



State of Delaware  
Department of Natural Resources & Environmental Control  
Division of Water Resources  
Ground Water Discharges Section

## **Innovative and Alternative System Approval**

**ISSUED TO:** Orenco Systems, Inc.  
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**FROM:** Jason Baumgartner – Environmental Scientist  
Ground Water Discharges Section

**FOR:** AdvanTex AX-RT Treatment System

**APPROVAL DATE:** 5/16/16

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In accordance with the Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems (Regulations), an application dated April 22, 2016, was submitted by Orenco Systems, Inc. for approval of the AdvanTex AX-RT Treatment System as an Innovative & Alternative On-Site Wastewater Treatment Unit

Based on the review of the application, the Department hereby grants approval of the use of the AdvanTex AX-RT Treatment System as an Innovative & Alternative On-Site Wastewater Treatment Unit subject to the conditions, limitations, and requirements set forth herein:

### **1. Product Description**

The AdvanTex Treatment System is a multiple-pass, packed-bed aerobic wastewater treatment system specifically designed and engineered for long-term processing of residential strength wastewater. The treatment media is an engineered textile, which

has an extremely high void capacity, moisture-holding capacity, and surface area per unit volume.

Raw sewage enters the septic tank through its inlet tee. In the septic tank, the raw sewage separates into three distinct zones — a scum layer, a sludge layer, and a clear zone. Effluent from the clear layer passes through a Biotube® effluent filter and is discharged by gravity to the recirculation/blend chamber of the AX-RT unit. The effluent then flows through the recirculation transfer line to the recirculation pumping system.

The recirculation pump is timer-controlled to ensure that small, intermittent doses (micro-doses) of effluent are applied to the textile sheets throughout the day. This ensures an aerobic, unsaturated environment for optimal treatment to occur. A manifold with distribution nozzles distribute the effluent evenly over the textile.

The effluent then percolates down through the textile sheets and is distributed between the recirculation/blend and recirculation/filtrate chambers by means of a tank baffle that separates the unit into different sections. The textile material is suspended from the top of the treatment unit, with a portion of the media positioned over the recirculation/blend chamber. The remainder of the media is positioned over a recirculation/filtrate chamber that is separated from the recirculation/blend chamber by a baffle, and from which filtrate (treated effluent) is discharged.

The baffle is fitted with a recirculation-return valve for equalization during low-flow periods. Under low daily flow conditions, the valve allows 100% of the filtrate to be returned to the recirculation/blend chamber for continued recirculation. The recirculation-return valve is similar to a check valve in that it allows preferential flow in one direction only — in this case, from the recirculation/filtrate chamber to the recirculation/blend chamber.

The recirculation-return valve closes when the liquid head on the recirculation/blend side is equal to or greater than the liquid head on the recirculation/filtrate side. When the liquid head on the recirculation/filtrate side is higher, the pressure differential pushes the recirculation return valve open for filtrate to pass back to the recirculation/blend side of the baffle, thus providing for continued recirculation during periods of low or no inflow. Flow from the recirculation/blend chamber can pass to the recirculation/filtrate chamber only through the treatment media.

## 2. Claim

**Approval is based on third party testing submitted by the Manufacturer indicating the specified model will routinely provide an effluent quality not exceeding 30 mg/l of BOD ,30 mg/l of TSS, and 20 mg/l Total Nitrogen (TN)**

**or a 50% reduction in TN assuming influent loading does not exceed the treatment capabilities of the units.**

**\* This unit has been certified under NSF Standard 40 NSF 245 standards.**

**4. AdvanTex Unit Specifications**

<b>Number of Bedrooms</b>	<b>Septic Tank Size</b>	<b>AX-RT Model</b>
<b>1-4</b>	<b>1000 gal</b>	<b>AX20-RT</b>
<b>5-6</b>	<b>1500 gal</b>	<b>AX25-RT</b>

**3. Use and Design Criteria**

- a. The AdvanTex unit may be installed for new and replacement systems with conventional and innovative and alternative disposal systems.
- b. An on-site wastewater treatment and disposal system permit application incorporating an AdvanTex unit shall be designed in accordance with the Regulations, and manufacturer’s specifications. The design shall be completed by a DNREC Class C Design Engineer unless otherwise approved by the Department. The permit application shall include proper unit specifications.
- c. The designer must assure that the treatment unit has above grade access. The media shall also have above grade access. The design also must ensure that the control panel is accessible.
- d. A septic tank must precede the AdvanTex unit. The septic tank must incorporate an effluent filter as specified by the manufacturer.
- e. A VeriComm telemetry control panel with web based monitoring shall be utilized. Separate control and alarm circuits shall be provided.
- f. The AdvanTex treatment system’s initial timer settings should be established based on the expected average daily flow and a 4:1 recirculation ration. Should flows vary, the authorized service provider will adjust timer settings per manufacturer’s recommendations.
- g. The AdvanTex unit shall not be installed within areas subject to traffic loads unless specially designed on a case by case basis in accordance with the Regulations.
- h. The manufacturer is responsible for providing the Department a list of all local distributors and their associated contact information. This list must be kept current and shall be submitted to the Department on a yearly basis.

#### **4. Installation Procedures**

- a. The AdvanTex unit shall be installed by a DNREC Class E System Contractor under the supervision of a manufacturer's representative, or by a DNREC Class E System Contractor who has been certified for unit installation. Proof of certification shall be provided in writing to the Department.
- b. Start up of the system and initial operational checks shall be conducted by the Class E System Contractor (trained by the manufacturer), Design Engineer, and a Ground Water Discharges Section (Large System Branch) representative. If the Class E System Contractor is not certified, a manufacturer's representative shall perform the operational checks of the system at start up. If the manufacturer's representative can not be on site at the time of start up, they must provide final start up approval to the Department in writing.

#### **5. Operation and Maintenance**

- a. The AdvanTex unit shall be operated and maintained in accordance with the manufacturer's specifications.
- b. The manufacturer or manufacturer's representative shall comply with all Department mandated requirements as specified in permit conditions. This shall include operation and maintenance requirements.

#### **6. Sampling and Approval**

The Department reserves the right to sample any unit at any time.

#### **7. General Conditions**

- a. Use of the system for wastes other than residential shall be on a case by case.
- b. In the event that the product fails to perform as claimed by the applicant, and it is found that the system is installed and working as designed, and there is not toxicity in the waste; the use of the units for new installations shall cease. Use of the units shall not resume until such time the applicant and the Department have reached an acceptable agreement for resolving the situations.
- c. Any changes that deviate from the specifications as submitted with this approval shall be approved by the Department prior to use.