

ROSSI SEPTIC

OWNER'S MANUAL



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INTRODUCTION TO SEPTIC SYSTEMS

Septic systems are decentralized wastewater treatment systems that process and dispose of household wastewater in an environmentally friendly manner. Here's a detailed breakdown of their operation:

1. WASTEWATER GENERATION
All the water used in a home, including water from sinks, showers, toilets, and laundry, flows into the septic system. This wastewater is classified into:

- Blackwater: Wastewater from toilets, containing solids and pathogens.
- Graywater: Wastewater from sinks, showers, and laundry, with less organic content.

2. PRIMARY TREATMENT: THE SEPTIC TANK
The septic tank is a watertight container designed to slow the flow of wastewater and separate solids, grease, and oils from liquids.

KEY PROCESSES IN THE TANK:

- Sedimentation: Solids settle at the bottom to form a layer of sludge. Fats, oils and grease float to the top as scum. The layer between these two layers is called the clear or clarified layer also referred to as effluent.
- Anaerobic Digestion: Microorganisms in the tank break down organic material in the absence of oxygen, reducing the volume of sludge.
- Effluent Discharge: The clarified liquid (effluent) in the middle layer flows out of the tank into the drain field or additional treatment components.

3. SECONDARY TREATMENT: THE DRAIN FIELD
The drain field, also known as the leach field or soil absorption system, is where the effluent is further treated and dispersed into the soil.

KEY PROCESSES IN THE DRAIN FIELD:

- Distribution: The effluent is evenly distributed through perforated pipes buried in gravel or other dispersal systems (e.g., chambers or drip lines).
- Filtration: The soil acts as a natural filter, trapping particles and pathogens.
- Biological Degradation: Microorganisms in the soil digest remaining organic matter and harmful bacteria.

4. TERTIARY TREATMENT (IF APPLICABLE)

Some systems use additional components for advanced treatment, such as:

- Aerobic Treatment Units (ATUs): Introduce oxygen to enhance biological digestion.
- Sand Filters or Biofilters: Provide additional filtration to remove nutrients and pathogens.
- Disinfection Units: Use UV light or chemicals to kill pathogens before effluent dispersal.

5. EFFLUENT DISPOSAL

Once treated, the effluent is safely absorbed into the soil, recharging groundwater or being reused for specific applications (e.g., landscaping in some advanced systems). The effluent travels to the absorption field via gravity or with the help of a pump.

KEY COMPONENTS AND THEIR ROLES:

- Inlet Pipe: Delivers wastewater to the septic tank.
- Septic Tank: Provides primary treatment by separating solids, oils, and effluent.
- Distribution Box or Pump: Directs effluent evenly to the drain field.
- Drain Field: Provides secondary treatment through filtration and biological processes.
- Soil: Acts as a final filter, ensuring effluent is clean before reaching groundwater.

Effluent is transported to the absorption field either via gravity or a pump. The pump systems are either Time-Dose or Demand-Dose.

- Time-Dose Systems: Release effluent at scheduled intervals using a timer, ensuring consistent flow and preventing overloading.
- Demand-Dose Systems: Release effluent based on liquid levels in the tank, responding dynamically to household water usage.

Summary

Septic systems work by separating, treating, and dispersing wastewater through natural and engineered processes. When properly maintained, they efficiently protect public health and the environment by treating wastewater onsite and preventing contamination of groundwater and surface water.

TROUBLESHOOTING

Here are the steps to take should you encounter any problems with your septic system.

GRAVITY SYSTEMS:

- If there is a back up of sewage in the house contact a plumber.
- If there is ponding of water over the absorption field contact Rossi Septic at 785-340-2462.

PUMP SYSTEMS:

- If there is a back up of sewage in the house contact a plumber.
- If there is ponding of water over the absorption field contact Rossi Septic at 785-340-2462.
- If there is an audible alarm coming from the control panel press the red button on the exterior of the panel to silence the alarm. Immediately call Rossi Septic at 785-340-2462.

SECTION 1: THE SEPTIC TANK

The septic tank is the core of any septic system, designed to slow wastewater flow and separate solids and grease from effluent. Sludge settles at the bottom, while scum floats to the top. The clarified effluent flows to the next stage for further treatment.

HOW IT WORKS

1. Wastewater enters the tank through an inlet pipe and inlet tee.
2. Solids settle at the bottom to form sludge, while oils and grease rise to form scum.
3. Clarified effluent exits the tank through the outlet tee to the drain field or secondary treatment unit.

WHAT ARE INLET AND OUTLET TEES IN A SEPTIC TANK?

The inlet and outlet tees are essential components of a septic tank, designed to regulate the flow of wastewater into and out of the tank while preventing solids and scum from clogging the system. These T-shaped pipes are typically made of PVC or other durable materials and are strategically placed at the tank's inlet and outlet to manage wastewater flow and protect downstream components.

HOW THEY WORK

1. INLET TEE

- Location: Positioned at the point where wastewater enters the septic tank from the household plumbing system.
- Function: Directs incoming wastewater downward into the tank, minimizing disturbance to the settled sludge layer at the bottom and the scum layer at the top.

Purpose: Prevents splashing or mixing that could disrupt the tank's natural separation process.

2. OUTLET TEE

- Location: Positioned at the point where treated effluent exits the tank to flow into the drain field or secondary treatment system.
- Function: Ensures that only the clarified effluent from the middle layer of the tank is discharged, preventing solids and scum from entering downstream components.
- Purpose: Protects the drain field from clogging by keeping large particles and grease within the septic tank.

KEY FEATURES:

- T-Shape Design: The vertical and horizontal portions of the T-shape guide wastewater flow while providing a barrier to solids and scum.
- Ventilation: Both tees allow for proper venting within the septic tank system, ensuring smooth wastewater flow and preventing airlocks.
- Material Durability: Typically made of PVC or concrete to withstand corrosive wastewater conditions.

ADVANTAGES OF INLET AND OUTLET TEES:

- Efficient Wastewater Flow: Tees direct flow in a controlled manner, reducing turbulence and promoting the natural settling of solids and oils.
- System Protection: Prevents solids and grease from exiting the tank and clogging downstream components like drain fields or pumps.
- Improved Tank Performance: Helps maintain the natural stratification of sludge, scum, and effluent within the tank, optimizing the biological treatment process.
- Ease of Maintenance: Tees can be easily accessed for cleaning and inspection during routine septic system maintenance.

MAINTENANCE TIPS:

- Regular Inspections: Check the condition of the inlet and outlet tees during septic tank pumping to ensure they are not cracked, clogged, or dislodged.
- Clean Tees When Necessary: Use a plumber's snake or pressure washer to clear any debris or buildup inside the tees.
- Protect the Tees: Avoid flushing non-biodegradable items or excessive grease into the system to prevent blockages.

Conclusion

Inlet and outlet tees are critical components of a septic tank, facilitating proper wastewater flow, protecting downstream components, and improving the overall performance of the system. Regular inspection and maintenance of these tees are essential to prevent blockages and ensure the longevity of the septic system. Properly functioning inlet and outlet tees help maintain the natural separation and treatment processes within the tank, safeguarding both the system and the environment.

SEPTIC TANK DO'S AND DON'TS

DO:

- Pump the tank every 3-5 years or as recommended by a professional.
- Use septic-safe cleaning products.

EXAMPLES OF SEPTIC-SAFE CLEANING CHEMICALS

Septic-safe cleaning chemicals are those that do not harm the beneficial bacteria in your septic system, as these bacteria are crucial for breaking down organic matter. Using the wrong chemicals can kill these bacteria, disrupt the treatment process, and lead to costly repairs. Here is a list of examples of septic-safe cleaning products and categories to consider:

SEPTIC-SAFE HOUSEHOLD CLEANING PRODUCTS

- Dishwashing Liquid Examples:
  - Seventh Generation Dish Liquid
  - Dawn Ultra (use sparingly due to its high concentration)
  - Method Dish Soap

- Laundry Detergent Examples:
  - ECOS Laundry Detergent
  - Arm & Hammer Liquid Laundry Detergent (Free of dyes and perfumes)
  - Tide Purclean

- All-Purpose Cleaner Examples:
  - Mrs. Meyer's Clean Day Multi-Surface Cleaner
  - Method All-Purpose Cleaner
  - Better Life All-Purpose Cleaner

- Toilet Bowl Cleaner Examples:
  - Ecover Toilet Bowl Cleaner
  - Green Works Toilet Bowl Cleaner
  - Seventh Generation Toilet Bowl Cleaner

- Drain Cleaners Examples:
  - Green Gobbler Septic-Safe Drain Cleaner
  - Bio-Clean Drain Septic Bacteria (a natural enzymatic product)

- Floor Cleaner Examples:
  - Method Squirt + Mop Hard Floor Cleaner
  - Mrs. Meyer's Clean Day Concentrated Hard Floor Cleaner

- Glass Cleaner Examples:
  - Seventh Generation Glass Cleaner
  - Method Glass + Surface Cleaner

SEPTIC-SAFE CHEMICAL INGREDIENTS

LOOK FOR CLEANING PRODUCTS WITH THE FOLLOWING CHARACTERISTICS:

- Biodegradable: Breaks down naturally without leaving harmful residues.
- Low in Phosphates: High phosphate levels can disrupt the bacterial balance and contribute to environmental issues like algae blooms.
- pH Neutral: Avoid highly acidic or alkaline products, which can harm bacteria.
- Free of Chlorine and Bleach: These chemicals kill beneficial bacteria essential to septic system function.
- Natural Ingredients: Products made from plant-based or mineral-based ingredients are safer for septic systems.

HOMEMADE SEPTIC-SAFE CLEANING SOLUTIONS

ALL-PURPOSE CLEANER:

- Mix 1 part white vinegar with 1 part water.
  - Optional: Add a few drops of essential oils (e.g., lemon or tea tree oil) for a pleasant scent.

TOILET BOWL CLEANER:

- Sprinkle baking soda inside the bowl.
- Scrub with a toilet brush, then add a splash of vinegar to fizz and clean naturally.

GLASS CLEANER:

- Combine 1 cup of water, 1 cup of white vinegar, and 1 tablespoon of rubbing alcohol in a spray bottle.

DRAIN MAINTENANCE:

- Pour ½ cup of baking soda followed by ½ cup of vinegar down the drain.
- Let sit for 30 minutes, then flush with hot water.

WHAT TO AVOID:

- Harsh Chemicals: Avoid products with chlorine bleach, ammonia, or quaternary ammonium compounds (e.g., disinfectants labeled "antibacterial").
- Oil-Based Cleaners: These can form a film in the septic system and block pipes.
- Heavy-Duty Cleaners: Industrial-strength cleaners are typically too strong and can harm the bacterial balance.

CONCLUSION:
Using septic-safe cleaning chemicals is essential for maintaining the health of your septic system and ensuring its long-term efficiency. Look for biodegradable, pH-neutral products with minimal harsh chemicals, or opt for natural, homemade alternatives. Regularly inspecting and maintaining your system while using septic-safe products will prevent damage, protect the environment, and save on costly repairs.

DON'T:
- Flush diapers, wipes, or other non-biodegradable items.
- Plant trees or shrubs near the tank to prevent root intrusion.
- Overload the septic tank with organics.

Septic tanks rely on a delicate balance of biological processes to treat wastewater. While organic material is essential for the natural decomposition process, an excessive amount of organics can overwhelm the system, disrupt the microbial ecosystem, and lead to inefficiencies or failures.

MAINTENANCE:
- Inspect the tank annually for cracks, leaks, or overflows.
- Install effluent filters to prevent solids from entering the drain field.

SECTION 2:
AEROBIC TREATMENT UNIT (ATU) SEPTIC TANKS

Aerobic Treatment Units (ATUs) are a specialized septic tank that introduces oxygen to accelerate biological processes. These systems are ideal for sites with high water tables or poor soil conditions.

HOW IT WORKS:

- Air is pumped into an aeration chamber to sustain aerobic bacteria.
- Aerobic bacteria digest organic material faster than anaerobic systems.
- Effluent flows to a clarifier and then to a drain field for secondary treatment.

DO'S AND DON'TS

DO:

- Ensure continuous power supply to the aerator
- Test effluent quality annually by a licensed maintenance provider

DON'T:

- Turn off the aerator
- Use chemicals that kill aerobic bacteria

MAINTENANCE:

- Regularly clean or replace aerators
- Inspect mechanical components for wear or malfunction
- Contract with service provider for yearly maintenance

SECTION 3:
ROCK AND PIPE LATERAL FIELDS

A rock and pipe lateral field, also known as a conventional drain field, is a secondary treatment system for septic effluent. It disperses the treated effluent from the septic tank into the soil for further filtration and purification. This system is one of the most traditional and commonly used methods for effluent dispersal in septic systems.

HOW IT WORKS:

- Effluent Transport: Effluent from the septic tank flows into a distribution box or manifold, which evenly directs the effluent into perforated pipes buried in trenches.
- Piping System: Perforated pipes are typically made of PVC and are surrounded by layers of gravel or crushed stone. These pipes distribute the effluent along their length, allowing it to seep into the surrounding soil.
- Gravel Layer: The gravel or crushed stone provides a porous medium for effluent distribution, preventing clogs and allowing oxygen to enter the system. This promotes aerobic bacterial activity, which breaks down organic matter and pathogens in the effluent.
- Soil Absorption: Once the effluent leaves the pipe and gravel layer, it infiltrates the surrounding soil. The soil acts as a natural filter, removing pathogens, nutrients, and other contaminants before the water recharges the groundwater.

