MicroSepTec

EnviroServer

ES Series

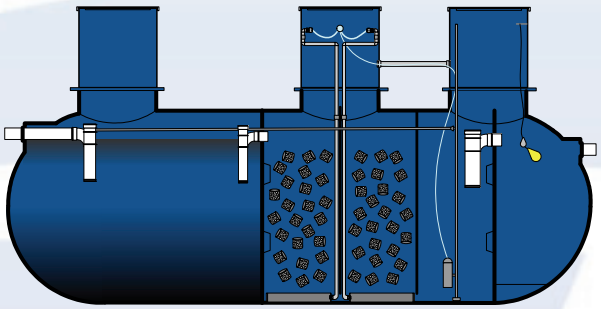
Owners Manual

This manual covers:

Model ES6 □

Model ES12 □

Model ES25 □



MicroSepTec
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Distributed by:

IMPORTANT SAFEGUARDS

To reduce the risk of fire, electrical shock or injury:

- Do not use any flammable liquids near any portion of the EnviroServer®
- Keep flammable materials and vapors, such as gasoline, away from the EnviroServer®
- Never operate the system with any of the covers opened or removed
- Do not attempt to open manhole covers
- There are no owner serviceable parts on the EnviroServer® System…..ALL SERVICE MUST BE PERFORMED BY A MICROSEPTEC AUTHORIZED PROVIDER.

Range of Operating Conditions

Technology performance can be achieved when the EnviroServer® ES System is properly installed in accordance with MicroSepTec's Installation Manual and maintained with a Maintenance Service Contract from a MicroSepTec Authorized Service Provider. The EnviroServer® ES6 is designed to process up to 600 GPD (gallons per day), the EnviroServer® ES12 is designed to process up to 1200 GPD, and the EnviroServer® ES25 is designed to process up to 2500 GPD[1]. The design flow is based on an average throughout the day. As such, high peak flows can adversely affect the treatment process. Peak flows of greater than 4 gallons per minute, 10% of the design flow per hour, and 50% of the design flow over 6 hours will increase the likelihood of poor performance of the system, and should be avoided.

The system is designed to treat typical residential strength wastewater. Typical properties of residential wastewater are: 150-200 mg/l $CBOD_5$, 150-250 mg/l TSS and 40-60 mg/l Total Nitrogen (Nitrates, Nitrites, & TKN).

[1] The maximum treatment volume is based on the Typical Residential Strength listed above.

SAVE THESE INSTRUCTIONS

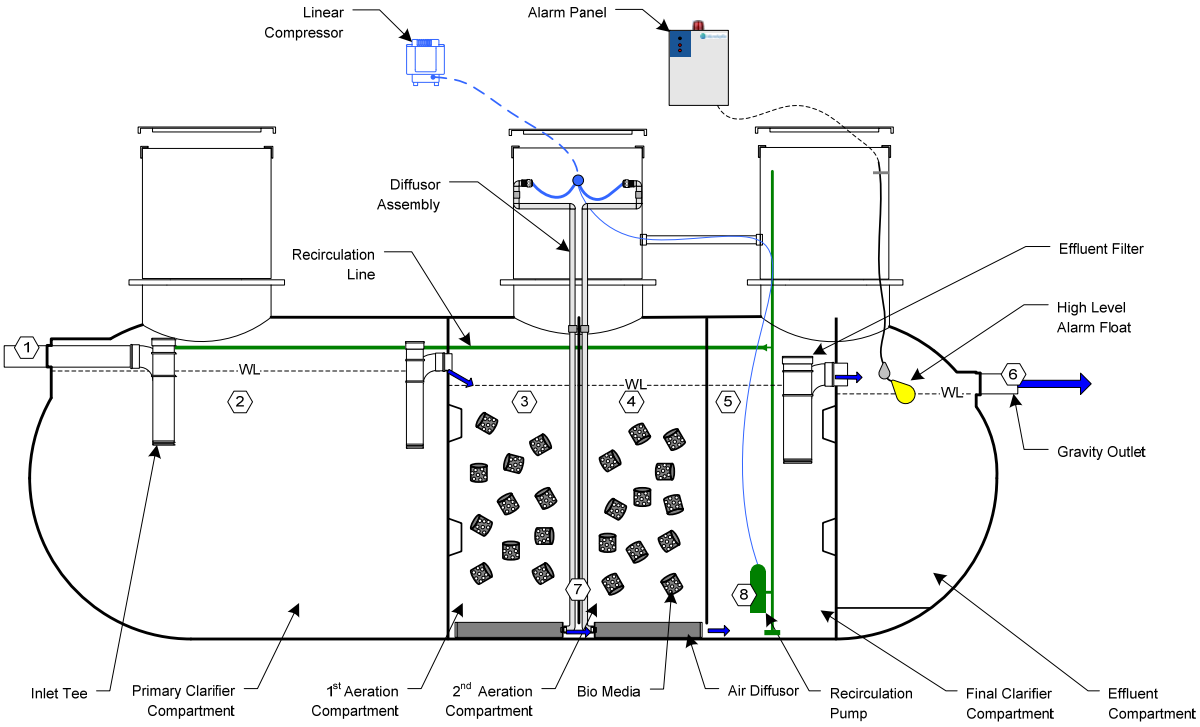
CAUTION!

