



MicroSepTec
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CS SERIES



OWNER'S MANUAL

ONE TANK – FIVE CHAMBERS – TOTAL TREATMENT

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General Information

Thank you for selecting the EnviroServer® CS Series Wastewater Treatment System. Sometimes, the simplest solution is the best and that's the case with the EnviroServer. Simple, because the entire treatment system is in one tank. Simple, because the only moving part is the compressor. Simple, because there is minimal intrusion to the landscape. Simple, because the process is accomplished with aeration and agitation, the same technology as sewer treatment plants. Simply simple!

The system employs a naturally occurring biological process. Although it is robust, certain care must be taken. This manual will let you know what the EnviroServer CS Series is, how it works, and what is needed to keep it operational and healthy for as long as you own it. Please read through the entire manual and familiarize yourself with all maintenance recommendations, safeguards, and care instructions. Remember to educate members of your household and guests about the system, paying attention to the safeguards.

Glossary of Terms

Air Diffusers: Membrane device used to evenly distribute fine air bubbles in order to transfer and mix oxygen with dissolved substrates.

Alarm Control Panel: Controls the process and indicates failures of mechanical and electrical components.

Back-Flush System: Used with a drip dispersal system. A series of valves and a filter used downstream from the EnviroServer to flush the drip line filter and field.

Coliform Bacteria: Group of bacteria that constitute most of the intestinal flora of warm-blooded animals (including the genera *Klebsiella* sp., *Enterobacter* sp., *Citrobacter* sp., or *Escherichia* sp.) and are used as water pollution indicator organisms.

Coliform Bacteria, fecal: Indicator bacteria common to the digestive systems of warm-blooded animals that is cultured in standard tests to indicate either contamination from sewage or the level of disinfection; generally measured as number of colonies/100 mL or most probable number (MPN).

Coliform, total (TC): Measurement of water quality expressed as the number of colony-forming units (cfu) of coliform bacteria per unit volume.

BOD (Biochemical Oxygen Demand): The amount of dissolved oxygen needed (i.e. demanded) by aerobic biological organisms to break down organic material present in each water sample at a certain temperature over a specific time period. The BOD value is most expressed in milligrams of oxygen consumed per liter of sample during 5 days of incubation at 68°F and is often used as a surrogate of the degree of organic pollution in water.

CBOD (Carbonaceous BOD): A subset of BOD. BOD results are based on DO depletion from both carbonaceous and nitrogenous actors in a wastewater sample. CBOD measures DO depletion from only carbonaceous sources. Concentrations of oxygen utilized by microorganisms in the oxidation of organic matter during a 5-day period at 68°F. BOD is measured to indicate the strength of wastewater and/or the effectiveness of treatment. This is the unit measurement used in NSF/ANSI testing of treated wastewater systems.

Discharge Pump: A pump used to discharge processed water from the last chamber to the dispersal area.

Disinfection: Process used to destroy or inactivate pathogenic microorganisms in wastewater to render them noninfectious.

Disinfection, ultraviolet (UV): Process used to inactivate microorganisms by irradiating them with ultraviolet light to disrupt their metabolic activity, thus rendering them incapable of reproduction.

Dispersal: Spreading of effluent over and into the final receiving environment.

Distribution: The process of conveying wastewater or effluent to one or more components or devices.

Drip Dispersal: Application of effluent over an infiltrative surface via pressurized emitters and associated devices and parts (pump, filters, controls, and piping).

Effluent: Treated wastewater that flows out of the system.

EnviroServer ES System: An advanced wastewater treatment system that employs a hybrid fixed-film, suspended growth, extended aeration process (MBBR) that utilizes a two-stage biological process to optimize nitrification and denitrification.

ES (Extended Storage): The extended amount of storage volume of the EnviroServer CS Series.

Influent: Wastewater flowing into the system.

FOG (fats, oils, and grease): Constituent of sewage typically originating from foodstuffs (animal fats or vegetable oils) or consisting of compounds of alcohol or glycerol with fatty acids (soaps and lotions), typically measured in mg/L.