DESIGN AND COMPONENTS

A TYPICAL ROCK AND PIPE LATERAL FIELD INCLUDES:

- Trenches: Excavated pathways that house the perforated pipes and gravel. Trenches are typically 1-3 feet deep, depending on soil type and site conditions.
- Perforated Pipes: Pipes with holes to allow effluent to seep out evenly along their length.
- Gravel or Crushed Stone: A layer of gravel, typically 12-18 inches thick, surrounds the pipes to ensure proper drainage.

- Filter Fabric: A geotextile fabric is placed over the gravel to prevent soil and debris from clogging the system.
- Topsoil Cover: Trenches are covered with a layer of soil to protect the system and blend it into the landscape.

ADVANTAGES:

- Proven Technology: A long-established, reliable method for effluent dispersal.
- Simple Construction: Easy to design and install using readily available materials.
- Cost-Effective: Generally less expensive to install than advanced dispersal systems.
- Passive Operation: Does not require mechanical components or energy for operation.

LIMITATIONS:

- Space Requirements: Requires sufficient land area with good soil drainage.
- Soil Dependency: Effectiveness depends on soil type and permeability. Poorly draining soils (e.g., clay) are unsuitable.
- Clogging Risks: Over time, biofilm (biomat) can build up and clog the soil, reducing infiltration rates.
- Environmental Sensitivity: Not ideal for sites with high water tables, shallow bedrock, or steep slopes.

DO'S AND DON'TS

DO:

- Inspect the pipes and trenches periodically for clogs or damage.
- Maintain proper vegetation over the field to prevent erosion.
- Monitor for signs of system failure, such as standing water or foul odors.

DON'T:

- Drive vehicles or heavy machinery over the lateral field, as this can compact the soil and damage the pipes.
- Plant trees or shrubs near the field, as roots can infiltrate and clog the pipes.
- Allow excessive water usage in the home, which can overload the system.

MAINTENANCE:

- Routine Inspections: Inspect the distribution box, pipes, and trenches annually to check for clogs or uneven distribution.
- Protect Soil: Keep the soil over the lateral field aerated and uncompacted by limiting activity and avoiding heavy loads.
- System Rehabilitation: If biomat buildup becomes excessive, you may need to rehabilitate the field by removing the top layer of soil and gravel or installing an alternative dispersal system.

CONCLUSION

A rock and pipe lateral field is a simple, effective, and proven method for wastewater dispersal in septic systems. It relies on the natural filtering and treatment capabilities of soil and provides long-lasting service when designed, installed, and maintained properly. It is best suited for properties with adequate space, good soil drainage, and minimal site constraints.

SECTION 4: INFILTRATOR LEACHING CHAMBER SYSTEMS

WHAT IS AN INFILTRATOR LEACHING CHAMBER?

An Infiltrator Leaching Chamber is an alternative septic system dispersal technology that replaces traditional gravel and pipe drain fields. These chambers are open-bottom, arch-shaped structures made of lightweight, durable plastic. They are designed to provide a larger void space for effluent storage and soil contact, promoting efficient filtration and treatment of septic effluent.

HOW IT WORKS:

- Effluent Transport: Effluent flows from the septic tank into a distribution box or manifold, which directs the flow into the leaching chambers.
- Chamber Design: The chambers are installed in trenches with their open bottoms in direct contact with the soil. The arch-shaped design provides ample void space for effluent storage and oxygen exchange.
- Effluent Distribution: The effluent exits the chamber through the open bottom and side vents, infiltrating the surrounding soil.
- Soil Filtration: The effluent is filtered and treated by the soil as it percolates downward. Aerobic bacteria in the soil break down organic matter and pathogens, completing the treatment process.

DESIGN AND COMPONENTS

A TYPICAL INFILTRATOR LEACHING CHAMBER SYSTEM INCLUDES:

- Leaching Chambers: Modular plastic units that connect to create a continuous dispersal field.
- End Caps: Seal the ends of chamber rows to control flow.
- Distribution Box or Manifold: Ensures even distribution of effluent to all chambers.
- Trenches: Excavated pathways where the chambers are installed, typically backfilled with soil after installation.

ADVANTAGES:

- Efficient Design: The arch shape and open bottom allow for better effluent distribution and soil contact.
- Reduced Footprint: Requires less trench area compared to traditional gravel and pipe systems, making it ideal for properties with limited space.
- Environmentally Friendly: Eliminates the need for mined gravel, reducing environmental impact.
- Lightweight and Easy Installation: The modular plastic design is easier and faster to install than gravel systems, saving time and labor costs.
- High Durability: Made from corrosion-resistant materials, ensuring long-term performance.

LIMITATIONS:

- Soil Dependency: Performance depends on the permeability and absorption capacity of the soil. Poorly draining soils may require additional treatment measures.
- Compaction Sensitivity: The soil above and around the chambers must remain uncompacted to maintain optimal infiltration rates.
- Clogging Risk: Without proper maintenance, sediment or grease from the effluent may clog the soil interface over time.

DO'S AND DON'TS

DO:

- Inspect the chambers periodically for sediment buildup or damage.
- Protect the soil above the chambers by planting grass or shallow-rooted vegetation.
- Monitor for signs of system failure, such as pooling water or odors near the leaching field.

DON'T:

- Drive vehicles or place heavy objects over the leaching field, as this can compact the soil and damage the chambers.
- Plant trees or shrubs near the system, as roots can infiltrate and obstruct the chambers.
- Allow excess grease or non-biodegradable items into the septic tank, as these can clog the system downstream.

MAINTENANCE:

- Regular Inspections: Check the chambers, distribution box, and surrounding soil for signs of sediment buildup, uneven effluent distribution, or damage.
- Effluent Quality: Maintain your septic tank to ensure effluent entering the chambers is properly treated. Pump the septic tank regularly to prevent solids from reaching the leaching field.
- Rehabilitation: If the system experiences reduced performance due to clogging, the soil above the chambers may need to be aerated or replaced.

CONCLUSION

The Infiltrator Leaching Chamber system is a modern, efficient, and environmentally friendly alternative to traditional gravel and pipe drain fields. Its modular design simplifies installation and reduces the overall system footprint, making it an excellent choice for properties with limited space or challenging site conditions. With proper maintenance and care, these systems provide long-lasting and effective wastewater dispersal.

SECTION 5:
SUBSURFACE DRIP SEPTIC SYSTEMS

A Subsurface Drip Septic System is an advanced wastewater dispersal method that uses small-diameter tubing with emitters to evenly distribute treated effluent directly into the soil at the root zone. This system is ideal for sites with limited space, shallow soil, high water tables, or steep slopes, as it provides precise control over effluent distribution. This system will always have an ATU septic tank.

HOW IT WORKS:

- Effluent Treatment: Wastewater flows from the home into the septic tank for primary treatment. Solids settle at the bottom, and the clarified liquid effluent flows into a pump tank.
- Pump Tank and Filtration: The pump tank collects the effluent and uses pressure to distribute it through drip tubing. Filters and pressure regulators ensure even flow and prevent clogging of the emitters.
- Drip Tubing Distribution: The drip tubing, installed in shallow trenches just below the soil surface, delivers small, consistent doses of effluent directly into the soil. Emitters in the tubing release the effluent in controlled amounts.
- Soil Absorption and Treatment: The soil absorbs the effluent, filtering out contaminants and providing aerobic treatment as it percolates downward.

DESIGN AND COMPONENTS

A TYPICAL SUBSURFACE DRIP SYSTEM INCLUDES:

- Septic Tank: Provides primary treatment by separating solids and grease.
- Pump Tank: Collects treated effluent and uses a pump to pressurize the distribution system.
- Drip Tubing: Flexible polyethylene tubing with built-in emitters to release effluent evenly.
- Filters and Pressure Regulators: Prevent debris from clogging the emitters and maintain consistent pressure throughout the system.
- Control Panel: Manages pump operation, often using time-dosing to regulate effluent distribution.

ADVANTAGES:

- Precise Effluent Control: Provides even distribution of effluent, reducing the risk of soil saturation or overloading.
- Adaptability: Can be installed on difficult sites, including steep slopes, shallow soils, and irregularly shaped lots.
- Environmentally Friendly: Delivers nutrients to the root zone, benefiting plants and reducing nutrient loss to groundwater.
- Space Efficiency: Requires less land than conventional systems, making it suitable for smaller properties.
- Low Visual Impact: The system is installed below ground, preserving the landscape's appearance.

LIMITATIONS:

- Complex Installation: Requires careful design and installation by trained professionals to ensure proper operation.
- Clogging Risks: Emitters and tubing can become clogged without proper filtration and maintenance.
- Energy Dependence: Requires a pump for operation, making it reliant on electricity.

DO'S AND DON'TS

DO:

- Flush drip tubing regularly to prevent blockages.
- Inspect filters and pressure regulators to ensure they are functioning correctly.
- Use a control panel with alarms to monitor system performance.

DON'T:

- Allow heavy equipment or vehicles over the tubing area, as this can damage the system.
- Plant trees or deep-rooted vegetation near the tubing to avoid root intrusion.
- Overload the system by using excessive water or introducing grease and non-biodegradable items into the septic tank.

MAINTENANCE:

- Regular Flushing: Drip lines should be flushed periodically to remove sediment and prevent clogging of emitters.
- Filter Cleaning: Clean or replace filters regularly to ensure debris does not enter the tubing.
- Pressure Monitoring: Check pressure regulators to confirm consistent operation and avoid uneven effluent distribution.
- System Inspection: Inspect the pump, control panel, and tubing annually for wear, leaks, or damage.

TIME-DOSE VS. DEMAND-DOSE

Subsurface drip systems typically use time-dosing to ensure consistent hydraulic loading and prevent soil saturation. Effluent is released at intervals controlled by a timer, allowing the soil to absorb and treat effluent evenly. Demand-dosing can be used but may lead to uneven distribution during periods of high water usage.

CONCLUSION

Subsurface drip septic systems offer a modern and efficient solution for effluent dispersal, particularly on challenging sites. By delivering precise amounts of effluent directly to the root zone, these systems promote effective wastewater treatment while benefiting the surrounding vegetation. Proper design, installation, and maintenance are critical for ensuring long-term performance and environmental protection.

SECTION 6:
RAISED DRIP SEPTIC SYSTEMS

A Raised Drip Septic System is a type of effluent dispersal system designed for sites with challenging conditions, such as high water tables, shallow bedrock, or poorly draining soils. This system combines the precision of subsurface drip tubing with a raised installation, elevating the dispersal field above the natural soil grade to ensure proper treatment and protect groundwater. It is an advanced solution for properties where conventional systems are unsuitable. This system will always have an ATU septic tank.

HOW IT WORKS:

- Effluent Treatment: Wastewater flows from the home into a septic tank for primary treatment, where solids settle, and effluent is clarified.
- Pump Tank and Filtration: Effluent is transferred to a pump tank, where it is pressurized and filtered to remove debris. Pressure regulators ensure even flow through the system.
- Raised Drip Field: The drip tubing is installed within a raised bed composed of imported soil, sand, or gravel. This raised bed elevates the dispersal area above native soil, ensuring proper drainage and filtration.
- Effluent Distribution: The drip tubing releases small, controlled amounts of effluent into the raised soil bed. The soil absorbs and treats the effluent as it percolates downward.
- Final Treatment: The soil in the raised bed provides aerobic treatment, filtering out contaminants and breaking down organic material before the water reaches the native soil.

DESIGN AND COMPONENTS

A RAISED DRIP SYSTEM TYPICALLY INCLUDES:

- Septic Tank: Provides primary treatment by separating solids and grease from effluent.
- Pump Tank: Collects treated effluent and pressurizes it for distribution.
- Drip Tubing: Flexible tubing with emitters, installed within the raised bed, delivers effluent evenly.
- Raised Bed: A mound or berm made of permeable materials (e.g., sand, gravel, or loam) to provide additional treatment and drainage.
- Filters and Pressure Regulators: Prevent debris from clogging the emitters and ensure consistent pressure.
- Control Panel: Manages pump operation, typically using time-dosing for precise effluent distribution.

ADVANTAGES:

- Adaptability to Poor Soil Conditions: Raised beds allow effluent to be treated effectively on sites with clay soil, shallow bedrock, or high water tables.
- Efficient Effluent Distribution: Drip tubing provides precise and even dispersal, reducing the risk of ponding or soil saturation.
- Groundwater Protection: The elevated installation ensures proper separation between effluent and groundwater, preventing contamination.
- Space Efficiency: Suitable for properties with limited usable land.
- Nutrient Recycling: Delivers nutrients to vegetation in the raised bed, promoting plant growth and reducing nutrient loss.

LIMITATIONS:

- Complex Design and Installation: Requires careful engineering and professional installation to ensure proper function.
- Higher Initial Cost: More expensive than traditional systems due to the materials and labor required for the raised bed and drip tubing.
- Energy Dependence: Requires a pump for effluent distribution, making the system reliant on electricity.

DO'S AND DON'TS

DO:

- Use shallow-rooted vegetation to stabilize the raised bed and prevent erosion.
- Monitor the control panel and pump for proper operation.
- Flush drip tubing regularly to prevent emitter clogging.