The EnviroServer® employs a natural biological process. As such, it is critical that certain items not be introduced to the system. The items below constitute a representative example of items that should never be flushed down the drain or toilet. These items can overtax or destroy the biological digestion taking place within the system or clog pumps and pipes. Note these items are broad categories that are intended to serve as examples and are by no means all-inclusive.

- Chemicals, such as: paints, varnishes, thinners, waste oils, photographic solutions, pesticides, acids, bleaches
- Gasoline in any form
- Fat, greases and oils
- Coffee grounds
- Cigarette butts
- Dental floss
- Kitty litter
- Non septic-safe toilet paper
- Sanitary napkins
- Tampons
- Condoms
- Gauze bandages
- Disposable diapers
- Construction debris
- Excessive amounts of disinfectants, detergents and cleaning supplies
- Prescription medicines

In addition, do not use excessive amounts of water and do repair any leaking plumbing fixtures. A leaky toilet can waste as much as 2,000 gallons per day, resulting in hydraulic overtaxing of your treatment system. A typical household uses about 50 gallons per day per person of water.

HOW THE SYSTEM WORKS



Stage 1 - Primary Clarification

Wastewater Influent(1) from the house is gravity fed into the first compartment(2) (**Primary Clarifier**) of the system. In the first compartment, settling of the sludge and solids occurs. The primary clarified wastewater overflows into the second compartment of the system (**First Aeration Compartment**)(3) through sanitary tees.

Stage 2 - Biological Organic Removal

In the second compartment the wastewater is aerated using a high-efficiency low-pressure **air compressor** and a fine-bubble **membrane air diffuser assembly**(7). The diffuser assembly is custom designed to ensure maximum oxygen transfer and optimum mixing of dissolved substrates and oxygen. Furthermore, the mixing ensures that the solids remain suspended within the reactor and that the biomedia does not clog. The aeration promotes the growth of aerobic microorganisms, which convert and remove biodegradable organic matter. (The organics removed by the aerobic process are the constituents that are measured in the $CBOD_5$ test.)

Stage 3 - Biological Ammonia Conversion (Nitrification)

The partially treated wastewater, now low in carbon but high in ammonia, flows into the third compartment (**Second Aeration Compartment**)(4) of the system and is aerated in the same manner as the second compartment. The combination of low carbon content, high ammonia,

and high oxygen levels in this chamber promotes the growth of nitrifying microorganisms (Nitrosomonas and Nitrobacter). The nitrifying microorganisms convert ammonia to nitrates utilizing the oxygen in the wastewater.

To optimize the contact time and the mean cell residence time, the EnviroServer® utilizes a **biomedia** in the aerobic sections. This plastic media is used to supply a support structure for the establishment of a resident biofilm and is specifically developed for optimized biological growth without clogging. The design allows the biomass to attach to the biomedia and not flush out during high flow rates. The biomedia also enhances the nitrification process, which requires a larger population of organisms due to the lower metabolic rate of the nitrifying bacteria.

