

**Commonwealth of Pennsylvania
Department of Environmental Protection
Bureau of Clean Water
Harrisburg, PA**

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Technology: Orenco AdvanTex® Treatment System (AdvanTex)

Classification Date: August 25, 2009, October 6, 2009, January 18, 2012, December 4, 2012,
March 14, 2022, April 5, 2022, XXXX XX, 202X

Classification Type: Alternate technology (Listing #A2009-0001-0005)

In accordance with 25 Pa. Code § 73.72, the Pennsylvania Department of Environmental Protection (Department) generally classifies the Orenco AdvanTex® (AdvanTex) treatment system for use as an alternate on-lot sewage treatment system. This general classification permits the use of the AdvanTex – when designed, constructed, operated and maintained, as set forth in this general classification – as a treatment system for the specific purposes of reducing CBOD₅, TSS, and total nitrogen in sewage effluent prior to discharge to an absorption area. This system has demonstrated that it can produce an effluent that does not exceed 10 mg/L CBOD₅ and 10 mg/L TSS as monthly averages. With ultraviolet (UV) disinfection, the AdvanTex can also reduce fecal coliform concentrations to treatment levels that do not exceed 200 cfu/100 mL on a monthly average basis. When the system is used to reduce total nitrogen, the discharge limitations for total nitrogen must not exceed 20 mg/L as a monthly average. The system is approved for use on limiting zones of less than 20 inches. The AdvanTex also satisfies NSF Std-40 criteria and may be used as a conventional aerobic treatment tank described in 25 Pa. Code § 73.32 where nitrogen removal is not a concern.

I. Technology Description

The AdvanTex treatment system configuration consists of either a single dual-compartment processing tank or a combination of separate septic and recirculating tanks with each configuration recirculating wastewater through an AdvanTex packed bed filter, and a final discharge of the effluent to an on-lot absorption area or spray field.

II. Design Requirements

- a. Location: The AdvanTex may be installed for the treatment of domestic strength wastewater serving new construction or repair.
- b. Size: The Orenco AdvanTex Treatment system with model numbers: AX20, AX20RT, AX25RT, and AX100 may be utilized for CBOD/TSS/TN removal.

The models approved for use in Pennsylvania are listed in Tables 1, 2, and 3.

Table 1 – AX20 Models							
Model Number	AdvanTex AX20	AdvanTex AX20 2 pod	AdvanTex AX20 3 pod	AdvanTex AX20RT	AdvanTex AX20RT 2 pod	AdvanTex AX20RT 3 pod	AdvanTex AX20RT-UV
Rated Capacity (gpd)	500 600	1000 1200	1500	500 600	1000 1200	1500	500 600

Table 2 – AX25 Models			
Model Number	AdvanTex AX25RT	AdvanTex AX25RT 2 pod	AdvanTex AX25RT-UV
Rated Capacity (gpd)	625 750	1250 1500	625 750

Table 3 – AX100 Model	
Model Number	AdvanTex AX100
Rated Capacity (gpd/pod)	2,500

- c. Construction
 - (1) The AdvanTex must be installed:
 - i. Per the manufacturer's installation instructions.
 - ii. By an installer trained and authorized by Orenco.
 - (2) Tank installations must consist of either a two-compartment tank, two tanks in series, or otherwise conform to meet the requirements of 25 Pa. Code § 73.31. Hydraulic retention times must be the greater of 3 days or the tank volumes required by 25 Pa. Code § 73.31. Vertically aligned circular tanks are not permitted.
 - (3) The number of AdvanTex filters to be installed must be in accordance with the manufacturer's design specifications.