DON'T:

- Allow vehicles, heavy equipment, or livestock on the raised bed, as this can compact the soil and damage the system.
- Plant trees or deep-rooted vegetation near the system, as roots can infiltrate and clog the tubing.
- Overload the system with excessive water usage or allow untreated effluent to bypass the system.

MAINTENANCE:

- Inspect the Raised Bed: Regularly check the raised bed for signs of erosion, compaction, or vegetation overgrowth.
- Flush and Clean Tubing: Periodically flush the drip tubing and clean or replace filters to prevent clogging.
- Monitor System Performance: Use the control panel to track pump cycles and ensure the system is operating as designed.
- Maintain Vegetation: Keep vegetation healthy and trimmed to prevent damage to the tubing and raised bed.

TIME-DOSE VS. DEMAND-DOSE

Raised drip systems typically use time-dosing to release effluent at consistent intervals. This prevents overloading the raised bed and ensures the soil has adequate time to absorb and treat the effluent. Demand-dosing can be used but is less effective for systems requiring precise hydraulic control.

CONCLUSION

A raised drip septic system is an innovative solution for properties with challenging site conditions. By elevating the dispersal field and using precise drip technology, these systems ensure effective wastewater treatment while protecting groundwater and adapting to difficult terrains. Proper design, installation, and regular maintenance are essential for long-term system performance.

SECTION 7:
ADVANCED ENVIRO-SEPTIC SYSTEMS

WHAT IS AN ADVANCED ENVIRO-SEPTIC SYSTEM (PRESBY)?

The Advanced Enviro-Septic System (AES), commonly referred to as Presby, is an advanced wastewater treatment and dispersal system that combines treatment and effluent dispersal into a single unit. This system uses specially designed corrugated pipes and surrounding filtration materials to treat effluent before it enters the soil, making it an environmentally friendly and space-efficient solution for wastewater management.

HOW IT WORKS:

- Effluent Delivery: Effluent from the septic tank flows into a network of corrugated pipes. These pipes are surrounded by layers of specialized filtration materials.
- Treatment in the Pipes: The interior of each pipe is lined with ridges and perforations that encourage the growth of a biologically active biofilm. This biofilm breaks down organic matter, reduces pathogens, and captures nutrients.
- Filtration Layers: Surrounding each pipe is a layer of coarse fabric and small-diameter plastic fibers. These layers filter additional solids and distribute the effluent evenly to the soil.
- Oxygen Exchange: The system is designed to promote aeration, which sustains aerobic bacteria. These bacteria digest organic material more efficiently than anaerobic processes.
- Soil Absorption and Final Treatment: Once the effluent exits the pipes, it percolates into the surrounding soil, where further treatment occurs as it moves through the natural filtration of the soil layers.

DESIGN AND COMPONENTS

AN ADVANCED ENVIRO-SEPTIC SYSTEM TYPICALLY INCLUDES:

- Corrugated Pipes: Perforated and ridged pipes that facilitate biofilm growth and effluent distribution.
- Geotextile Wraps: Layers of fabric that surround the pipes to filter solids and provide additional treatment.
- Plastic Fiber Layers: Facilitate oxygen exchange and enhance microbial activity.
- System Sand Bed: A layer of sand beneath the pipes provides additional filtration and dispersal.
- Distribution Box or Manifold: Ensures even distribution of effluent to all pipes.

ADVANTAGES:

- Integrated Treatment and Dispersal: The system combines effluent treatment and soil dispersal into one unit, simplifying installation and operation.
- Environmentally Friendly: The biofilm and filtration layers reduce pathogens, nutrients, and contaminants before effluent reaches the soil.
- Space-Efficient Design: Requires less area compared to traditional systems, making it suitable for properties with space constraints.
- Adaptability: Works effectively in various soil types and site conditions, including sites with shallow soils or high water tables.
- Reduced Maintenance: The durable components are designed for long-term performance, requiring less frequent maintenance than conventional systems.

LIMITATIONS:

- Installation Complexity: Requires professional installation to ensure proper alignment and function of the pipes and filtration layers.
- Site Preparation: May require additional site preparation, such as a sand bed, for optimal performance.
- Clogging Risk: Like all systems, poor maintenance can lead to clogging of the filtration layers or biofilm buildup.

DO'S AND DON'TS

DO:

- Use septic-safe cleaning products to protect the biofilm.
- Inspect the pipes and distribution system annually.
- Maintain the septic tank to ensure effluent entering the AES system is properly treated.

DON'T:

- Flush grease, oils, or non-biodegradable items into the system.
- Allow heavy machinery or vehicles to drive over the AES installation area.
- Overload the system with excessive water usage.

MAINTENANCE:

- Septic Tank Maintenance: Pump the septic tank regularly (every 3–5 years) to prevent solids from entering the AES system.
- Visual Inspections: Inspect the pipes and distribution box for clogs, leaks, or uneven flow.
- Protect Soil and Filtration Layers: Avoid compacting the soil above the system and ensure proper drainage in the area.
- Vegetation Management: Plant shallow-rooted vegetation over the system to stabilize the soil without risking root intrusion.

The effluent can be delivered to the absorption field either via gravity or a pump.

TIME-DOSE VS. DEMAND-DOSE

The Advanced Enviro-Septic System is typically used with demand-dosing, where effluent is pumped into the pipes as needed based on tank levels. Time-dosing can also be incorporated for consistent, controlled effluent distribution, particularly on sites with sensitive soil conditions.

CONCLUSION

The Advanced Enviro-Septic System (Presby) is an innovative solution that integrates effluent treatment and dispersal into a single, efficient system. Its environmentally friendly design reduces nutrient and pathogen discharge, protecting groundwater and nearby ecosystems. Proper installation and maintenance are essential to ensure long-term performance and sustainability, making it an excellent choice for residential and commercial wastewater management.

SECTION 8:
LOW PRESSURE PIPE (LPP) SYSTEMS

WHAT IS A LOW PRESSURE PIPE (LPP) SEPTIC SYSTEM?

A Low Pressure Pipe (LPP) Septic System is an advanced wastewater dispersal method that uses small-diameter pressurized pipes to distribute effluent evenly across the drain field. Unlike conventional gravity-fed systems, the LPP system utilizes a pump to deliver effluent at low pressure, ensuring consistent and uniform distribution throughout the entire dispersal area. This system is particularly effective for sites with shallow soil, poor drainage, or irregular terrain.

HOW IT WORKS:

- Effluent Transport: Wastewater flows from the home into the septic tank, where solids settle and effluent is clarified. The treated effluent is then transferred to a pump tank.
- Pressurized Distribution: The pump pressurizes the effluent and sends it into a network of small-diameter pipes, each fitted with evenly spaced discharge holes.
- Effluent Dispersal: The pressurized effluent exits the holes in small, controlled doses, allowing it to infiltrate the soil gradually.
- Soil Absorption and Treatment: The soil absorbs the effluent, where microorganisms break down remaining organic material and pathogens. The soil also filters out nutrients before the water enters the groundwater table.

DESIGN AND COMPONENTS

AN LPP SYSTEM INCLUDES THE FOLLOWING COMPONENTS:

- Septic Tank: Provides primary treatment by separating solids and grease.
- Pump Tank: Houses the pump and collects effluent for pressurized distribution.
- Low-Pressure Distribution Pipes: Small-diameter pipes with evenly spaced holes to release effluent at low pressure.
- Distribution Network: A layout of pipes in shallow trenches to ensure uniform dispersal.
- Control Panel: Regulates pump operation, often incorporating time-dosing to ensure consistent flow.

ADVANTAGES:

- Uniform Distribution: The pressurized system ensures effluent is evenly distributed across the entire drain field, reducing the risk of localized saturation or system failure.
- Site Adaptability: Works well in areas with shallow soil, high water tables, or sloped terrain where conventional systems are unsuitable.
- Reduced Soil Overloading: By distributing effluent in small, controlled doses, the system prevents overloading and ensures adequate time for soil absorption and treatment.
- Space Efficiency: Requires less land area compared to traditional gravity-fed systems.
- Enhanced Treatment: The uniform distribution promotes aerobic conditions in the soil, improving the breakdown of organic material and pathogens.

LIMITATIONS:

- Energy Dependence: Requires a pump for operation, making it reliant on electricity.
- Clogging Risks: Small holes in the distribution pipes are susceptible to clogging if effluent is not properly filtered.
- Complex Design and Installation: Requires precise engineering and professional installation to ensure even pressure and distribution.
- Maintenance Needs: Filters, pumps, and pipes require regular maintenance to prevent failures.

DO'S AND DON'TS

DO:

- Use septic-safe products to protect the system's components.
- Inspect and clean the pump, filters, and distribution pipes regularly.
- Ensure the control panel and alarms are functioning properly.

DON'T:

- Flush grease, oil, or solids that can clog the pipes and filters.
- Drive heavy vehicles or place large loads over the drain field, as this can compact the soil and damage the pipes.
- Ignore signs of system failure, such as pooling water or foul odors.

MAINTENANCE:

- Pump and Filter Maintenance: Clean or replace filters regularly to prevent clogs, and ensure the pump is functioning properly.
- Pipe Flushing: Flush the distribution pipes periodically to remove any sediment or debris buildup.
- Control Panel Monitoring: Check the control panel to confirm that time-dosing cycles are operating correctly and alarms are functional.
- Visual Inspections: Inspect the drain field for signs of uneven effluent distribution, standing water, or erosion.

TIME-DOSE VS. DEMAND-DOSE

LPP systems typically use time-dosing to deliver effluent in small, consistent doses at regular intervals. This ensures uniform hydraulic loading and prevents soil saturation. While demand-dosing can be used, it is less effective at maintaining even distribution and may cause localized overloading during peak water usage.

CONCLUSION

A Low Pressure Pipe septic system is an efficient and adaptable wastewater dispersal solution for challenging site conditions. By using pressurized pipes to evenly distribute effluent, the system minimizes the risk of overloading and enhances soil treatment. Proper maintenance of the pump, filters, and pipes is critical for ensuring long-term performance and protecting the environment. This system is ideal for properties where conventional gravity-fed systems are not feasible.

SECTION 9:
WISCONSIN MOUND SEPTIC SYSTEMS

WHAT IS A WISCONSIN SAND MOUND SEPTIC SYSTEM?

A Wisconsin Sand Mound Septic System is an advanced effluent dispersal and treatment system designed for sites with challenging soil conditions, such as shallow bedrock, high water tables, or poorly draining soils. It elevates the drain field above the natural soil grade, using a constructed mound of sand, gravel, and soil to provide additional filtration and treatment before effluent enters the natural environment. This system is often referred to simply as a "mound system."

HOW IT WORKS:

- Effluent Treatment in the Septic Tank: Wastewater from the home flows into the septic tank, where solids settle to the bottom as sludge, and oils and grease float to the top as scum. The clarified effluent flows to the next stage.
- Effluent Pumping: The effluent is pumped from the septic tank to the mound system using a pump tank. The pump ensures even and controlled delivery of effluent to the mound.
- Effluent Distribution in the Mound: The effluent is distributed evenly across the mound through perforated pipes laid within a gravel bed. The pipes release the effluent into the sand layer below.
- Treatment in the Sand Layer: As effluent percolates through the sand, pathogens and organic matter are removed by filtration and biological processes.
- Soil Absorption and Final Treatment: The treated effluent exits the sand layer and infiltrates the native soil, where additional treatment occurs before it reaches the groundwater.

DESIGN AND COMPONENTS

A WISCONSIN SAND MOUND SYSTEM TYPICALLY INCLUDES:

- Septic Tank: Provides primary treatment by separating solids, oils, and effluent.
- Pump Tank: Collects effluent from the septic tank and pumps it to the mound.
- Mound: A raised structure constructed from layers of sand, gravel, and soil.
- Distribution Pipes: Perforated pipes within the gravel layer ensure even dispersal of effluent across the mound.
- Control Panel: Regulates pump operation and often includes alarms to signal system malfunctions.

ADVANTAGES:

- Adaptability to Poor Soil Conditions: Designed for sites where conventional drain fields are infeasible due to shallow bedrock, high water tables, or low-permeability soils.
- Enhanced Treatment: The sand and gravel layers provide additional filtration and treatment, reducing the risk of groundwater contamination.
- Uniform Effluent Distribution: Controlled pumping ensures even dispersal of effluent, preventing localized saturation.
- Environmental Protection. The elevated design protects nearby water bodies and groundwater from untreated effluent.

LIMITATIONS:

- Space Requirements: Mound systems require a large area for proper installation and operation.
- High Initial Cost: The construction of the mound and associated components is more expensive than conventional systems.
- Visual Impact: The raised mound is visible and may not blend seamlessly with the landscape.
- Energy Dependency: Requires a pump for effluent distribution, making it reliant on electricity.

DO'S AND DON'TS

DO:

- Inspect the pump, control panel, and mound regularly to ensure proper operation.
- Maintain vegetation on the mound to prevent erosion and stabilize the soil.
- Use septic-safe cleaning products to protect the system's biological processes.

DON'T:

- Drive vehicles or heavy equipment over the mound, as this can compact the soil and damage the system.
- Allow trees or deep-rooted vegetation near the mound, as roots can infiltrate and damage the pipes.
- Overload the system with excessive water usage, which can saturate the mound and cause failure.

MAINTENANCE:

- Pump and Control Panel: Inspect and test the pump and control panel regularly to ensure proper operation. Replace or repair components as needed.
- Mound Condition: Monitor the mound for signs of erosion, ponding water, or vegetation loss. Address any issues promptly to prevent further damage.
- System Flushing: Periodically flush the distribution pipes to remove sediment and debris that may block perforations.
- Septic Tank Maintenance: Pump the septic tank every 3-5 years to prevent solids from entering the pump tank or mound system.