MBBR (Moving Bed Biological Reactor): A type of wastewater treatment process that consists of an aeration tank (like an activated sludge tank) with special plastic carriers that provide a surface where a bio-film can grow. To achieve higher concentration of biomass in the bioreactors, hybrid MBBR systems (like the EnviroServer) are used where suspended and attached biomass co-exist, contributing both to biological processes.

Normally Closed (NC): An alarm circuit that will not report an alarm when the circuit is closed; opening of the circuit (e.g. disconnecting wire, an open float or pressure switch) creates an alarm.

Normally Open (NO): An alarm circuit that will not report an alarm when the circuit is open; closure of the circuit (e.g., a jumper, a closed float or pressure switch) creates an alarm.

Recirculation Pump: A pump used to return sludge and nitrified water from the final clarifier to the primary clarifier. The EnviroServer uses an air-actuated pump as its standard or an optional mechanical recirculation pump.

Telemetry System: A system that remotely monitors the process by delivering alarm signals to a remote Internet server.

Nitrogen (N): Essential chemical element and nutrient for all life forms; molecular formula (N_2), constitutes 78 percent of the atmosphere by volume; nitrogen is present in surface water and groundwater as ammonia (NH_3), nitrite (NO_2^-), nitrate (NO_3^-), and organic nitrogen; excess levels of nitrogen in marine areas may contribute to eutrophication.

Nitrogen, ammonia (NH_3): Non-ionized form of reduced nitrogen. Nitrogen, ammonium (NH_4^+): ionized form of reduced nitrogen usable by plants.

Nitrogen, Kjeldahl: Combination of ammonia nitrogen (NH_3) and organic nitrogen in a wastewater sample; total Kjeldahl nitrogen is operationally defined by a method that involves digestion of a sample followed by distillation and determination of ammonia (NH_3) in the distillate; see also nitrogen, ammonia; nitrogen, organic; and nitrogen, total Kjeldahl (TKN).

Nitrogen, nitrate (NO_3^-): Stable oxidized form of nitrogen; nitrifying bacteria can convert nitrite (NO_2^-) to nitrate (NO_3^-) in the nitrogen cycle.

Nitrogen, nitrite (NO_2^-): Unstable oxidized form of nitrogen.

Nitrogen, organic: Nitrogen bound in plant and animal matter, primarily amino acids and proteins; the amount of organic Nitrogen can be obtained by separately measuring the ammonia nitrogen and subtracting that value from the total Kjeldahl nitrogen.

Nitrogen, total: Measure of the complete nitrogen content in wastewater including nitrate (NO_3^-), nitrite (NO_2^-), ammonia (NH_3), ammonium (NH_4^+), and organic nitrogen, expressed as mg/L of N; all these forms of nitrogen, (as well as nitrogen gas [N_2]), can be biochemically converted from one form to another and are constituents of the nitrogen cycle.

Nitrogen, total Kjeldahl (TKN): Measure of the total concentration of organic nitrogen, ammonia, and ammonium nitrogen.

TSS (Total Suspended Solids): The quantity of solids, which can be readily removed from a well-mixed sample with standard laboratory filtering procedures. TSS is measured to indicate the strength of wastewater and/or the effectiveness of treatment.

Toxic event: Sudden introduction of a substance or substances that impair or destroy biological activity within a wastewater treatment process.

Wastewater: The spent or used water of a structure containing dissolved and suspended matter.

Wastewater, commercial: Non-toxic, non-hazardous wastewater from commercial establishments, including but not limited to commercial food preparation operations, that is similar in composition to domestic wastewater, but which may have one or more of its constituents exceed typical domestic ranges.

Wastewater, domestic: Water or liquid carried waste from plumbing fixtures, appliances, and devices such as toilets, bath, laundry, and dishwashers. Wastewater, high-strength influent having BOD greater than 300 mg/L and/or TSS greater than 350 mg/L and/or fats, oils, and grease greater than 50 mg/L.