- (4) The AdvanTex treatment system must be constructed so that a sample can be collected from the recirculating splitter valve. If UV disinfection is utilized, then the sample must be taken from the spigot in the discharge basin.
 - (5) The AdvanTex must be configured and operated using the Combination Mode.
 - (6) The AdvanTex filters must maintain between a minimum recirculation ratio of 4:1 and a maximum recirculation ratio of 7:1 based upon actual daily flow. The preferable recirculation ratio is 4:1.
 - (7) All valves connected to the manifold inside the AdvanTex filter must be in the closed position during operation.
 - (8) All AdvanTex filter pods must include insulation.
 - (9) Additional requirements for the AX-RT Only (Model Numbers AX20RT and AX25RT):
 - i. May be installed for single-family homes only;
 - ii. The Orenco Biotube Effluent Filter (Model Numbers FTS0444-36V, FTW0444-36V, and FT0822-14B filters) must be installed at the outlet of the final septic tank.
 - iii. If the AXRT is being installed parallel to septic tank, the AXRT needs to be offset from the septic tank by 4 feet (1.2 m) for units without anti-buoyancy measures and 6 feet (1.8 m) for units with anti-buoyancy measures.
 - (10) The area surrounding the tanks must be constructed to divert surface water.
 - (11) All AX100 designs must include a letter from the manufacturer or the manufacturer's authorized representative certifying the contents of the design package.
- d. Use of the Component/System and Siting Requirements
- (1) For final treatment and disposal for an on-lot system described in 25 Pa. Code Chapter 73 other than IRSIS, up to a 40% reduction in the size of the absorption area is allowed where the percolation rate is in the range of 3 to 60 minutes per inch (min/in), inclusive. However, where the percolation rate is in the range of 61 to 180 min/in, inclusive, no reduction in absorption area sizing is permitted.
 - (2) On sites exhibiting limiting zones greater than or equal to 20 inches from the mineral soil surface, the absorption area may be designed in accordance with the alternate at-grade absorption area. Where the percolation rate is in the range of 3 to 60 min/in, inclusive, up to a 40% reduction in the size of the absorption area is allowed.

However, where the percolation rate is in the range of 61 to 180 min/in, inclusive, no reduction in absorption area sizing is permitted.

- (3) On sites exhibiting limiting zones less than 20 inches from the mineral soil surface, the absorption area may be designed in accordance with the specifications described by the alternate shallow limiting zone at-grade absorption area. UV disinfection is optional but may be required by the Department.
- (4) The absorption area may also be designed in accordance with the specifications described by the alternate drip irrigation.
- (5) General
 - i. Where absorption area sizing reductions are proposed, they are not cumulative. No additional sizing reduction is allowed for use of either an aerobic tank or infiltration chambers.
 - ii. If absorption area sizing reductions are proposed, where the system is used to serve a new dwelling, the soil profile evaluations and percolation testing must document that sufficient area is available for installation of a full-sized absorption area (prior to the calculation of the 40% reduction).
 - iii. The absorption area must be designed to take full advantage of the slope to move effluent out from under the absorption area and downgradient with the laterals placed parallel to the contour.

III. Minimum Maintenance Standards

- a. Service Contract: A service contract with a Service Provider qualified to maintain the AdvanTex Treatment System is required: two visits required during each of the first two years (at approximately 6, 12, 18, and 24 months after installation) and a minimum of one annual visit thereafter. When the AdvanTex is used for the specific purposes of reducing total nitrogen, the telemetry monitoring system is required unless the subject site does not have telemetry capabilities.
- b. Inspection
 - (1) Inspection of the area around the outside of the media filter and soil absorption area every 6 months by the homeowner and annually by the Service Provider to ensure that there is no ponding of effluent or downgradient seepage.
 - (2) Septic tanks, dosing tanks, and lift pump tanks must be inspected every 6 months for structural integrity of the tank, inlet and outlet baffles, solids retainer, pumps, siphons, and electrical connections. Aerobic tanks must be inspected every 6 months for structural integrity of the tank, inlets, and outlet baffles, buoyed solids retainer, pumps, siphons, and electrical connections. The inspection and concurrent pumping

of excess solids must be conducted in accordance with the manufacturer's requirements.