TIME-DOSE VS. DEMAND-DOSE

Wisconsin Sand Mound systems are typically used with demand-dosing, where effluent is pumped into the pipes as needed based on tank levels. Time-dosing can also be incorporated for consistent, controlled effluent distribution, particularly on sites with sensitive soil conditions.

CONCLUSION

The Wisconsin Sand Mound septic system is a highly effective solution for treating and dispersing wastewater on challenging sites. By elevating the drain field and incorporating additional filtration layers, this system provides enhanced protection for groundwater and the surrounding environment. Proper design, installation, and maintenance are essential for ensuring long-term performance and reliability. This system is ideal for properties with site limitations where traditional septic systems are not viable.

SECTION 10: WASTEWATER STABILIZATION POND (LAGOON) SYSTEMS

WHAT IS A WASTEWATER STABILIZATION POND (LAGOON)?

A Wastewater Stabilization Pond, commonly known as a lagoon, is an open, shallow pond used to treat and stabilize wastewater through natural biological processes. This system relies on the interactions between sunlight, algae, and microorganisms to break down organic matter and remove pathogens. Wastewater stabilization ponds are typically used in rural or low-population areas where land is available, and cost-effective, low-maintenance solutions are needed.

HOW IT WORKS:

- Effluent Introduction: Wastewater flows from the septic tank or directly from the home into the stabilization pond. The pond serves as the primary and secondary treatment system.
- Anaerobic and Aerobic Zones:
  - The bottom layer of the pond is anaerobic (lacking oxygen), where bacteria break down organic matter into simpler compounds.
  - The upper layers are aerobic (oxygen-rich), supported by the photosynthetic activity of algae, which produces oxygen for aerobic bacteria.
- Biological Treatment:
  - Algae and aerobic bacteria work together to digest organic material, convert nitrogen compounds, and remove harmful pathogens.
  - The aerobic bacteria consume organic matter, and the algae utilize the carbon dioxide produced by bacteria for photosynthesis.
- Pathogen Removal: Prolonged retention time in the pond allows pathogens to settle out, degrade, or die off due to exposure to sunlight and natural predators.
- Effluent Discharge: Treated wastewater exits the pond through an outlet and may infiltrate the soil, flow to a second treatment pond, or discharge into a designated area, depending on regulations.

DESIGN AND COMPONENTS

A WASTEWATER STABILIZATION POND TYPICALLY INCLUDES:

- Inlet Pipe: Delivers wastewater to the pond.
- Pond Basin: An excavated, shallow area with gentle slopes to retain water.
- Lining (Optional): Some ponds are lined with clay or synthetic materials to prevent seepage into the groundwater.
- Aeration Zones: Distinct aerobic and anaerobic layers within the pond.
- Outlet Structure: Controls the flow of treated effluent out of the pond.

ADVANTAGES:

- Low Cost: Construction and operational costs are lower compared to mechanical treatment systems.
- Simple Operation: Requires minimal mechanical components and relies on natural processes for treatment.
- Resilient to Fluctuations: Handles variations in wastewater flow and composition effectively.
- Pathogen and Nutrient Reduction: The prolonged retention time allows for effective removal of pathogens and nutrient stabilization.
- Environmentally Friendly: Promotes natural nutrient cycling and minimizes energy use.

LIMITATIONS:

- Space Requirements: Requires significant land area, which may not be feasible in densely populated areas.
- Odor Potential: Improper maintenance or overloading can lead to unpleasant odors from the anaerobic layer.
- Climate Dependency: Performance can be affected by seasonal changes in temperature and sunlight.
- Effluent Quality: May not achieve the same level of treatment as advanced systems without additional filtration or disinfection.

DO'S AND DON'TS

DO:

- Regularly remove debris, such as leaves or trash, from the pond surface.
- Monitor the pond for signs of algae overgrowth or imbalance.
- Maintain vegetation around the pond to prevent erosion and control runoff.

DON'T:

- Allow excessive inflow of wastewater, which can overload the pond.
- Use the pond for activities such as swimming or fishing.
- Permit untreated effluent to bypass the pond system.

MAINTENANCE:

- Debris Removal: Skim the surface regularly to remove floating debris and maintain aerobic conditions in the upper layers.
- Vegetation Control: Keep vegetation along the pond's perimeter trimmed to prevent roots from damaging the lining and to minimize organic debris entering the pond.
- Sludge Management: Remove accumulated sludge from the bottom of the pond every 10–20 years, depending on system performance and wastewater volume.
- Effluent Monitoring: Test the treated effluent periodically to ensure compliance with local environmental regulations.

CONCLUSION

A wastewater stabilization pond is a natural, cost-effective solution for treating and stabilizing wastewater. Its reliance on biological processes, sunlight, and retention time makes it an environmentally friendly option, especially in rural or low-population areas. Proper maintenance and regular monitoring are essential to ensure optimal performance and compliance with environmental standards. This system is ideal for properties with sufficient land area and limited access to more complex wastewater treatment technologies.

SECTION 11:
BOTTOMLESS SAND FILTERS

WHAT IS A BOTTOMLESS SAND FILTER SEPTIC SYSTEM?

A Bottomless Sand Filter Septic System is an advanced onsite wastewater treatment system that combines filtration and dispersal in a single unit. It uses layers of sand and other porous materials to treat effluent as it percolates through the filter, ultimately dispersing into the native soil below. This system is ideal for sites with poor soil conditions, high water tables, or environmentally sensitive areas.

HOW IT WORKS:

- Effluent Collection and Pre-Treatment: Wastewater flows from the home into a septic tank, where solids settle and effluent is clarified.
- Effluent Delivery to the Sand Filter: The clarified effluent is pumped or flows by gravity into the bottomless sand filter.
- Filtration Process: Effluent is distributed evenly across the sand filter bed. As it percolates through the sand layers, contaminants are removed through filtration, adsorption, and biological activity.
- Final Soil Absorption: Once the effluent passes through the sand filter, it disperses into the native soil below for final treatment and groundwater recharge.
- Aeration and Nutrient Reduction: The open-bottom design allows air to circulate, supporting aerobic bacteria that break down organic matter and reduce nutrients.

Design and Components

A BOTTOMLESS SAND FILTER SYSTEM TYPICALLY INCLUDES:

- Septic Tank: Provides primary treatment by separating solids, grease, and effluent.
- Pump Tank (Optional): Collects effluent and pressurizes it for even distribution to the sand filter.
- Distribution Pipes: Perforated pipes distribute effluent evenly across the sand bed.
- Sand Filter Bed: A specially engineered bed made of coarse sand or gravel that filters and treats effluent.
- Open Bottom Design: Allows treated effluent to pass directly into the native soil below.
- Protective Liner (Optional): Some systems include a liner to prevent effluent from bypassing the filter media.

ADVANTAGES:

- Enhanced Treatment: The sand filter removes pathogens, organic matter, and nutrients, ensuring high-quality effluent treatment.
- Adaptability to Poor Soils: Ideal for sites with clay soil, shallow bedrock, or poor drainage, as it bypasses native soil limitations.
- Compact Design: Requires less land area compared to traditional drain fields, making it suitable for small properties.
- Low Environmental Impact: Reduces the risk of groundwater contamination and minimizes nutrient discharge into surrounding ecosystems.
- Aerobic Treatment: The open-bottom design promotes aerobic bacterial activity, which enhances treatment efficiency.

LIMITATIONS:

1. Complex Installation: Requires professional design and installation to ensure proper filtration and dispersal.
2. Higher Initial Costs: More expensive than conventional systems due to specialized materials and construction requirements.
3. Maintenance Needs: Requires regular monitoring and maintenance to prevent clogging and maintain filtration efficiency.
4. Clogging Risks: If improperly maintained, solids or grease can clog the sand filter, reducing its effectiveness.

DO'S AND DON'TS

DO:

- Regularly inspect the septic tank and pump to ensure only properly treated effluent enters the sand filter.
- Protect the sand filter from compaction by limiting foot and vehicle traffic over the system.
- Use septic-safe cleaning products to maintain the biological activity within the system.

DON'T:

- Allow untreated effluent or grease to enter the sand filter, as this can clog the media.
- Overload the system with excessive water use, which can saturate the sand bed.
- Allow roots from trees or shrubs to grow near the sand filter, as they can infiltrate and damage the system.

MAINTENANCE:

- Septic Tank Maintenance: Pump the septic tank regularly (every 3–5 years) to prevent solids from entering the sand filter.
- Filter Bed Inspection: Inspect the sand filter for signs of clogging, uneven effluent distribution, or erosion.
- Effluent Distribution Pipes: Flush or clean the distribution pipes periodically to remove sediment or debris.
- Vegetation Management: Maintain shallow-rooted vegetation above the filter to stabilize the soil and protect the system.

TIME-DOSE VS. DEMAND-DOSE

Bottomless sand filters typically use time-dosing, where effluent is distributed at regular intervals to ensure consistent loading across the filter. This approach prevents overloading and allows the sand bed to maintain optimal filtration efficiency. Demand-dosing is less commonly used, as it can lead to uneven distribution and system overload during peak usage.

CONCLUSION

A bottomless sand filter septic system is a highly effective and environmentally friendly solution for treating and dispersing wastewater. Its advanced filtration and open-bottom design make it an excellent choice for properties with challenging site conditions or where high-quality effluent treatment is required. Proper maintenance, including regular septic tank pumping and sand filter inspections, is essential to ensure long-term system performance and environmental protection.

INTRODUCTION TO THE WASTEWATER TREATMENT PROCESS

WHAT IS THE ADVANCED ENVIRO-SEPTIC™ WASTEWATER TREATMENT SYSTEM?

Advanced Enviro-Septic™ is a passive, non-mechanical wastewater treatment system designed to process, purify and disperse wastewater in locations not served by a public sewer system. It requires no electricity, no mechanical devices, and no special maintenance. Advanced Enviro-Septic™ has been vigorously tested and proven to remove approximately 99% of the contaminants from wastewater that has received primary treatment in a septic tank. No other passive system provides treatment this effective, and neither do most expensive mechanical devices. An Advanced Enviro-Septic™ Wastewater Treatment System provides superior environmental protection and long-term, reliable service at a price that makes it exceptionally cost-effective for the consumer.

WHAT HAPPENS IN THE SEPTIC TANK?

When greywater (from sinks, showers and washing machines) and blackwater (from toilets) exits the structure, this wastewater flows into a septic tank. The septic tank is a watertight container usually made of concrete, fiberglass or polyethylene and buried so the top of the tank is below the surface of the ground; sometimes a riser is installed to facilitate access to the tank. The wastewater is held in the septic tank long enough for solids to settle to the bottom of the tank (forming the “sludge layer”) and for grease, oil and foam to rise to the surface (forming the “scum layer”). The clarified water in between the sludge and the scum layers exits the septic tank and travels through a tee or baffle into the Advanced Enviro- Septic™ pipes.

What happens in the Advanced Enviro-Septic™ System?
The patented design of the pipe creates the ideal conditions for further separation of grease and solids (which are retained inside the pipe) and further purification of the wastewater by bacterial action as it passes through the geotextile fabrics and the aerobic "biomat" that forms on it. The biomat is a layer of bacteria that operates like a living filter, digesting waste materials as the wastewater passes through. AES provides superior treatment and dispersal processes as a result of the addition of Bio-Accelerator. This proprietary enhancement filters additional solids from effluent, enhances and accelerates treatment, facilitates quick start-up after periods of non-use, provides additional surface area for bacterial growth, promotes even distribution, and further protects outer layers and the receiving surfaces so they remain permeable. The treated wastewater next passes through a layer of System Sand and then into the soil, safely recharging groundwater.

HOW IS THE ADVANCED ENVIRO-SEPTIC™ SYSTEM DIFFERENT FROM A PIPE AND STONE LEACHING SYSTEM?
A conventional pipe and stone leaching system is a method of "dispersing" wastewater rather than a treatment system. The biomat in a pipe and stone system eventually becomes dominated by "anaerobic" bacteria (bacteria that exist without oxygen) which forms a thick, slimy biomat, while in the Advanced Enviro-Septic™ System, the multi-stage biomat maintains a healthy population of "aerobic" bacteria (bacteria that require oxygen), which are considerably more efficient at digesting waste materials.

A pipe and stone system relies on the soil to purify wastewater, while the wastewater which exits an Advanced Enviro-Septic™ System has already been purified to a high degree before it reaches the soil. A pipe and stone leaching system would require almost three times as much area to handle the same amount of wastewater flow. Conventional systems are also more prone to failure because the solids in the wastewater (grease and oils, in particular) eventually coat the soil's surface, preventing the wastewater from infiltrating into the ground. Outdated technologies like pipe and stone systems are big, expensive to build, and they pose a greater threat of groundwater contamination.

WHAT HAPPENS IN THE SOIL?

The treated wastewater passes through the System Sand and slowly infiltrates into the soil. The Advanced Enviro-Septic™ treatment field may be located underground or constructed as an above- ground mound depending on the site's soil conditions and topography. Microbes contained in the soil provide final purification of the wastewater, removing bacteria, viruses and nutrients, as the treated wastewater percolates through the soil and eventually returns to the groundwater. Since the Advanced Enviro-Septic™ Wastewater Treatment System releases much cleaner water than conventional systems, it can be placed closer to the groundwater than other systems in many states.

