirements

- A. 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 under this listing. All other proposals under this listing must be submitted to the Department for review and comment.
- B. The permit must include a written certification from the supplier to the sewage enforcement officer and permittee which includes the name of the supplier of the aggregate, testing results, testing date, amount of material purchased, and the delivery date which confirms that the aggregate meets the requirements of either the regulations or the alternate aggregates listing.
- C. The sewage enforcement officer shall include on both the *Application for An Onlot Sewage Disposal* permit (Part III, Section 1) and the permit, the classification number itemized in the Classification Type of this listing.

V. Planning Requirements

Not applicable

FIGURES



