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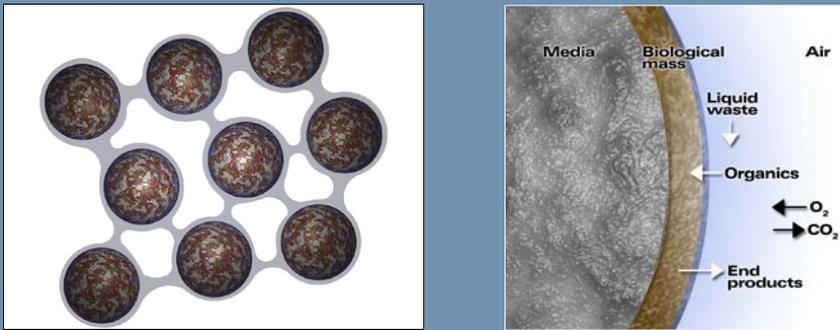
## Media Filter Treatment Process

- Wastewater is applied in small doses
- It percolates over media in a thin film
- Organisms on media come in contact with wastewater
- Air is maintained in media pores
- Oxygen is transferred into the thin film and to organisms
- Aeration may be active or passive

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## Fixed Film Treatment



The diagram illustrates the fixed film treatment process. On the left, a cluster of spherical media particles is shown, each covered in a brownish, textured biological film. On the right, a cross-sectional view of the media and biological film is shown. The media is on the left, followed by a layer of biological mass. To the right of the biological mass is the liquid waste, and further right is the air. Arrows indicate the flow of liquid waste from right to left, and the flow of air from left to right. The biological mass is shown to be in contact with the liquid waste, and the air is shown to be in contact with the biological mass. The diagram also shows the flow of organics from the liquid waste to the biological mass, and the flow of oxygen (O<sub>2</sub>) from the air to the biological mass. The flow of carbon dioxide (CO<sub>2</sub>) is shown from the biological mass to the air. The flow of end products is shown from the biological mass to the liquid waste.

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## Packed Bed Filter Biofilms

- Oxygen is diffused from the air that fills the unsaturated voids into the effluent and biofilms
- After the carbonaceous demand is met in the upper levels of the media, autotrophic bacteria reduce inorganic constituents (such as ammonia) through nitrification (the conversion of ammonia to nitrate) in the lower region of the media

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## Two Major Categories of PBF

- Single pass
- Multiple pass

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## Media Filters

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### Typical Single Pass ... ISF

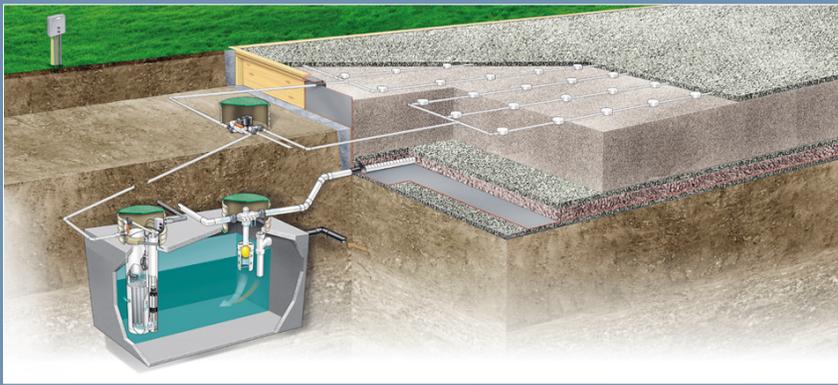


*cBOD: 5 mg/L*  
*TSS: 5 mg/L*  
*NO<sub>3</sub>-n: 30mg/L (typically 50% TN reduction)*

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### Typical Multiple Pass ... RSF



*cBOD<sub>5</sub>: 10 mg/L*  
*TSS: 10 mg/L*  
*NO<sub>3</sub>-n: 30mg/L (typically 50% TN reduction)*

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## Media Filters



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### Media Types

- Natural and mineral media
  - ~ Sand and gravel
  - ~ Expanded shale
  - ~ Cinders
  - ~ Limestone
  - ~ Activated carbon
  - ~ Peat or peat fiber