Wastewater, residential strength: Wastewater generated from a household that is not being used as a home business, in-home health care facility, beauty shop, taxidermy shop, or any other use that would be considered commercial use. Typical residential strength waste has a strength of 100-300 mg/L of BOD and a TSS of 100-350 mg/L and fats, oils, and grease less than or equal to 25 mg/L.

Wastewater Treatment System, on-site (OWTS): Wastewater treatment system relying on natural processes and/or mechanical components to collect and treat sewage from one or more dwellings, buildings, or structures and disperse the resulting effluent on property owned by the individual or entity.

What is the MicroSepTec EnviroServer CS System?

The EnviroServer CS (Commercial Strength) Series is a pre-engineered, prefabricated MBBR on-site wastewater treatment system that is typically used in areas where sewer is not available and septic systems are not permissible due to environmental concerns. The system uses an accelerated natural biological process for wastewater treatment in a single tank design without employing any chemical or biological additives. The EnviroServer CS Series is engineered for dependability and proven reliability. It uses a heavy-duty fiberglass tank, which is the preferred method of storage for volatile fluids like gas and oil, and it employs industrial compressors and pumps (when needed) that function reliably for many years. The system is based on simple "plug and play" concepts to allow for quick installation and maintenance, with a minimum of moving parts.

The EnviroServer was the first small package MBBR product available in a self contained single tank, later re-engineered for the commercial market to handle the higher organic loading of commercial facilities. As a result, it requires minimal excavation which reduces installation costs and it can be installed in lots with space constraints. The tank leaves a very small footprint, which can be camouflaged with flagstone, fake rocks, etc. While maintaining easy access for future maintenance of the system. There are no large, unsightly boxes or lids visible in the landscape. The tank can also be installed in traffic-rated situations with minimal special requirements.

Because the air supply (compressors or regenerative blowers) are the only moving part, minimal upkeep is required. Routine maintenance and inspections are mandatory to meet warranty requirements. Regulatory agencies may have additional requirements above the minimum required by MicroSepTec. Typically, maintenance is performed on the EnviroServer in about an hour, keeping operational costs low. MicroSepTec trained and authorized personnel must complete the installation, startup, inspections, service, and maintenance of the EnviroServer unit.

Optional equipment includes mechanical recirculation pump, ultra-violet disinfection, and telemetry. The system can be configured to meet the needs of each specific site, including discharge pump(s), depending on the options required and the location of the components.

Major Components

Aeration Diffusers: The two membrane air diffusers are in the bottom of the second and third compartments and are supplied air from external air compressors. The diffusers transfer dissolved oxygen to the chamber and agitate the biomedica and suspended solids for rapid bacterial digestion of organic matter.

Alarm Control Panel: The EnviroServer is equipped with a series of alarms. These alarms are:

High-Level Alarm: Triggers when the water level in the effluent chamber is too high. The local indicator is the High-Level Alarm light and an audible alarm. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

Low Air Alarm: Triggers when there is a loss of air pressure. The local indicator is the Low Air Alarm light and an audible alarm. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

UV Alarm (optional): Triggers when there is a UV lamp failure and/or when the lamp is not transferring enough ultraviolet radiation to be effective and needs to be replaced. The local indicator is the UV Alarm light and an audible alarm. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

Power Failure: Is indicated when the green light on the front of the panel is not illuminated.

Spare Alarm: Is triggered when the spare alarm contact is open. The local indicator is both the high-level and low air lights, together, and audible alarm active. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

Remote Alarm Input: The system has a remote alarm input that allows alarms (120V input) from a remote panel to connect through the EnviroServer Panel. This Interface has no local alarms and only sends a signal to the optional telemetry unit.

Communication Failure (with telemetry option): No local notifications. Will have blinking lights on the telemetry board inside the panel and will notify the service provider of the failure once this condition occurs.

Biomedica: Plastic media used in the MBBR to help promote the attachment and growth of bio-films and high biologically active organisms that are used to treat wastewater.

High-Level Float: Activates an audible alarm and the red light on the front of the panel. If equipped with telemetry remote notification, an alert will be sent to the service provider.