THE ADVANCED ENVIRO-SEPTICTM SYSTEM

WHAT IS THE ADVANCED ENVIRO-SEPTIC™ SYSTEM AND HOW DOES IT WORK?
The Advanced Enviro-Septic™ Wastewater Treatment System consists of a 12" diameter, high-density plastic pipe which is corrugated and perforated with skimmer tabs protruding inwardly.

A layer of Bio- Accelerator™ runs along the bottom of the pipe on the outside surface*. A mat of coarse plastic fibers surrounds the outside of the pipe, and a geo-textile fabric holds the fibers in place, creating a protected surface that is optimal for the bacterial processes that purify the wastewater. Wastewater is either pumped or travels by gravity into the Advanced Enviro-Septic™ System, where the patented Advanced Enviro-Septic™ pipe cools the liquid, separating and retaining the remaining solids and grease inside the pipes, while allowing the treated wastewater to pass through the pipes and into the fibers and fabric. This provides optimal conditions for the aerobic bacterial activity that result in purification. The Advanced Enviro-Septic™ pipes are surrounded by a bed of System Sand, which facilitates the process by wicking the liquid out of the pipes and ensuring that the system receives sufficient oxygen to support a healthy population of bacteria.

ADVANTAGES OF AN ADVANCED ENVIRO-SEPTIC™ WASTEWATER TREATMENT SYSTEM:

- Cost-effective compared to conventional systems and mechanical devices
- Requires no electricity or mechanical parts
- Needs no maintenance other than pumping septic tank
- Requires a smaller treatment field
- Blends into sloping terrain
- Adapts to difficult site constraints
- Installs more easily and quickly than conventional systems
- Eliminates the need for expensive washed stone
- Adapts easily to both commercial and residential sites
- Uses a protected receiving surface to maximize bacterial activity
- Superior system performance and longevity

- Environmentally safer than conventional systems (confirmed by scientific testing)
- Recharges groundwater more safely than conventional systems
- Significant post-consumer recycled plastic content

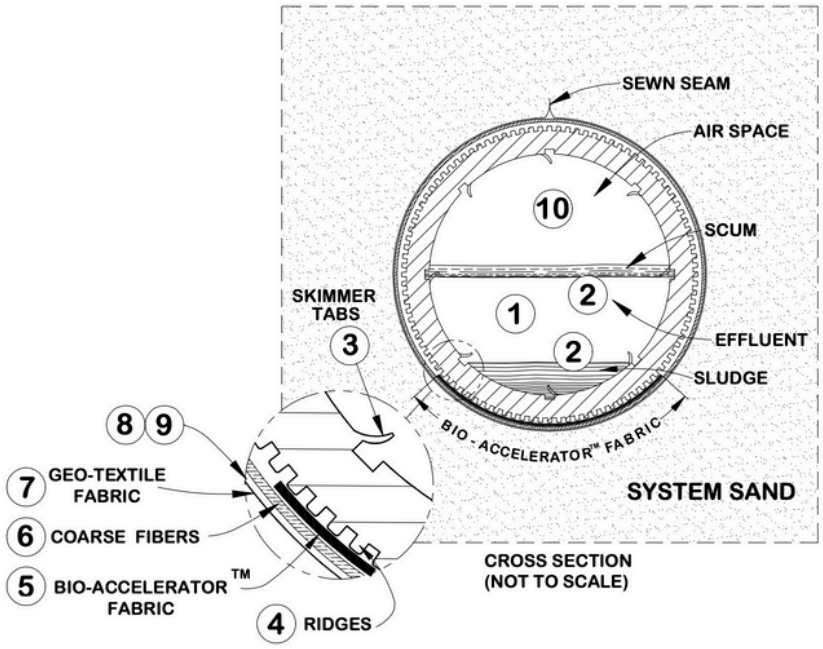
EXPECTED CHARACTERISTICS OF WASTEWATER AFTER BEING TREATED IN THE ADVANCED ENVIRO-SEPTIC™ SYSTEM:

Tested Wastewater Characteristics	Wastewater from septic tank	After treatment by pipe and stone	After treatment by Advanced Enviro-Septic™	Percentage Removed
Total Suspended Solids	125 mg/L	25 mg/L	2 mg/L	98.4%
MPN Fecal Coliforms	3,091,000 per 100 ml	190,000 per 100 ml	2,300 per 100 ml	99.9%
Biological Oxygen Demand	172 mg/L	21 mg/L	2 mg/L	98.8%

* AES provides superior treatment and dispersal processes as a result of the addition of Bio-Accelerator. This proprietary enhancement filters additional solids from effluent, enhances and accelerates treatment, facilitates quick start-up after periods of non-use, provides additional surface area for bacterial growth, promotes even distribution, and further protects outer layers and the receiving surfaces so they remain permeable. Original Enviro-Septic® does not include Bio-Accelerator™.

CROSS-SECTION OF ADVANCED ENVIRO-SEPTIC™ PIPE:

TEN STEPS OF WASTEWATER TREATMENT: ADVANCED ENVIRO-SEPTICTM TREATS EFFLUENT MORE EFFICIENTLY TO PROVIDE LONGER SYSTEM LIFE AND TO PROTECT THE ENVIRONMENT.



STAGE 1: WARM EFFLUENT ENTERS THE PIPE AND IS COOLED TO GROUND TEMPERATURE.
STAGE 2: SUSPENDED SOLIDS SEPARATE FROM THE COOLED LIQUID EFFLUENT.
STAGE 3: SKIMMER TABS FURTHER CAPTURE GREASE AND SUSPENDED SOLIDS FROM THE EXITING EFFLUENT.
STAGE 4: PIPE RIDGES ALLOW THE EFFLUENT TO FLOW UNINTERRUPTED AROUND THE CIRCUMFERENCE OF THE PIPE AND AID IN COOLING.
STAGE 5: BIO-ACCELERATORTM FABRIC SCREENS ADDITIONAL SOLIDS FROM THE EFFLUENT AND DEVELOPS A BIOMAT WHICH PROVIDES TREATMENT AND ENSURES ACCELERATED BIOMAT DEVELOPMENT.
STAGE 6: A MAT OF COARSE RANDOM FIBERS SEPARATES MORE SUSPENDED SOLIDS FROM THE EFFLUENT.
STAGE 7: EFFLUENT PASSES INTO THE GEO-TEXTILE FABRICS AND GROWS A PROTECTED BACTERIAL SURFACE.
STAGE 8: SAND WICKS LIQUID FROM THE GEO-TEXTILE FABRICS AND ENABLES AIR TO TRANSFER TO THE BACTERIAL SURFACE.
STAGE 9: THE FABRICS AND FIBERS PROVIDE A LARGE BACTERIAL SURFACE TO BREAK DOWN SOLIDS.
STAGE 10: AN AMPLE AIR SUPPLY AND FLUCTUATING LIQUID LEVELS INCREASE BACTERIAL EFFICIENCY

CARE AND MAINTENANCE

Note: These recommendations are applicable to nearly all onsite septic systems. The AES system requires virtually no maintenance on the part of the system owner. However, reasonable use and care will enhance the longevity and trouble-free operation of your system.

GUTTER, DRAINAGE AND IRRIGATION SYSTEMS:
Roof drains, foundation drains, French drains, gutter systems, sump pumps, irrigation systems, etc. should NOT discharge on or near your Advanced Enviro-Septic™ System. Such additional hydraulic loading could overload the system and cause it to malfunction. The water from such systems does not require treatment and can be safely dispersed away from your treatment system; consult with your designer or installer for more information.

PERIMETER DRAINS:
Perimeter drains are used to lower the groundwater under and around the system location (if necessary and if allowed per state/local regulations). They surround the system on all four sides and are designed to intercept water and transport it away from the system before being dispersed. If your system includes a perimeter drain, it is very important that you periodically check the outlet to ensure that it remains unobstructed. It is also a good idea to install “animal guards” (a screen covering the outlet) to prevent animal activity.

GRADING, SWALES AND SURFACE DIVERSIONS:
After installation, you will probably notice that the soil above the treatment field is slightly “crowned;” this is done purposely to direct surface water flows away from the system.

You may also notice a “swale,” which is a shallow trench in the soil upslope of the treatment field. Crowning and swales are used to intercept surface water flows and direct them away from the treatment field. It is important to the proper functioning of your system that you do not alter these surface diversions, since they protect the system from being flooded.

VENTING:
An adequate supply of oxygen throughout the Advanced Enviro-Septic™ System is essential to proper functioning. Do not alter or remove any vent stacks. If you are displeased with the appearance of vent stacks, consult with your installer about "remote venting" or vent disguises.

PERIODIC PUMPING OF THE SEPTIC TANK:
One of the advantages of the Advanced Enviro-Septic™ System is that it requires virtually no maintenance other than the need to remove the accumulated matter from the septic tank. The majority of the solids in wastewater are retained in the septic tank, where they settle into the "sludge" layer or float on the surface as the "scum" layer. The bacterial action within the septic tank will break down some of the solids in the tank; the solid waste that isn't digested accumulates over time as these sludge and scum layers, which eventually need to be removed. Pumping is required approximately every 3 to 5 years for a typical residence with a properly sized system. If a garbage disposal is used, more frequent pumping will be required.

There are many factors which determine how often a particular system's septic tank needs to be emptied, including:

- The number of occupants;
- The amount of wastewater generated;
- The volume of solids in the waste;
- The size of the septic tank.

Refer to the Proper Use section for useful information about how to conserve water and minimize the accumulation of solids in your septic tank.

As a general rule, the septic tank should be pumped when the surface scum and bottom sludge occupy one-fourth or more of the septic tank's liquid depth.

- When you consider that 25-30% of total household wastewater is attributable to toilet use, it is easy to see that replacing a traditional toilet (5-7 gallons per flush) with a high efficiency toilet (1.6 gallons per flush) can conserve a considerable amount of water.
- Installing aeration devices on faucets and showerheads greatly reduces the amount of water used. A "low flow" showerhead reduces the water used in a ten minute shower from 50 gallons to 25 gallons. Multiply this by the number of showers per day, and the water conservation is significant.
- Leaks and drips within the plumbing system can waste a significant amount of water and should be repaired immediately. One toilet leaking at a rate of one gallon per minute could needlessly send over 1,400 gallons of water per day into your wastewater treatment system.

TIP: An excellent resource for learning more about water conservation is available from the EPA at www.epa.gov/owm/water-efficiency/index.htm

WHAT NOT TO FLUSH:

As described above, how often your septic tank needs to be pumped is dependant on the amount of solids that are accumulating in the tank; in addition, certain items if flushed down the toilet can lead to blockages in the pipes or in components of the wastewater treatment system. The following should be disposed of in the trash rather than by flushing down the toilet:

- Diapers
- Baby, hand or cleaning wipes (even if they state "flushable" or "septic safe")
- Cat Litter
- Cigarette butts and ashes
- Plastic or cellophane wrappers
- Chewing gum
- Coffee grounds or eggshells
- Feminine hygiene products
- Excessive amounts of toilet paper
- Napkins, tissues, paper towels
- Cotton swabs or cotton balls
- Dental floss
- Condoms, rubber gloves or other plastic or latex items
- Adhesive bandages
- Laundry lint
- Hair

SELECTING A SERVICE PROVIDER:
When selecting an individual or a company to pump your tank and inspect your system, make sure that they are familiar with Advanced Enviro-Septic™ Systems. Your designer and/or installer may be a good resource for providing referrals to a reputable local service provider.

ROUTINE INSPECTION AND PUMPING FREQUENCY:
Since it is difficult to predict with precision how often a particular system's tank will require pumping, Presby Environmental, Inc., recommends that a service professional inspect the system at least once every two years, even if there are no indications of a problem, in order to access the need for tank pumping and to confirm that the system's components are in good working order. There would be no "downside" to emptying the tank every two years, even if the accumulated solids have not reached one- fourth of the tank's liquid depth. Advanced Enviro-Septic™ Systems equipped with a pump or effluent filter will require more frequent maintenance (refer to and follow the manufacturer's recommendations). Septic tanks contain toxic gases and only a trained professional with proper gear should attempt to service a septic tank.

USE OF ADDITIVES:
There are a variety of additives on the market which claim to breakdown sludge or boost the bacteria population so that the septic tank will need to be pumped less frequently. These claims are largely unsupported, and therefore Presby Environmental does not recommend the use of additives of any kind. The microbes needed for effective treatment are naturally present in wastewater; there is no need to use any chemicals, enzymes, yeast, cleaners, solvents or other additives with an Advanced Enviro-Septic™ System. Some of these "treatments" can actually have a detrimental effect on the system, and some states have even banned their use.

ROUTINE INSPECTION OF SYSTEM:
At the same time that the need for pumping the tank is assessed, the service provider will typically perform a routine inspection. Make sure that your service provider is familiar with Advanced Enviro- Septic™ Systems; our systems work differently than conventional systems, so it is important that your service provider knows what is "normal" for our system.

Evaluate the Integrity of the Septic Tank and its Components:

(connecting pipes; inlet and outlet baffles; lids, seals and risers; distribution box; filters; pumps; etc.): It is especially important that your service provider confirms the structural integrity of the septic tank; if the tank and its seals are not watertight, water can leak both in and out of it. Water from the environment leaking into the septic tank overloads the system beyond its treatment capabilities, while untreated wastewater leaking out of the septic tank poses a health hazard and can contaminate the groundwater. If your system includes a distribution box, the service provider should inspect it to make sure that it has remained level, that its equalizers are in place (if included in the design), and that it has not become clogged.