Stage 4 - Clarification

The two-stage aerobically treated wastewater, which is now high in nitrates but low in carbon (BOD), flows into the fourth compartment (**Final Clarifier**) ⑤ of the system where clarification and settling of suspended solids occurs.

Stage 5 - Nitrate Removal

To promote denitrification, the wastewater is recirculated ⑧ from the fourth chamber back to the primary clarifier, which contains sufficient carbon to promote denitrification. Denitrification occurs because the bacteria in the primary (anoxic) clarifier use the oxygen from the nitrate molecules in their metabolic process; the nitrogen left over from this reaction is then released as a gas.

Stage 6 - Solids Removal

The recirculation also helps prevent accumulation of biomass in the final clarifier, decreasing the need for periodic removal. Removing the accumulated biomass helps ensure optimum clarifier performance, resulting in an effluent with low suspended solids. The transfer of the biomass to the primary clarifier ensures a large vital population of microorganisms for the organic and nitrogen-removal processes in the aeration compartments. When the water is recirculated, it carries nutrients from the primary clarifier into the aeration compartments. Thus, the available nutrients are utilized to sustain the population as long as possible, particularly in times of low loading such as vacation periods. In normal operation, this keeps sludge build-up to a minimum by helping break up and dissolve the solids and thereby make the nutrients available for the microorganisms.

Because of the recirculation, the sludge is accumulated and stored in the primary clarifier. The primary clarifier is sized to hold sludge for one to three years, depending on the usage of the system, and will need to be pumped as needed. The first baffle is reinforced to be able to withstand the hydraulic pressure of the first compartment being empty and the second full.

Stage 7 - Effluent Filtration and Disinfection (optional)

The clarified water leaves the treatment compartments through an **effluent filter** into the final storage compartment (**Effluent Compartment**). The effluent filter protects the effluent compartment and subsequent dispersal field from solids carry-over during upset conditions. It is designed to remove all particles larger than 1/16".

A UV-disinfection unit is offered as an option to eliminate remaining pathogens, including fecal coliform. When selected, the clarified water passes through a disinfection unit after it leaves the effluent filter. The effluent is now ready for subsurface discharge⑥.