Peak Float (included with discharge pump control panels): Activates the discharge pump(s) regardless of timer settings. If duplex discharge pumps are required, this float operates the second pump rather than overriding the timer on the first pump. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

On/Off (timer enable) (included with discharge pump control panels): Activates the pump in a demand-dose application or enables the timer in a time-dose application.

Redundant Off (optional with discharge pump control panels): Deactivates discharge pumps when the water level is too low to prevent the pump from running dry and activates an audible alarm. If equipped with telemetry remote notification, an alert will be sent to the service provider.

Compressors: Air compressors provide air to the diffusers and the airlift recirculation pump. The ES6 uses one compressor and both the ES12 and ES25 use two compressors. Since airflow is the key to the proper function of the system, the compressors run continuously.

Discharge Pump (optional): A discharge pump is used when gravity flow from the system is not adequate. These pumps are powered through a PLC controlled by the Alarm Control Panel and floats.

Recirculation:

Solenoid Controlled Airlift Pump (optional): This pump resides in the fourth compartment; it recirculates water and biomass back to the first compartment. The pump has no moving parts and uses air to lift the water and siphon it through piping back to the first chamber. The rate of recirculation is controlled by a solenoid valve that controls the volume of air provided to the pump and is controlled by a timer in the control panel to recirculate 8-10% of the system capacity per hour. The solenoid timer should be adjusted at service intervals depending on actual system loading.

Mechanical Recirculation Pump (MRP) (optional): The Mechanical recirculation pump can be used instead of the airlift pump. It is installed in the fourth compartment and recirculates water and biomass back to the first compartment. This pump is controlled by a timer that is included in the control panel to recirculate 8-10% of the system capacity per hour. The MRP timer should be adjusted at service intervals depending on actual system loading.

Pressure Switches: The EnviroServer is equipped with one or two pressure switches that monitor the air pressure from the compressors to the air diffusers and airlift pump. The pressure switches are mounted in a junction box in or near the third riser of the tank.

Silent/Test Selector: This switch is mounted on the exterior of the controller door and is used to test all alarms and silence an audible alarm. Moving the switch to the 'Test' position will turn on the audible alarm and alarm lights. Moving the switch to the 'Silent' position will turn off the audible alarm when buzzing.

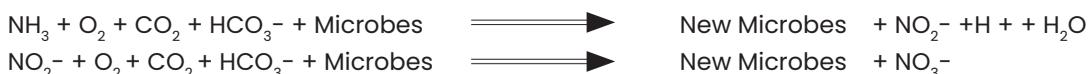
Telemetry (optional): The telemetry system monitors all alarm conditions in addition to system power outages. If any alarm condition continues for a period, the telemetry system will contact the remote monitoring computer. The remote computer will log the alarms and alert the service provider with text and email messages.

UV disinfection (optional): UV disinfection is a physical process that instantaneously neutralizes microorganisms as they pass by ultraviolet lamps submerged in the effluent.

Scientific and Engineering Principles

The design of the EnviroServer ES Model is based on well-known engineering principles in the wastewater field applied in a new way. The system can be described as a hybrid fixed-film, suspended growth, extended aeration wastewater treatment system with a two-stage biological process to optimize de-nitrification. This system is also referred to as a Moving Bed Biological Reactor (MBBR). The treatment portion of the ES Model is the same as the patented¹ and certified² EnviroServer SM Model. The ES Model is equipped with a larger Primary Clarifier Compartment for Extended Storage (ES) of sludge in lieu of the Thermal Processor for Solids Management (SM), which is part of the SM Model.

The EnviroServer ES removes nitrogen using biological processes; specifically, ammonification followed by nitrification and de-nitrification. In ammonification, organic nitrogen (proteins and peptides) is decomposed to ammonia or ammonium ions. About 80% of the ammonification takes place in the sewer lines before the wastewater enters the EnviroServer and the balance is ammonified in the first compartment. The ammonification is followed by nitrification. In nitrification, ammonia is removed biologically by a two-step process in which the ammonia is oxidized to nitrite and then the nitrite is oxidized to nitrate according to the following formulas^(3, 8, 13).