INSPECT VENTS:
The service provider should also verify that the vents are in place and free of obstructions, since the flow of air to the Advanced Enviro-Septic™ System is crucial to its functioning. A "draw test" may be conducted to confirm that vents are functioning properly. If your system is vented, DO NOT remove the vent, as this will diminish the oxygen supply to the Advanced Enviro-Septic™ System, which could result in system malfunction. Consult with your designer or installer, or visit our website, for some suggested ways to relocate or "disguise" unsightly vents.

NOTE: Refer to the back of this manual for a System Information and Maintenance section, where you can keep a record of your system's maintenance history.

PROPER USE OF ONSITE SEPTIC SYSTEMS

IMPORTANCE OF WATER CONSERVATION:
Onsite systems are designed based on “daily design flow”, which is usually calculated based on the number of bedrooms for residential systems. Note that the daily design flow (in gallons per day) is two or three times greater than the “actual” amount of wastewater that is expected to be generated by the structure on a daily basis. Therefore, be aware of situations (additional occupants, addition of fixtures, etc.) which result in an increase of water usage, since this will require more frequent septic tank pumping and may even necessitate expanding (increasing the size of) the system. If the amount of wastewater entering is more than the system can handle, wastewater can back up into the house or the yard, creating a health hazard and a nuisance. The Advanced Enviro-Septic™ System’s ability to be expanded to accommodate increased daily flow if necessary is one of the product’s many advantages. The use of the toilet, shower/bath and washing machine account for the majority of water use in a typical household.

In general, the less wastewater that goes down the drain, the better any onsite system will work. A common sense approach to water consumption will maximize your system’s effectiveness. A few suggestions for ways to conserve water consumption:

- Don’t wash all your laundry on the same day, since this will “flash flood” the system and agitate the settled solids. A single load of wash in a typical machine can use up to 62 gallons of water. If the system is flash flooded, liquid will pass through more quickly than it is intended to, resulting in incomplete treatment. Instead, distribute the wash loads throughout the week.
- Run your washing machine and dishwasher only when they have full loads.
- Careful selection of appliances and fixtures that use less water is another way to minimize the demands placed on your Advanced Enviro-Septic™ System. Look for the terms “Energy Star” or “high-efficiency” in the product’s description. For example, an “Energy Star” washing machine uses one-half as much water as a traditional model.

NOTE: If it is not biodegradable, it does not belong in your wastewater treatment system! Use of Garbage Disposals:

The use of a garbage disposal (also called a "garbage grinder") creates a tremendous increase in the amount of solids in wastewater, resulting in the need for more frequent pumping (one to two years sooner than if no garbage disposal is used). While some of the kitchen waste from a garbage disposal will be broken down by bacterial action, most of it will eventually have to be pumped out.

CONSIDERATIONS REGARDING HOT TUBS:
Hot tubs use a tremendous amount of water; if your plumbing system includes a jetted tub larger than 125 gallons, the system should be increased in size to accommodate this additional flow. If the hot tub drains into the system, the sudden influx of water stirs up the solids in the septic tank and could push them into the Advanced Enviro-Septic™ System. In addition, the chemical additives sometimes used to disinfect the water in hot tubs are detrimental to the helpful bacteria that are essential to the treatment process. The water from a hot tub does not require treatment, so it is recommended that hot tub water be cooled and then dispersed in an area that is not near the septic tank or treatment field.

WATER SOFTENERS AND EATER PURIFIERS:
Water purification systems and water softeners use hundreds of gallons of water. If these appliances discharge into the septic tank, it will cause agitation of solids and excess flow to the system. Check with your plumber about alternative ways to disperse these discharges. The "brine" which exits the water purification contains calcium, magnesium and salt; there are differing opinions regarding whether or not the concentrations of these minerals in the backwash has a negative effect on bacterial function or the hydraulic conductivity of the soil. Since this "backwash" does not require treatment, there is no sense in overburdening your wastewater treatment system with it.

CHEMICALS AND TOXIC SUBSTANCES

The following substances are harmful to the living organisms in your system and introducing them constitutes system abuse. These substances can not only have an adverse effect on your system, they can also result in groundwater contamination.

CHECK WITH YOUR LOCAL SANITATION DEPARTMENT FOR PROPER DISPOSAL PROCEDURES FOR:

- Fertilizers
- Root killers or other products with copper sulfate
- Poisons or pesticides
- Drain cleaners
- Oven cleaners or other lye-based products
- Degreasers
- Photographic processing chemicals
- Petroleum products of any kind
- Latex paint, oil paint, stains, thinners and solvents
- Antifreeze
- Chlorinated water from swimming pools or hot tubs

GREASE AND COOKING OIL:

Grease may harden in the septic tank's scum layer and result in a blockage of the inlet or outlet. If you melt grease and pour it down the drain, it may make its way into the system before hardening, which could clog the fibers and fabrics in the Advanced Enviro-Septic™ pipe and/or the pores of the soil in the treatment field. Whenever possible, it is preferable to dispose of waste grease and oil in the trash rather than down the drain.

SPECIAL CONSIDERATIONS FOR PUMPED SYSTEMS

Pressure distribution is not to be used with the Advanced Enviro-Septic™ System; however, in some situations systems may require a pump to gain elevation if the site's topography does not allow for a gravity system. We recommend that the pump dosing frequency be set so the system is dosed a minimum of 4 times a day. If it is dosed less frequently, an increased volume of wastewater will be sent to the system, which could disrupt the settling of solids and greases and lead to clogging.

OTHER SUBSTANCES DETRIMENTAL TO WASTEWATER TREATMENT SYSTEMS

An Advanced Enviro-Septic™ System is a living collection of organisms, and the introduction of toxins and chemicals can kill the bacteria that are essential to the treatment process. If it is impossible to avoid the use of any of the following substances, use care to introduce them a little at a time so their concentration is diluted and the system can neutralize them gradually.

CLEANING PRODUCTS

The system's bacteria should recover quickly after small amounts of household cleaning products enter the system, but using excessive amounts of such substances constitutes system abuse.

ESPECIALLY HARMFUL TO BACTERIA, USE ONLY IN MODERATION:

- Bleach
- Chlorine
- Ammonia
- Anti-bacterial soaps
- Disinfectants

MEDICATIONS:

- Some people dispose of medications by flushing them down the toilet
- Certain medications, particularly antibiotics, can have adverse effects on the system's bacteria
- Dispose of medications in the trash and not in your plumbing system

CARE OF SYSTEM DURING PERIODS OF INTERMITTENT OR NON-USE

The Advanced Enviro-Septic™ System does not require any special maintenance before, during or after periods of non-use. While the system's bacteria may go temporarily dormant if the system is not used for awhile, once wastewater re-enters the system it will return to its normal function in a short period of time. It would not be advisable to have the septic tank pumped and left unused at times when the groundwater is high, as this could cause the tank to "float" out of the ground.

PROPER CARE OF THE TREATMENT FIELD:

- Do not build anything above the treatment field
- Do not drive over the treatment field (unless the system was designed for this)
- Do not dig in the treatment field
- Do not plant trees or shrubs in the treatment field
- Do not store heavy equipment or park on the treatment field
- Do not install irrigation systems in the treatment field
- Do not allow any gutter or drainage systems to discharge above the treatment field
- Do not install additional soil cover materials over the treatment field

LANDSCAPING AND PLANTING IN THE TREATMENT FIELD:

- Do not plant trees or shrubs within 10' of the treatment field, since there is the potential for roots to damage the components and interfere with the system's functioning.
- After installation and proper grading to divert surface waters, the treatment field should be mulched and seeded promptly in order to prevent erosion.
- Only shallow rooted, native vegetation should be planted above the treatment field. Grass, wildflowers and shallow-rooted ground covers are good choices.

- Vegetative cover over the treatment field is important because it contributes to the elimination of nitrogen and phosphorous.
- Do not use fertilizers in the area above the treatment field.
- Do not plant gardens for human consumption above the treatment field.
- Take care not to compact the soil when landscaping; compacted soil above the system can reduce the oxygen supply and gas transfer.

VENTILATION:

- Vents are required for Advanced Enviro-Septic™ Systems to ensure that the system receives a sufficient supply of oxygen, which is required for the bacterial processes that treat the wastewater.
- Typically, vents will look like a cane-shaped piece of PVC protruding straight up out of the ground or mound in the treatment field.
- Vents should be checked periodically to ensure that they are not clogged or blocked in any way, for instance by leaves, animal activity or snow accumulation.
- Do not under any circumstances remove the vent or cover it with any materials that will impede the flow of oxygen. The vent inlet should be a minimum of 3 ft. higher than final grade or above the yearly expected height of snow accumulation.
- If you are concerned about the unsightly appearance of vents, consult with your installer about the possibility of installing remote or by-pass venting in order to locate vents in a less-conspicuous area away from the treatment field. This information is also available on our website, www.PresbyEnvironmental.com.
- Unsightly vents can also be disguised by installing specially-designed products which conceal the vent but still allow sufficient oxygen flow. These products, constructed of durable but lightweight plastic, are made to look like a large rock, a granite post, a birdbath, etc. If you are interested in purchasing a vent disguise, contact your installer or call Presby Environmental and we can refer you to a distributor near you.
- Some customers find that simply painting the vent stack (green, brown, camouflage, etc.) makes it much less noticeable.
- Resist the temptation to conceal vents with landscaping; no trees or shrubs may be located within 10 feet of the treatment field to prevent the infiltration of roots.

CAUSES & INDICATORS OF SEPTIC SYSTEM MALFUNCTION

WHAT IS "SYSTEM MALFUNCTION?"

The term "system malfunction" refers to any situation in which a septic system has stopped operating as expected. One of the unique advantages of the Advanced Enviro-Septic™ System is that in many cases it is possible to restore the system to proper functioning through the process of "Rejuvenation," which returns the system's bacteria to an aerobic state. (See "Rejuvenation, Replacement and Expansion" section of this manual for more information.)

WHAT CAN CAUSE SEPTIC SYSTEM MALFUNCTION?

- Continuous volume of wastewater in excess of design flow
- System flooded with excessive volumes of wastewater which agitates sludge in the septic tank and sends solids into the Advanced Enviro-Septic™ System
- Hydraulic overload from surface or ground water
- Improper design or installation of system and/or plumbing fixtures
- Compacted soil under or over the Advanced Enviro-SepticTM System
- Use of incorrect product for System Sand
- Lack of oxygen, improper venting, vent obstructions
- Failure to periodically pump the septic tank
- Clogged or improperly maintained septic tank effluent filters
- System components clogged by grease, non-biodegradable solids, or roots
- Excessive use of chemicals, toxic substances, cleaning products
- Excessive volume of solids and/or non-biodegradable materials in the wastewater
- Damage to or leaks in any of the system components

WHAT ARE THE SYMPTOMS OF SEPTIC SYSTEM MALFUNCTION?

- A foul odor in the treatment field or from plumbing fixtures
- Ponding or surfacing of wastewater at the ground surface
- Wastewater collecting in the basement
- Backing up of wastewater inside the structure (sluggish drains or toilets slow to flush)

CONTACT YOUR SERVICE PROVIDER IMMEDIATELY IF YOU OBSERVE SYMPTOMS OF SYSTEM MALFUNCTION.

You may also call Presby Environmental directly at 800-473-5298 and we will provide technical assistance and trouble-shooting guidance. No matter what the problem may be, the sooner it is addressed the easier it will be to correct or repair.

Problem	Possible Cause(s)	Action to take
Wastewater backup into plumbing fixtures (sluggish drains or slow flushing toilets)	Sewage line to septic tank clogged	Use a plumbing "snake" to remove the clog. Do not use caustic chemical drain cleaners.
	Sewage line damaged or invaded by roots	Replace sewage line to septic tank
	Too many accumulated solids in the septic tank	Have septic tank pumped
	Damaged or missing inlet or outlet baffles	Repair/replace baffle
	D-Box plugged	Clean out D-Box
	Pump Failure	Contact service provider
	Effluent filter is blocked	Clean or replace filter
	Connecting pipe from septic tank to Advanced Enviro-Septic™ System damaged or invaded by roots	Replace connecting pipe
Foul odor detected	System overload or malfunction	Restrict water use as much as possible and contact service provider
	Ventilation malfunction or improper configuration	
Ponding or pooling of wastewater on ground surface or basement	System overload or malfunction	Restrict water use as much as possible and contact service provider
For any malfunction or questions…..	**First** consult your service provider, designer or installer for assistance.	Presby Environmental's technical support team can be contacted by telephone at (800) 473-5298 or by email to info@presbyeco.com.

REJUVENATION, REPLACEMENT, AND EXPANSION

WHAT IS THE DIFFERENCE BETWEEN "AEROBIC" AND "ANAEROBIC" BACTERIA?

The bacterial processes that provide treatment of wastewater in the Advanced Enviro-Septic™ System are performed by "aerobic" bacteria (bacteria that require oxygen.) When a system malfunctions, it is most often due to a lack of oxygen, which results in the bacteria being converted to an "anaerobic" state (bacteria that exist without oxygen.) (See preceding section of this manual for more information about the possible causes of system malfunction.) These anaerobic bacteria are severely limited in their ability to treat the contaminants in wastewater effectively, which means that the liquid passing through the system is not being purified as intended. When the bacteria turn anaerobic, the System Sand around the pipes turns a darker color.