- c. Water Softeners: The manufacturer strongly recommends avoiding plumbing salt-based water softener regenerate (backwash) into or ahead of any Orenco AdvanTex treatment system whenever possible. The concentration of sodium and chlorides in water softener backwash alters the settling and general solids segregating characteristics through the system and chlorides are elevated above the 180 mg/L toxicity or inhibitory threshold established by the Environmental Protection Agency (EPA) for nitrogen removal. Note, water softener regenerate (backwash) must be discharged to a treatment tank or a holding tank meeting all necessary requirements in 25 Pa. Code Chapter 73.
- d. Sampling
 - (1) When the AdvanTex is installed for the purposes of reducing total nitrogen, a sample should be collected from the treated effluent at least once annually by the maintenance provider and analyzed for total nitrogen. The location of sampling should be in accordance with the operation and maintenance manual. The sampling must not commence until at least 30 seconds of continuous discharge through the sampling tap has occurred. Analysis should be completed by a laboratory certified by the Department or the National Environmental Laboratory Accreditation Program. A test result for total nitrogen that is 45 mg/L or greater may indicate system non-compliance and possible performance issues. Such results justify further investigation to determine a cause for the observed condition and to determine possible repair activity. Continued non-compliance is considered a nuisance violation under Section 14 of the Pennsylvania Sewage Facilities Act and may be subject to compliance action by the local agency.
 - (2) The Service Provider may require additional sampling if the AdvanTex unit is not performing to the following effluent quality where required: 10 mg/L CBOD₅, 10 mg/L TSS, and/or 20 mg/L total nitrogen.
 - (3) When the AdvanTex is used for sites that remove total nitrogen, test results must be sent to the local agency and Department's Central Office (Municipal Facilities Division, Planning Section). Other information should include the property owner, the property owner's address, the location of the site, the AdvanTex filter model number, the date of the sample collection, and the effluent data. Information submittal must be on an annual basis each January.
 - (4) The homeowner must retain annual records of monitoring information on a rolling 5-year period.

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. When permitting on-lot systems in areas of elevated nitrate-nitrogen groundwater concentrations, the permitting authority must verify whether a Department sewage facility's planning approval letter condition exists which requires the lot(s) to be permitted with the AdvanTex treatment system.
- c. Issuing on-lot sewage system permits that are inconsistent with planning approval conditioned upon use of the AdvanTex treatment system is considered a violation of the Sewage Facilities Act.
- d. The standards in Section III of this listing are required to maintain operation of the AdvanTex treatment system.
- e. When the AdvanTex is used for the specific purpose of reducing total nitrogen, the following conditions apply:
 - (1) The sewage enforcement officer may only issue permits for residential establishments.
 - (2) Design plans involving commercial or institutional establishments must be submitted to the Department's Regional Office with oversight of the county within which the site resides.

V. Planning Requirements

- a. The AdvanTex treatment system satisfies the nitrate-nitrogen reduction requirement conditions specified in certain Department sewage facility's planning module approval letter.
- b. A preliminary hydrogeologic evaluation is required under conditions set forth in 25 Pa. Code § 71.62(c)(2). If results from the preliminary hydrogeologic evaluation identify a potential for a conflict between the proposal and existing or potential future uses of groundwater in the area, a detailed hydrogeologic study will be required. The accepted nitrogen loading figure that may be used for assessing groundwater impacts from the AdvanTex treatment system may be lowered to 20 mg/L total nitrogen (TN) in the preliminary hydrogeologic evaluation when a commitment to use the AdvanTex unit is included with the planning proposal. Note that Department's Bureau of Laboratories defines total nitrogen as $TN = NO_2-N + NO_3-N + TKN-N$. Preliminary hydrogeologic evaluations may assume that all nitrogen entering the system will be converted to nitrate-nitrogen as stated in the Department's guidance document, *Impact of the Use of Subsurface Disposal Systems on Groundwater Nitrate Nitrogen Levels* ([385-2207-002](#)). Thus, the 20 mg/L total nitrogen must be considered equivalent to 20 mg/L nitrate-nitrogen.

- c. The Department may require the permitting and use of the proposed AdvanTex technology as a condition for approval of that project.