The nitrification is affected by temperature, pH, dissolved oxygen (DO), alkalinity, contact time, and mean cell residence time^(4, 6, 13). Influent pH ranges between 7.5-8.0 are required for de-nitrification. The temperature and pH are not specifically controlled in the EnviroServer. The temperature is normally kept between 70 and 90°F by the microbial activity and some added heat from the air compressor(s). The pH is typically between 7.0 and 8.5 in the EnviroServer, since no chemicals are added to any of the compartments. In the EnviroServer, under normal operations, both the temperature and the pH fall well within the optimum range for nitrification.

Air is continuously supplied to the two aerobic compartments in the tank to keep the dissolved oxygen above 3 mg/l. The conversion of ammonia to nitrates requires 4.57 kg of oxygen per kg of ammonia converted (^{12, 15, 16}). Furthermore, it requires about 7 mg of carbonate alkalinity per mg of ammonia nitrogen (⁸). The alkalinity concentration in the tap water is typically enough to convert all the ammonia to nitrates, but in some cases, an alkalinity source must be added.

Nitrate formed during nitrification is removed by heterotrophic organisms under anaerobic conditions by converting it to gaseous nitrogen species through de-nitrification (^{13, 15, and 16}). In this process, nitrate is first reduced to nitrite and then to nitric oxide (NO), followed by nitrous oxide (N₂O), and nitrogen gas (N₂). This process requires a carbon source. In the EnviroServer, the wastewater exiting the two-stage aerobic section is high in nitrates and low in carbon. It is recirculated back to the first anaerobic compartment where it mixes with the raw wastewater, which is high in carbon. De-nitrification requires 5-6 mg of BOD per mg of Nitrate-Nitrogen removed, and it produces about 3 mg of carbonate alkalinity per mg of Nitrate-Nitrogen removed.

The biodegradable organic carbon that causes CBOD is converted to carbon dioxide and settleable biomass by heterotrophic organisms¹³. These microorganisms require oxygen. The process is referred to as aerobic digestion and can be expressed by the following equation (^{7, 12}).



The aerobic digestion takes place in the second compartment of the EnviroServer. The EnviroServer utilizes a combination of an attached and suspended growth process. The attached film is growing on a biomedica and the suspended growth is created by mixing and recirculation of sludge. This combination results in a treatment efficiency that exceeds the individual performance of either an attached or suspended growth process. The aerobic digestion of organic matter is mainly affected by dissolved oxygen, pH, temperature, mixing, and solids retention time. The design of the EnviroServer optimizes these parameters for maximum CBOD₅ and nitrogen removal (^{5, 6, 7, 10}).

The fourth compartment is the clarifier where final settling of suspended solids and clarification of the effluent takes place. The settled solids are then recirculated back to the first compartment. The fourth compartment is followed by an effluent storage compartment which can be equipped with an optional gravity flow UV disinfection unit and/or an effluent pump. UV disinfection is recommended for shallow dispersal fields, such as drip dispersal.

The tank design is optimized, so no additional chemicals are required, with respect to the following parameters: wastewater flow rate, sludge settling rate, sludge removal, surface area, tank depth, overflow rate, inlet device, and tank configuration (⁹).