WHAT IS "REJUVENATION"?

"Rejuvenation" is a procedure for returning the system's bacteria to its intended aerobic state. This feature is unique to the Advanced Enviro-Septic™ System, and could save thousands of dollars compared to the expense of replacing a failed system. The procedure is relatively simple and takes only a few days. Consult your service provider, installer or Presby Environmental technical advisors for more details before proceeding.

NOTE: It is helpful to have your septic tank pumped in preparation for Rejuvenation procedures.

PROCEDURES FOR REJUVENATION:

Step 1: Determine and correct the problem causing the bacteria conversion. (See preceding section of this manual for possible causes of system malfunction.)
Step 2: Excavate one end of all lines and remove the end cap(s) or offset adapter(s).
Step 3: If necessary, have the wastewater pumped from the system and septic tank.
Step 4: Safeguard the open excavation and guarantee passage of air through the system. If possible, attempt to perform procedure during warm, dry weather.
Step 5: Allow all lines to dry for a minimum of 72 hours. When the bacteria have successfully been converted back to an aerobic state, the System Sand will return to nearly its original color.
Step 6: Reassemble the system to its original design configuration, re-install proper cover materials.

COMPONENTS REUSABLE AND REPLACEABLE

Since Advanced Enviro-Septic™ components are non-biodegradable and highly durable, they may be re- used in cases of improper initial installation. In many situations, it will be possible to excavate the system and clean and reinstall all system components. If any components are discovered to be damaged, the individual component can be replaced easily.

SYSTEM EXPANSION

Another unique advantage of the Advanced Enviro-Septic™ System is its ability to be expanded if necessary to accommodate an increase in the daily flow to the system. As mentioned previously, systems are designed to accommodate a particular volume of liquid per day, and exceeding the system's design flow will overload it, possibly resulting in system malfunction. The Advanced Enviro-Septic™ System can be increased in size in order to handle an increase in the daily design flow. Equal lengths of pipe may be added to each Advanced Enviro-Septic™ line, or additional equal sections can be added to the system.

APPENDIX A
SYSTEM INFORMATION & MAINTENANCE RECORDS

Designer & Installer Information:

Date of Installation	
Copy of Plan available?	Yes No
Designer Name	
Designer Company	
Designer Address	
Designer Telephone	
Installer Name	
Installer Company	
Installer Address	
Installer Telephone	

Site Information:

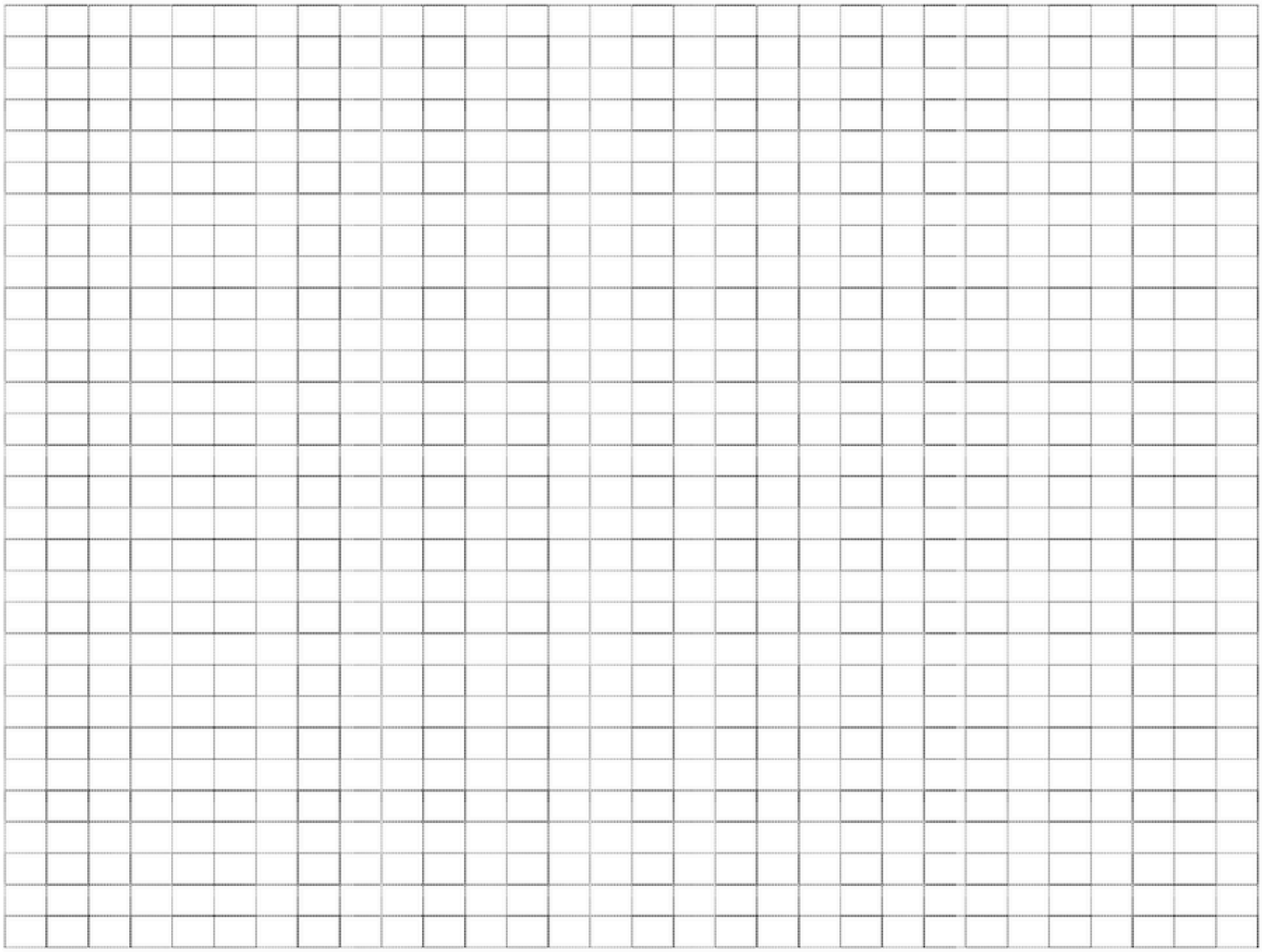
Street Address	
Town / County / State	
Map/Lot	
Municipal Contact Name & Telephone	
Permit Number	
Water Supply	Public Private (circle one)
If private, Well Info.	
Soil Type / Perc Rate	
Relevant Site Characteristics	
Proximities to bodies of water, wetlands, etc.	

System Information:

Design Flow	_____ Gallons per Day _____ # of Bedrooms
Design Type (circle all that apply)	Basic Serial Combination D-Box Multiple Beds (#_____) Pump Gravity Raised (mound) In-Ground Non-Conventional Non-Standard Flow Equalizers Velocity Reducers
Site Slope	Level _____%
System Slope	Level _____%
Vent Locations	
Vent Size	
Linear Feet E-S pipe	
Number of Lines	
Pipe Spacing (center-to-center)	
Sand Bed Dimensions & Number of Beds	
Other Comments:	

Diagram System Location:

Indicate location of structure, septic tank & access hatch, treatment field, vents, wells, restrictive features (pavement, swimming pools, foundations, surface water, property lines, etc.)



System Maintenance and Service Record		
DATE:	PERFORMED BY:	DESCRIPTION OF SERVICE:



PRESBY ENVIRONMENTAL INC. STANDARD LIMITED WARRANTY

a) The structural integrity of each unit, endcap and other accessory manufactured by Presby Environmental Inc. (collectively referred to as "Units"), when installed and operated in an onsite wastewater system in accordance with Presby Environmental's installation instructions, is warranted to the original purchaser ("Holder") against defective materials and workmanship for one year from the date upon which a septic permit is issued for the septic system containing the Units; provided, however, that if a septic permit is not required for the septic system by applicable law, the one (1) year warranty period will begin upon the date that installation of the septic system commences. In order to exercise its warranty rights, Holder must notify Presby Environmental in writing at its corporate headquarters in Whitefield, New Hampshire within fifteen (15) days of the alleged defect. Presby Environmental will supply replacement Units for those Units determined by Presby Environmental to be defective and covered by this Limited Warranty. Presby Environmental's liability specifically excludes the cost of removal and/or installation of the Units.

(b) THE LIMITED WARRANTY AND REMEDIES IN SUBPARAGRAPH (a) ARE EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE UNITS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(c) This Limited Warranty shall be void if any part of the Presby Environmental system (unit, endcap or other accessory) is manufactured by anyone other than Presby Environmental. The Limited Warranty does not extend to incidental, consequential, special or indirect damages. Presby Environmental shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other losses or expenses incurred by the Holder or any third party. Specifically excluded from Limited Warranty coverage are damage to the Units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the Units; the Units being subjected to vehicle traffic or other conditions which are not permitted by the installation instructions; failure to maintain the minimum ground covers set forth in the installation instructions; the placement of improper materials into the system containing the Units; failure of the Units or the septic system due to improper siting or improper sizing, excessive water usage, improper grease disposal, or improper operation; or any other event not caused by Presby Environmental. This Limited Warranty shall be void if the Holder fails to comply with all of the terms set forth in this Limited Warranty.



Further, in no event shall Presby Environmental be responsible for any loss or damage to the Holder, the Units, or any third party resulting from installation or shipment, or from any product liability claims of Holder or any third party. For this Limited Warranty to apply, the Units must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Presby Environmental's installation instructions.

(d) No representative of Presby Environmental has the authority to change this Limited Warranty in any manner whatsoever, or to extend this Limited Warranty. No warranty applies to any party other than the original Holder.

The above represents the standard Limited Warranty offered by Presby Environmental. A limited number of states and counties have different warranty requirements. Any purchaser of Units should contact Presby Environmental's corporate headquarters in Whitefield, New Hampshire, prior to such purchase, to obtain a copy of the applicable warranty, and should carefully read that warranty prior to the purchase of Units.

PRESBY ENVIRONMENTAL, INC.
143 Airport Road, Whitefield NH, 03598 • (800) 473-5298 • www.presbyeco.com

Advanced Enviro-SepticTM U.S. Patent Nos. 6,461,078; 5,954,451; 6,290,429; 6,899,359; 6,792,977; 7,270,532 and 5,606,786 with other patents pending.
Enviro-Septic® is a registered trademark of Presby Environmental, Inc. Advanced Enviro-SepticTM is a pending trademark of Presby Environmental, Inc. Bio-AcceleratorTM is a pending trademark of Presby Environmental, Inc.
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INFILTRATOR® tanks

SEPTIC TANKS

IM-300 • IM-540 • CM-1060 • IM-1250 • IM-1530

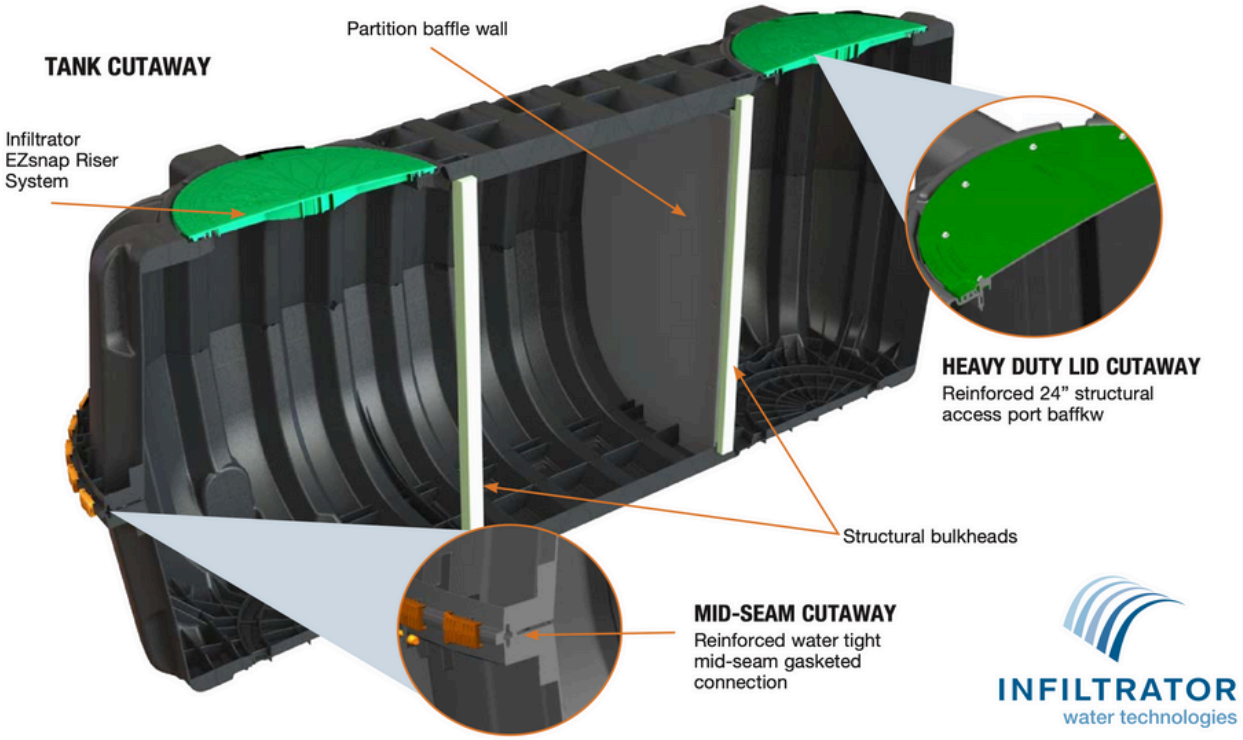


CM-1060

Features & Benefits

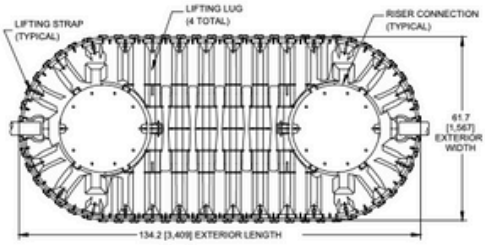
- Strong injection and compression molded polypropylene construction
- Lightweight plastic construction and inboard lifting lugs allow for easy delivery and handling
- Can be pumped dry during pump-outs
- Structurally reinforced access ports eliminate distortion during installation and pump-outs
- Reinforced structural ribbing offers additional strength
- Suitable for use as a pump tank or rainwater (non-potable) tank
- No special water filling requirements are necessary
- The tank may be backfilled with suitable native soil. See installation instructions for guidance.