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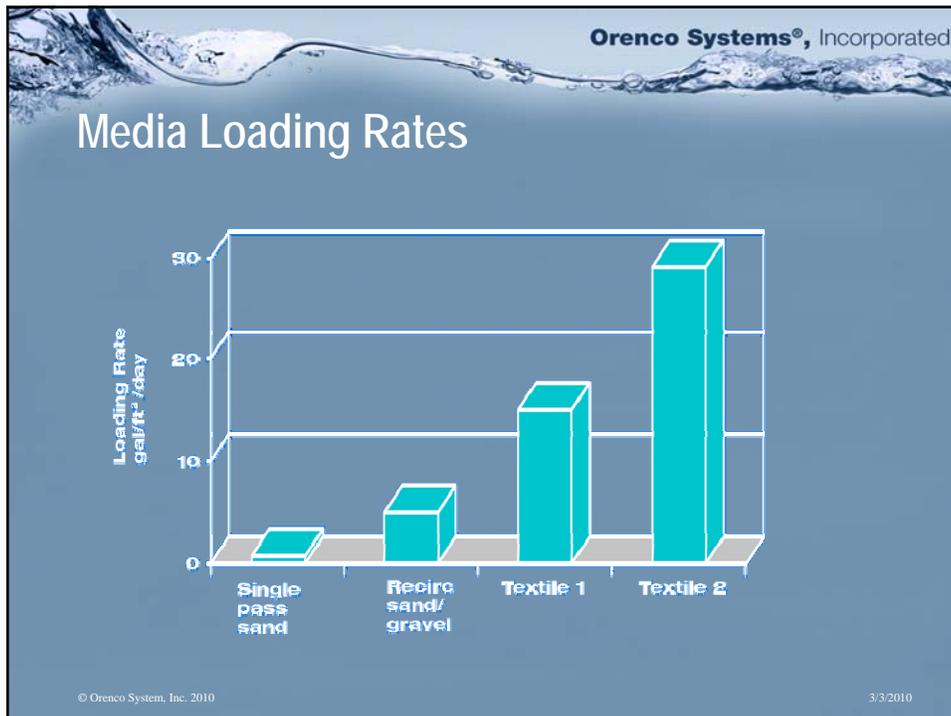
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### Manufactured Media Types

- Textile fabric
- Open-cell foam cubes
- Hard plastic
- Crushed recycled glass
- Chipped recycled tires
- Processed slag

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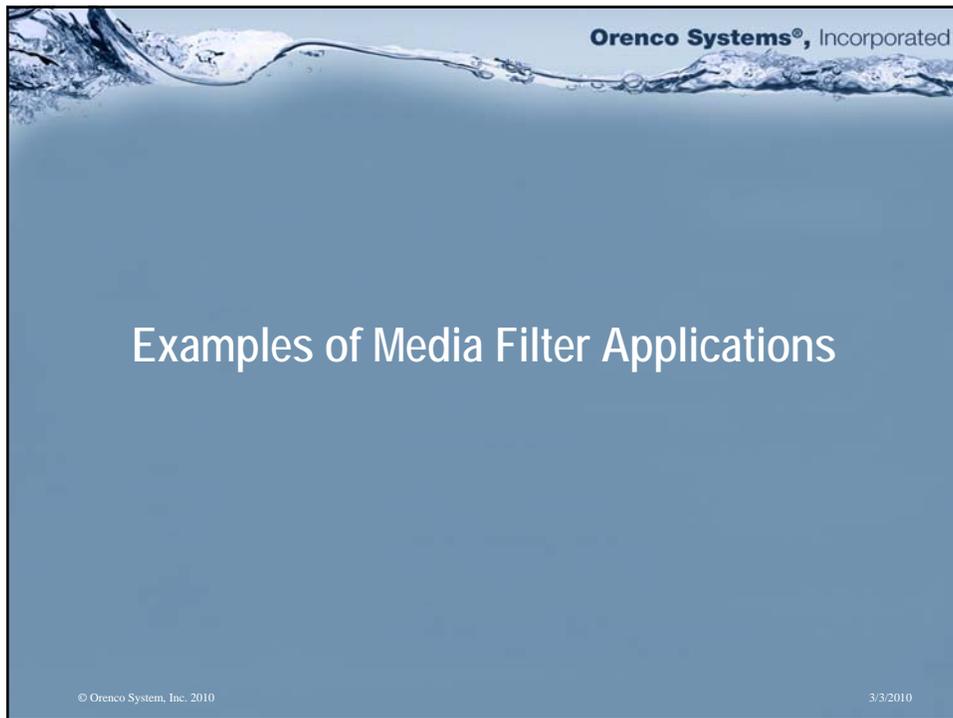
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### Textile Filters

- They are recirculating media filters
  - ~ Like a recirculating sand filter
- They use textile instead of sand or gravel
- They require approximately 1/5 the area of an RSF and approximately 1/25 the area of an ISF
- The units arrive as pre-plumbed “pods” (plug and play)
  - ~ Just add electricity and sewage