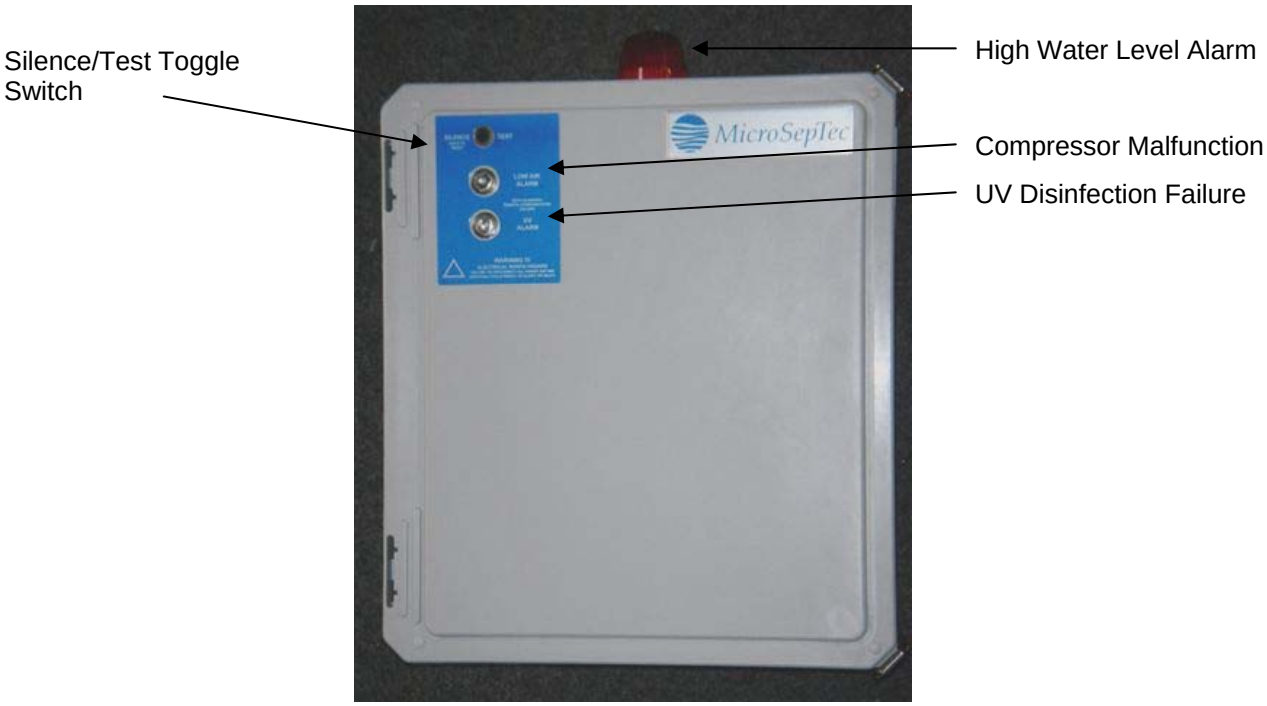
Alarm & Control Panel

The EnviroServer® ES System is equipped with a local audible and visual alarm for detecting high water level, air compressor failure, and optional UV disinfection failure. The panel is also capable of time dosing an effluent pump.

Telemetry (optional)

The EnviroServer® System is offered with an optional telemetry panel, which will send the alarms via a modem connection to the MicroSepTec Monitoring Center. The Monitoring Center will automatically notify the assigned Service Provider about the malfunction.

Audible and Visual Alarm & Control Panel



Materials Supplied by MicroSepTec

The following items are supplied by MicroSepTec as part of the EnviroServer® ES System:

1. Water Processing Tank Assembly to include:

   Fiberglass Tank
   - ES6 - 1,708 gallon tank
   - ES12 - 3,436 gallon tank
   - ES25 - 6,840 gallon tank

   Access Man-ways with Adjustable Risers
   Air Diffuser Assembly
   Air Compressor(s)
   - ES6 - One HiBlow Compressor HP-120 or equal
   - ES12 - Two HiBlow Compressors HP-120 or equal
   - ES25 - Two HiBlow Compressors HP-200 or equal

   Recirculation Air-Lift Pump Assembly
   Effluent Filter
   High Level Alarm Float Assembly
   Compressor Pressure Switch
   Tank Plumbing & Electrical fittings
   Optional Disinfection Assembly with Alarm Sensor
   Optional Effluent Discharge Pump Assembly (low or high pressure)

2. Alarm & Control Panel to include:

   Alarms
   - Audible and Visual Alarm for High Water Level
   - Visual Alarm for Air Compressor Failure[2]
   - Visual Alarm for Optional UV Light Failure

   Timer controls for optional effluent pump & solenoid valve for automatic back-flush filter
   Optional Telemetry Panel that connects to the Alarm Board and telephone line

[2] Audible alarm can be selected for Low Air and UV alarms

Safety

The EnviroServer® System must be installed and serviced by MicroSepTec trained representatives. Proper tools must be used in the installation process to ensure assembly to manufacturer's specifications and to prevent damage and injuries.

Power Requirements

The MicroSepTec EnviroServer® ES System requires electrical power to operate. The EnviroServer® is designed to perform effectively from the following source:

- Gravity Discharge - 115 VAC @ 60 Hz; 15 Ampere
- Pressurized Discharge - 115 VAC @ 60 Hz; 30 Ampere

The power supply must have separate neutral and ground.

Site Requirements

The MicroSepTec EnviroServer® System must be properly installed. The water processing tank will be sited below ground to ensure gravity flow of the wastewater from the site. The EnviroServer® Alarm & Control Panel is sited above ground. The cross-sectional space requirement for the water processing tank is 7 x 17 ft for an ES6 tank, 8 x 22 ft for an ES12 tank, and 10 x 26 ft for an ES25 tank. The depth requirement is site specific.