Infiltrator septic tanks dare to be different in pursuit of continual improvement and ultimate superior performance. Injection and compression molded tank halves join with permanent clips and a mid-seam EPDM gasket, producing a reinforced watertight bond. Harmful septic gases pose little threat to the tank's polypropylene construction because of its highly corrosive-resistant chemistry. While durability is achieved through an innovative combination of structural ribbing and fiberglass supports. Finally, the thermoplastic's lightweight nature makes transportation and installation of the tank quick and easy. Backed by Infiltrator's five-year warranty, these septic tanks are an investment into the future of a healthy and effective onsite wastewater management system.

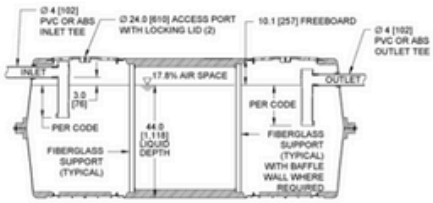


INFILTRATOR water technologies

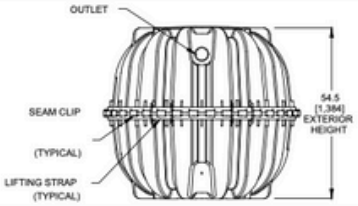
Septic Tanks General Specifications and Illustrations



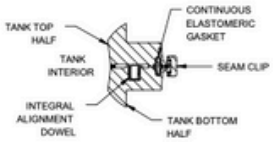
TOP VIEW



SECTION VIEW



END VIEW



MID-HEIGHT SEAM SECTION

The Infiltrator two-piece mid-seam polypropylene tank allows for a mid-seam joint that has precise dimensions for accepting an engineered EPDM gasket. The engineered mid-seam joint accepts a continuous loop EPDM gasket. Infiltrator's EPDM gasket design utilizes technology and materials from the sanitary sewer pipe industry to deliver a reliable watertight seal.The two-piece design is permanently fastened using a system of molded-in alignment dowels and locking seam clips. The Infiltrator septic tank is assembled and sold through a network of certified Infiltrator distributors.

Must be backfilled and installed in accordance with Infiltrator Water Technologies, Septic Tank General Installation Instructions and for shallow ground water conditions reference the Infiltrator Tank Buoyancy Control Guidance. Please visit www.infiltratorwater.com for the latest information.

Septic Tank Series					
Parameter	IM-300	IM-540	CM-1060	IM-1250	IM-1530
Working Capacity	278 gal (1,052 L)	475 gal (1,799L)	1,111 gal (4,207 L)	1,278 gal (4,839 L)	1537 gal (5,818 L)
Total Capacity	322 gal (1,219 L)	552 gal (2,089 L)	1,309 gal (4,956 L)	1,480 gal (5,604 L)	1787 gal (6,765 L)
Airspace	15.8%	16.2%	17.8%	15.8%	16.3%
Length	50.9" (1,293 mm)	64.9" (1,648 mm)	134.2" (3,409 mm)	154" (3,911 mm)	176" (4,460 mm)
Width	50.9" (1,293 mm)	61.7" (1567 mm)	61.7" (1,567 mm)	61.7" (1,567 mm)	62" (1,567 mm)
Length-to-Width Ratio	1 to 1	1.1 to 1	2.3 to 1	2.8 : 1	2.8 to 1
Height	50.5" (1,283 mm)	54.6" (1,387 mm)	54.5" (1,384 mm)	54.6" (1,387 mm)	55" (1,384 mm)
Liquid Level	41.25" (1,048 mm)	44" (1,118 mm)	44" (1,118 mm)	44" (1,118 mm)	44" (1,118 mm)
Invert Drop	2" (50.8 mm)	3" (76 mm)	3" (76 mm)	3" (76 mm)	3" (76 mm)
Fiberglass Supports	0	0	2	4	4
Compartments	1	1	1 or 2	1 or 2	1 or 2
Maximum Burial Depth	52" (1,321 mm)	48" (1,219 mm)	48" (1,219 mm)	48" (1,219 mm)	48" (1,219 mm)
Minimum Burial Depth	6" (152 mm)	6" (152 mm)	6" (152 mm)	6" (152 mm)	6" (152 mm)
Maximum Pipe Diameter	4" (102 mm)	4" (100 mm)	4" (102 mm)	4" (102 mm)	4" (100 mm)
Weight	140 lbs (64 kg)	204 lbs (93 kg)	354 lbs (161 kg)	400 lbs (181 kg)	518 lbs (235 kg)

INFILTRATOR water technologies

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For U.S. patents information visit www.infiltratorwater.com/patents. Other patents pending. Infiltrator, Quick4 and EZflow are registered trademarks of Infiltrator Water Technologies. Infiltrator Water Technologies is a wholly-owned subsidiary of Advanced Drainage Systems, Inc. (ADS).

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Contact Infiltrator's Technical Services Department for assistance at 1-800-221-4436 or info@infiltratorwater.com

INFILTRATOR®
water technologies

Quick4 PLUS CHAMBER SYSTEMS

The Quick4® Plus Standard Chamber

Quick4 Plus™ Series

The Quick4 Plus Standard Chamber offers maximum strength through its two center structural columns. This chamber can be installed in a 36-inch-wide trench. Like the original line of Quick4 chambers, it offers advanced contouring capability with its Contour Swivel Connection™ which permits turns up to 15-degrees, right or left. It is also available in four-foot lengths to provide optimal installation flexibility. The Quick4 Plus All-in-One 12 Endcap, and the Quick4 Periscope are available with this chamber, providing increased flexibility in system configurations.



Maximum Strength



Quick4 Plus Standard Chamber Benefits:

- Two center structural columns offer increased stability and superior strength
- Advanced contouring connections
- Latching mechanism allows for quick installation
- Four-foot chamber lengths are easy to handle and install
- Supports wheel loads of 16,000 lbs/axle with 12" of cover





Quick4 Plus Standard Chamber Specifications

Size 34"W x 53"L x 12"H (864 mm x 1346 mm x 305 mm)
Effective Length 48" (1219 mm)
Louver Height 8" (203 mm)
Storage Capacity 47 gal (178 L)
Invert Height 0.6" (15 mm), 5.3" (135 mm), 8.0" (203 mm), 12.7" (323 mm)

Quick4 Plus All-in-One 12 Endcap Benefits:

- May be used at the end of chamber row for an inlet/outlet or can be installed mid-trench
- Mid-trench connection feature allows construction of chamber rows with center feed, as an alternative to inletting at the ends of chamber rows
- Center-feed connection allows for easy installation of serial distribution systems
- Pipe connection options include sides, ends or top

Quick4 Plus All-in-One Periscope Benefits:

- Allows for raised invert installations
- 180° directional inletting
- 12" raised invert is ideal for serial applications

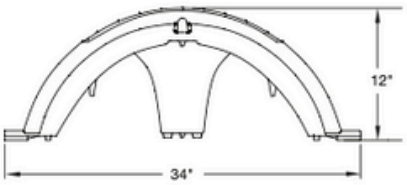
Certified by the International Association of Plumbing and Mechanical Officials (IAPMO)

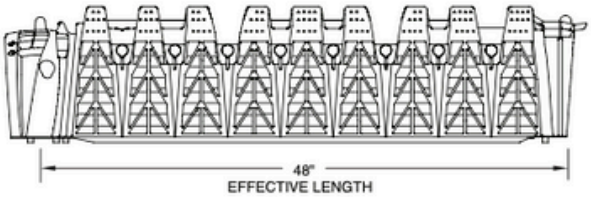
APPROVED in _____

Quick4 Plus™ Series

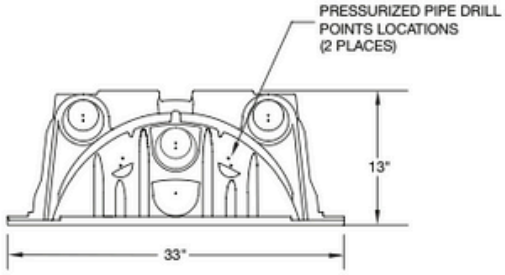
Quick4 PLUS CHAMBER SYSTEMS

Quick4 Plus Standard Chamber

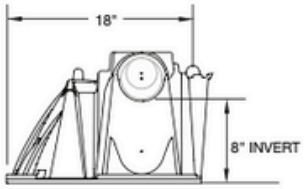




Quick4 Plus All-in-One 12 Endcap

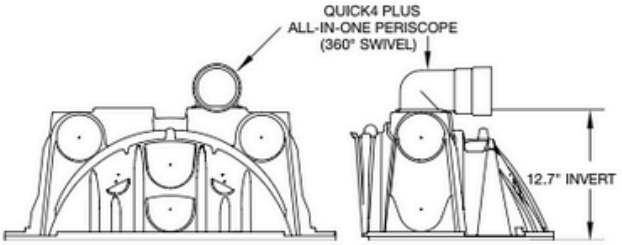


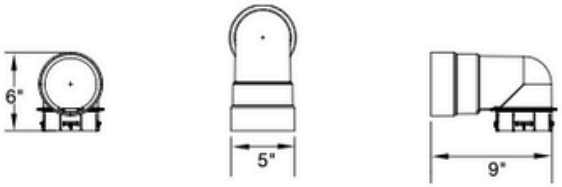
FRONT VIEW



SIDE VIEW

Quick4 Plus All-in-One Periscope





INFILTRATOR WATER TECHNOLOGIES, LLC ("INFILTRATOR")
Infiltrator Water Technologies, LLC STANDARD LIMITED Drainfield WARRANTY

(a) The structural integrity of each chamber, endcap, EZflow expanded polystyrene and/or other accessory manufactured by Infiltrator ("Units"), when installed and operated in a leachfield of an onsite septic system in accordance with Infiltrator's instructions, is warranted to the original purchaser ("Holder") against defective materials and workmanship for one year from the date that the septic permit is issued for the septic system containing the Units; provided, however, that if a septic permit is not required by applicable law, the warranty period will begin upon the date that installation of the septic system commences. To exercise its warranty rights, Holder must notify Infiltrator in writing at its Corporate Headquarters in Old Saybrook, Connecticut within fifteen (15) days of the alleged defect. Infiltrator will supply replacement Units for Units determined by Infiltrator to be covered by this Limited Warranty. Infiltrator's liability specifically excludes the cost of removal and/or installation of the Units.

(b) THE LIMITED WARRANTY AND REMEDIES IN SUBPARAGRAPH (a) ARE EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE UNITS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE

(c) This Limited Warranty shall be void if any part of the chamber system is manufactured by anyone other than Infiltrator. The Limited Warranty does not extend to incidental, consequential, special or indirect damages. Infiltrator shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other losses or expenses incurred by the Holder or any third party. Specifically excluded from Limited Warranty coverage are damage to the Units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the Units; the Units being subjected to vehicle traffic or other conditions which are not permitted by the installation instructions; failure to maintain the minimum ground covers set forth in the installation instructions; the placement of improper materials into the system containing the Units; failure of the Units or the septic system due to improper siting or improper sizing, excessive water usage, improper grease disposal, or improper operation; or any other event not caused by Infiltrator. This Limited Warranty shall be void if the Holder fails to comply with all of the terms set forth in this Limited Warranty. Further, in no event shall Infiltrator be responsible for any loss or damage to the Holder, the Units, or any third party resulting from installation or shipment, or from any product liability claims of Holder or any third party. For this Limited Warranty to apply, the Units must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Infiltrator's installation instructions.

(d) No representative of Infiltrator has the authority to change or extend this Limited Warranty. No warranty applies to any party other than the original Holder. The above represents the Standard Limited Warranty offered by Infiltrator. A limited number of states and counties have different warranty requirements. Any purchaser of Units should contact Infiltrator's Corporate Headquarters in Old Saybrook, Connecticut, prior to such purchase, to obtain a copy of the applicable warranty, and should carefully read that warranty prior to the purchase of Units.

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U.S. Patents: 4,759,661; 5,017,041; 5,156,488; 5,336,017; 5,401,116; 5,401,459; 5,511,903; 5,716,163; 5,588,778; 5,839,844 Canadian Patents: 1,329,959; 2,004,564 Other patents pending.
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