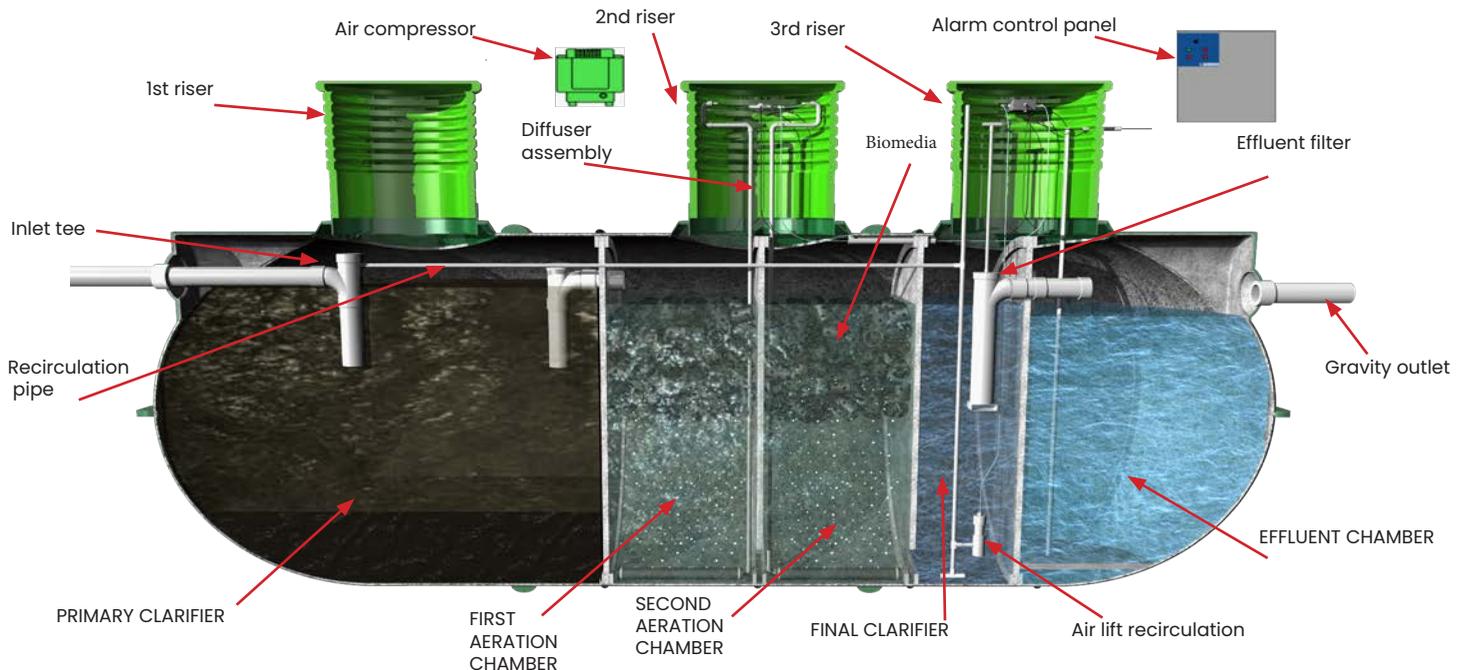
Treated Effluent Quality

Parameter	EnviroServer CS Series Average Effluent ¹	EnviroServer CS(N) Average effluent ¹
BOD ₅ (mg/L)	<100	<180
TSS (mg/L)	<100	<180
PH	6-9	6.2-7.9
TN (mg/L) ²	10-20% reduction	50% reduction

Note: ¹Effluent wastewater is a measurement of CBOD₅ ²Results from independent third party testing.

When treating Wastewater, commercial high-strength: Non-toxic, non-hazardous wastewater from commercial establishments, including but not limited to commercial food preparation operations, that is similar in composition to domestic wastewater, but which may have one or more of its constituents exceed typical domestic ranges. Influent having BOD greater than 300 mg/L and/or TSS greater than 350 mg/L and/or fats, oils, and grease greater than 50 mg/L, but not to exceed the influent design parameters per MicroSepTec design criteria for standard and custom models. Reductions in the BOD₅ and suspended solids (TSS) effluent concentrations will be attained within weeks of commissioning and should be consistently achieved over the lifetime of the EnviroServer with proper maintenance and service.

EnviroServer Process



Stage 1 – Primary Clarification

The figure above shows a process flow diagram of the EnviroServer ES Model. Wastewater influent from the house is gravity fed into the first compartment (Primary Clarifier) of the system. In the first compartment, settling of the sludge and solids occurs. The primary clarified wastewater flows into the second compartment of the system (First Aeration Chamber) 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. The diffuser assembly is custom-designed to ensure maximum oxygen transfer and optimum mixing of dissolved substrates and oxygen. Furthermore, the mixing ensures the solids remain suspended within the reactor and the biomedium 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 CBOD₅ test.)