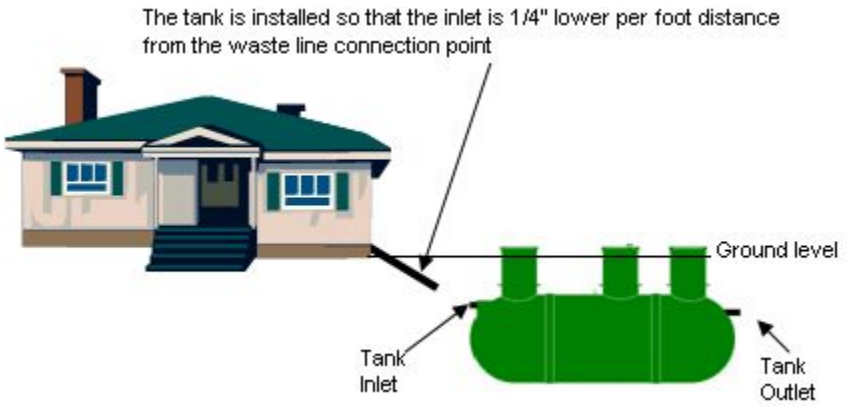
When the telemetry option is selected, The EnviroServer® System requires a telephone connection at the location of the Alarm & Control Panel. This must be a direct, analog phone line, but does not need to be dedicated.

Water Processing Tank

The EnviroServer® ES utilizes three tank sizes, each with five separate compartments. The rated capacities for the four sizes are 600, 1,200, and 2,500 gallons per day (residential strength) hydraulic loading.

System	Hydraulic Tank Volume Gallons	Size (L x Dia.)	Height to Bottom of Inlet	Height to Outlet of Clarifier	Height to Bottom of Gravity Outlet
ES6	1,708	180”x60”	51”	47.75”	46”
ES12	3,436	242”x72”	64”	59”	57”
ES25	6,840	292”x93”	83”	78”	75”

A pre-installation site inspection will have determined the location and layout of the tank. The fiberglass tank will normally be installed in the ground in direct proximity to the main waste line exiting the structure.



The burial depth of the tank is determined by measuring the distance from the main waste line to the inlet of the tank. Then, compute a ¼” grade per foot for that pipe distance. Measure the depth of the primary waste line and add the computed pipe grade to find the inlet distance below ground that the waste line should attach to the inlet side of the tank.

Maintenance Policy

A maintenance agreement can be offered from a MicroSepTec Authorized Service Provider, and is required under the terms of the warranty. Please call MicroSepTec's toll-free number at 877-473-7842 to locate a Service Provider in your area.

This maintenance agreement normally covers a system inspection/service visit every six months during which electrical, mechanical and other applicable components are inspected, adjusted and serviced.

Maintenance and monitoring agreements may be required depending on your local regulations.

Recommended Maintenance

The following is a list of recommended maintenance to ensure the high quality of treatment in the EnviroServer® ES System:

- Pumping of Primary Compartment, and as needed, Final Clarifier every one to three years depending on usage. Yearly Inspections will determine when pumping is needed.
- Inspect effluent filter every six months and clean if needed.
- Inspect and clean air diffusers every six months and after compressors have been shut down for more than 72 hours. Replace if clogged.
- Service (replace diaphragm & gaskets) or replace entire air compressor every three years or as needed.
- Inspect Air Lift Recirculation Pump every six months and clean as needed. Air flow may need adjustment.
- Inspect alarm panel & activate all alarm sensors every six months.
- If UV disinfection is used, replace UV lamp every two years or sooner as alarm indicates End-of-Life.
- If pressure discharge is used, inspect effluent pump every six months and replace or clean inlet as needed.
- If telemetry is used, replace backup batteries every two years (AA-Size, 3.6V (non-standard) Lithium), or after prolonged power outage
- If telemetry is used, replace memory battery (CR2032 – nickel-size on telemetry board) every 5 years

System Malfunctions

In the event that an alarm is activated (visible by red light alarm signals on the outside of alarm panel), please call your Service Provider. The following is a list of possible alarms:

- **Dome light steady** (top light) – High water level in tank
- **Dome light blinking** – Spare alarm input activated
- **UV Alarm light steady** – UV light malfunctioning (UV option)
- **Low Air Pressure Alarm light steady** – Air compressor malfunctioning or piping/tubing leaks
- **Low Air Pressure Alarm light blinking** – Power Failure
- **Both UV Alarm & Low Air Pressure Alarm lights blinking** – Communication Failure (telemetry option)

The High Level Alarm will cause the audible alarm to buzz steadily; if used, the spare input alarm will cause the audible alarm to buzz intermittently. The audible alarm can also be configured to buzz with UV Alarms and/or Low Air Pressure Alarms. Audible alarms can be silenced by pressing the toggle switch on the door to the “Silence” position.