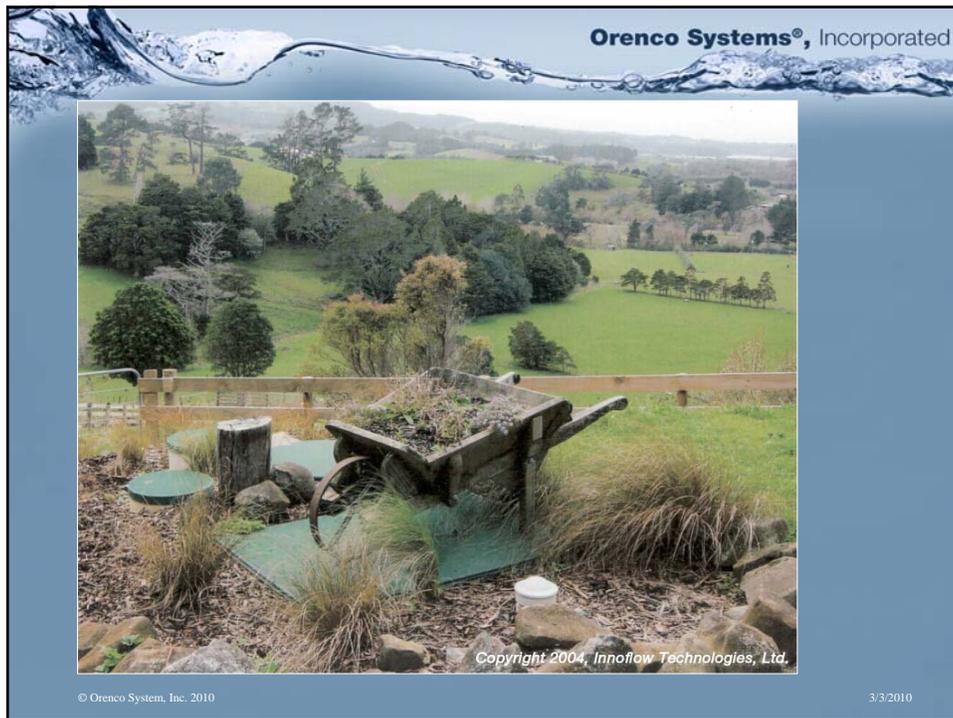
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# Media Filters



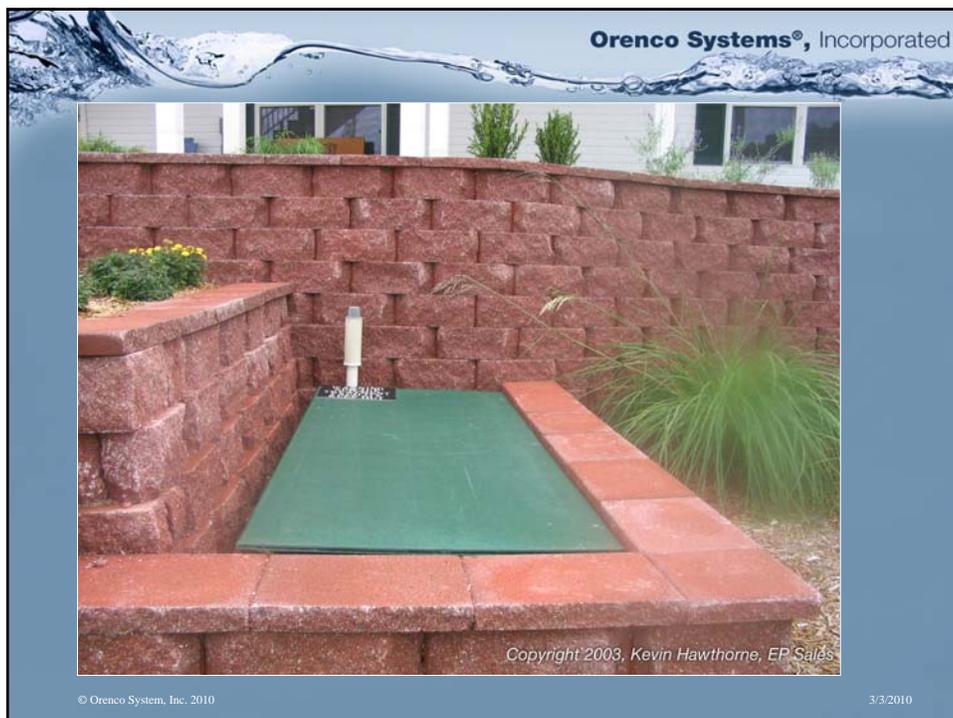
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## Media Filters