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

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 Chamber) 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.

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) of the system where clarification and settling of suspended solids occurs.

Stage 5 – Nitrate Removal

To promote denitrification, the wastewater is recirculated from the final clarifier back to the primary clarifier, which contains enough carbon to promote de-nitrification. De-nitrification 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 if 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, thereby making 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 pumping is required as needed.

Stage 7 – Effluent Filtration and Disinfection (optional)

The clarified water leaves the treatment compartments through an effluent filter into the final storage compartment (Effluent Chamber). The effluent filter protects the effluent chamber 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 sterilize 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 discharge.

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

For the system to perform as intended, the EnviroServer must be properly installed and maintained by a MicroSepTec Authorized service provider. The EnviroServer ES6, ES12, and ES25 are designed to process up to 600, 1,200, and 2,500 GPD (gallons per day), respectively, of residential strength wastewater. 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% of daily design flow per minute for more than four continuous hours in a 24 hour period, 12% of daily design flow per hour for more than six continuous hours in a 24 hour period, and 72% of daily design flow for eight continuous hours in a 24 hour period will increase the likelihood of poor performance of the system and should, therefore, be avoided.

Note: The CS Series is designed site by site to treat commercial waste water that normally has greater influent strength than typical residential influent strength wastewater. Influent qualities higher than the designed influent parameters will decrease the treatment capacity.

Note: Certain activities in the facility will change the characteristics of the influent. If the use in the facility changes especially cleaning chemicals, type of food served by the establishment, hours of operation or water usage the treatment quality of the EnviroServer CS series may be adversely affected. Please notify the service provider and/or MicroSepTec to determine if adjustments need to be made to the EnviroServer in order to continue to meet effluent standards.

Extended Periods of Non-Use

The EnviroServer went through testing protocols under several stress conditions and was effective at continuously meeting effluent standards under these stress conditions. However, like most biological treatment units if there is an extended period of non-use the biological activity in the EnviroServer could diminish in effectiveness.

If the EnviroServer System is used intermittently no special actions are required if the power is on and the system continues to operate.

In a system that will have an extended period (longer than 30 days) of non-use the EnviroServer may experience a lag in effluent quality that will correct itself within days of being returned to use and reintroduction of biological activity to the system. During these extended periods of non-use, it is recommended to consult with the Authorized Service Provider. They may decide to deactivate certain components (discharge pumps, optional UV Light, and compressors) and to reactivate immediately upon returning the system to use.

NOTE: During extended periods of non-use DO NOT turn off the Alarm Control Panel power as this will deactivate any alarm conditions that could be sent through the optional Telemetry unit to the Authorized Service Provider.

Water Conservation

The EnviroServer CS series is designed for a specific hydraulic and organic load based on design parameters submitted to MicroSepTec. Conserving water will reduce hydraulic loading of the system and disposal field, however, the EnviroServer system is a biological process that needs wastewater to perform as designed. Although water conservation helps the efficiency of the EnviroServer system, extreme water conservation may adversely affect the performance of the system. The EnviroServer should not be used with Grey-water systems or systems that separate the wastewater from the facility.

- ◊ Turn off the water when it isn't needed (e.g., when washing food, dishes, hands; brushing teeth, etc.).
- ◊ Wipe dishes in the trash prior to washing.
- ◊ Take shorter showers. When bathing, don't fill the tub all the way.
- ◊ Use water-saving devices including faucets, shower heads, washing machines, dishwashers, and toilets.
- ◊ Only run washing machines and dishwashers with full loads.
- ◊ Spread out laundry chores throughout the week, rather than multiple loads in a day.
- ◊ Repair any leaking fixtures. A leaky toilet can waste as much as 2,000 gallons per day!!

Do Not Flush

The EnviroServer employs a natural biological process. As such, it is critical that certain items not be introduced to the system. Cleaning supplies should be used in a proper dilution as to not adversely affect the operation of the biological process. The items below constitute a representative example of items that should never be poured down a drain or flushed down a toilet. These items can overtax or destroy the natural 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.