All alarms are cleared by holding the “Silence” switch (front of panel) for 3 seconds which will reset the panel. If alarm comes back, call your Service Provider.

Monitoring Agreement (optional)

If the telemetry option is selected, MicroSepTec offers 24 hours per day monitoring of the EnviroServer® for an annual fee. This system will automatically alert the authorized technicians of any equipment malfunctions.

To activate the monitoring, please contact your Authorized Service Provider and have them submit a signed Monitoring Agreement to MicroSepTec.

Maintenance and monitoring agreements may be required depending on your local regulations.

Extended Periods of Non-Use

If the EnviroServer® System is used intermittently and/or if extended periods of non-use are anticipated, no special actions are required as long as the power is on and the system continues to operate. Due to the nature of the EnviroServer®, the system will adjust itself as the need requires.

LIMITED WARRANTY
MicroSepTec EnviroServer®® ES Series

What is covered: MST Manufacturing, LLC ("MST") warrants the parts in each EnviroServer® Advanced Treatment System to be free from defects in material and workmanship for a period of two years from the date of initial installation as evidenced by the installer's Installation Sign-Off Form, or three years from date of sale, whichever occurs first.

What MST Will Do To Correct Problems: MST's sole obligation under this warranty is to fulfill this warranty by repairing or exchanging, at the sole discretion of MST, any component part, F.O.B. factory, that in MST's judgment shows evidence of defects, provided said component part has been paid for and is returned through an authorized dealer or distributor, delivery charges prepaid, along with proof of the date of original purchase, date of installation sign-off and a written statement from the warrantee specifying the nature of the defect.

What This Warranty Does Not Cover: This warranty covers only normal residential use within the United States. MST cannot warranty the treatment performance of the system since it cannot predict or control the nature of the influent and the effect of the influent on the biological process. MST is not responsible for warranty service should the MST label, the rating label, or serial number be removed or should the product fail to be properly maintained or fail to function properly as a result of misuse, abuse, improper installation, neglect, improper shipping, damage caused by disasters such as fire, flooding by external means, lightning, improper wiring or electrical current, interaction with non-MST products, service other than by a MST authorized service provider or the introduction of hazardous or harmful materials into the system.

This warranty applies only to the EnviroServer® and does not include the chlorine tablets or UV lamp, if applicable, or any of the existing on-site wiring, plumbing, venting, drainage, or additional disposal system components. In addition to, and not in limitation of anything else contained in this warranty, MST is not responsible for any delay or damages caused by defective components or material, or for loss incurred because of interruption of service, or for any other special or consequential damages or incidental expenses arising from the manufacture, sale, or use of the EnviroServer®.

The EnviroServer®® wastewater treatment system is based on a biological process using natural bacteria and oxygen to efficiently digest the waste in the water. The following items are examples of substances that should never be introduced into an onsite system because they can overtax or destroy the biological digestion or clog pumps and pipes and constitute misuse and/or abuse of the system: excessive amounts of fat, grease or oil; coffee grounds; disposable diapers; feminine hygiene products; condoms; cigarette butts; gauze or adhesive bandages; Q-tips; dental floss; cat litter; excessive amounts of disinfectants, detergents & cleaning supplies; chemicals such as paints, varnishes, thinners, oils, photographic solutions, pesticides; construction debris; and prescription medicines.

MST reserves the rights to revise, change, or modify the construction and design of the EnviroServer® or any component part or parts thereof without incurring any obligation to make such changes or modifications in previously manufactured equipment. MST also reserves the right, in making replacements of component parts under this warranty, to furnish a component part which, in its judgment, is equivalent to the part being replaced.

In addition to and not in limitation of anything else contained in this warranty, under no circumstances will MST be responsible for any other direct or consequential damages including, but not limited to lost profits, lost income, labor charges, delays in production, and/or idle production which result from defects in material and/or workmanship of the EnviroServer®.

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