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### Small Communities Bethel Heights, Arkansas

- 135,000 gpd design
- STEP collection
- 27 AX100 pods
- Subsurface drip dispersal
- Start-up: 12/2003
- Avg effluent characteristics:
  - ~ BOD<sub>5</sub>: 2.4 mg/L
  - ~ TSS: 5 mg/L



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## Subdivisions Saddlebrook, Missouri

- 13,000 gpd design
- STEP collection
- 6 AX100 pods
- Subsurface drip dispersal
- Start-up: 3/2004



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## Vacation Homes Northport Point, Michigan

- 50,000 gpd design
- STEP collection for seasonal homes in Northern Michigan
- 24 AX100 pods
- Subsurface dispersal
- Start-up: 3/2004
- Avg effluent characteristics:
  - ~ TN: 13.7 mg/L



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## Mobile Home/RV Parks Trask Mobile Home Park, Oregon

- 10,000 gpd design
- STEG and STEP collection
- 2 AX100 pods
- Subsurface dispersal
- Start-up: 8/2003
- Avg effluent characteristics:
  - ~ BOD<sub>5</sub>: 13 mg/L
  - ~ TSS: 8 mg/L



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## Arvest Bank Data Center/Offices Lowell, Arkansas

- 3,350 gpd design
- 225 employees
- 1 AX100 pod
- Subsurface drip dispersal
- Start-up: 3/2004



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## Schools/Churches

### Grand Bay Elementary School, Alabama

- 20,000 gpd design
- Capacity to add subdivisions
- 6 AX100 pods
- Subsurface dispersal
- Start-up: 6/2003
- Avg effluent characteristics:
  - ~ BOD<sub>5</sub>: 6 mg/L
  - ~ TSS: 6.4 mg/L



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## Seasonal Camps/Resorts

### Camp Meriweather, Oregon

- 10,000 gpd design
- STEP collection for cabins and lodges
- 12 AX20 pods
- Subsurface dispersal
- Start-up: 3/2003



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## Restaurants/Delicatessens Paradise Cove Beach Café, California

- 22,000 gpd design
- Popular, 200-seat beachfront restaurant
- High-strength, highly variable waste flows
- 10 AX100s
- Seepage pits and subsurface drip dispersal
- Start-up: 2/2003



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## Small Communities Hebo, Oregon

- 60,000 gpd peak flow
- STEG collection
- 12 AX100 pods
- Uses UV disinfection and directly discharges to the nearby river
- Start-up: 1/2003
- Avg effluent characteristics:
  - ~ BOD<sub>5</sub>: 7 mg/L
  - ~ TSS: 5 mg/L



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## Small Communities Starbuck, Washington

- 20,000 gpd design
- STEG collection
- Community self-help project
- 16 RX30 pods
- Subsurface dispersal
- Start-up: 5/1999
- Avg effluent characteristics:
  - ~ BOD<sub>5</sub>: 1.0 mg/L
  - ~ TSS: 1.3 mg/L
  - ~ TN: 11.9 mg/L



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## Ranger Stations/Campgrounds Steamboat Ranger Station, Oregon

- 5,000 gpd design
- Collection from small community/ranger station
- 4 RX40 pods
- Subsurface dispersal
- Start-up: 7/97
- Avg effluent characteristics:
  - ~ BOD<sub>5</sub>: 2.1 mg/L
  - ~ TSS: 1.8 mg/L
  - ~ TN: 23.2 mg/L



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## Environmentally "Green" Complex Audubon Society, California

- 1,200 gpd design
- Off the sewer and power grid in the city of Los Angeles
- 3 AX20 pods
- Subsurface drip dispersal
- Start-up: 11/2003



*Copyright: Audubon Society, 2004.*

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## Recirculating Sand Filters Elkton, Oregon

- 29,000 gpd design
- STEP/STEG collection
- RSF treatment
- Subsurface dispersal
- Start-up: 1989
- Avg effluent characteristics:
  - ~ BOD<sub>5</sub>: 3.8
  - ~ TSS: 5.4



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### Some Considerations

- All wastewater treatment systems require routine maintenance for proper performance
- Watertight tanks are a MUST for all wastewater treatment systems

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### Conclusions

- AdvanTex® textile filter systems can be installed on small lots for individual systems
- AdvanTex® textile filter systems can be used for cluster development for subdivisions
- AdvanTex® textile filter systems can provide high-quality effluent with TN less than 20 mg/L for subsurface dispersal

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