- ◊ Toxic chemicals such as paints, varnishes, thinners, waste oils, photographic solutions, pesticides, herbicides, fertilizers, acids, and bleaches
- ◊ Gasoline in any form
- ◊ Fat, greases, and oils, including cooking refuse and large amounts of bath salts/oils
- ◊ Food by-products including coffee grounds, tea bags, fruit seeds, gum, eggshells, etc.
- ◊ Cigarette butts
- ◊ Kitty litter
- ◊ Paper products including non-septic-safe toilet paper, paper towels, facial tissues, disposable diapers, feminine hygiene products, flushable wipes, gauze bandages, etc.
- ◊ Condoms
- ◊ Dental floss, hair, or lint (including from dryer and/or washing machine)
- ◊ Construction debris
- ◊ Cleaning supplies including disinfectants, detergents, rug cleaners, polishing wax, bleaches, etc.
- ◊ Septic additive products
- ◊ Prescription medicines including, but not limited to, antibiotics and chemotherapy
- ◊ Water softener back-flush

NOTE: Garbage disposals are not recommended with the Enviroserver system and should not be used with any septic system because they increase the organic loading to the system.

References

1. Shades, R.C., et al, "Waste Treatment Device and Method Employing the Same", Patent 5,958,252, Patent 6,048,452, Patent 6,139,744
2. NSF/ANSI Standard 40 Certification
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MATERIALS SUPPLIED BY MICROSEPTec

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

BASE ASSEMBLY

- ◇ Fiberglass tank assembly
- ◇ Three Access man-ways with lids
- ◇ Air Diffuser Assembly
- ◇ Recirculation Pump Assembly
- ◇ Effluent Filter
- ◇ Tank Plumbing
- ◇ Biomedia

AIR SUPPLY ASSEMBLY

- ◇ Air Compressor(s) or regenerative blowers
- ◇ Air Supply fittings
- ◇ Air Lines
- ◇ Compressor pressures switches

CONTROL CONFIGURATION

- ◇ Alarm Control Panel
 - ◇ Audible and visual alarm for high water level
 - ◇ Audible and visual alarm for low air pressure
 - ◇ Audible and visual alarm for optional UV light failure
 - ◇ Timer controls for optional discharge pump & recirculation control
 - ◇ Remote notification from separate control panel
- ◇ Floats (number depends on system configuration)
- ◇ Junction Box for recirculation control and wiring
- ◇ Electrical Fittings

FRAGILE COMPONENTS

These assemblies must be handled carefully to ensure that breakage does not occur.

- ◇ Air Compressor Assembly
- ◇ Controller
- ◇ Optional UV Assembly

OPTIONS

- ◇ Timed recirculation
- ◇ UV Disinfection
- ◇ Discharge pump controls
- ◇ Telemetry

ORDERING REPLACEMENT PARTS

Replacement parts are available from your local MicroSepTec distributor.

Regenerative Blower Location

- ◇ Blowers should be located in a well-ventilated, shady, and accessible place. An indoor location like a shed or garage is ideal. Access should be made available for service if located in a shed or garage.
- ◇ Elevated off the ground so surface water cannot enter the electrical terminals of the compressor.
- ◇ Located as close to the tank as possible; do not exceed 50' distance from tank.
- ◇ Plumbing from compressor enters the middle riser
- ◇ The airline from the compressor to the Air Supply Inlet pipe must fall toward the tank with no low points.
- ◇ 1 1/2" Scheduled 80 PVC pipe is required for plumbing the blower to the middle riser

Alarm Control Panel



Alarms

If you see any red lights on the door of the alarm control panel, please call your service provider immediately.

If you need to silence the alarms, simply turn the selector switch to silence and let it return to normal.

List of possible alarms

High-Level Alarm: Triggers when the water level in the effluent chamber is too high. The local indicator is the High-Level Alarm light and an audible alarm. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

Low Air Alarm: Triggers when there is a loss of air pressure. The local indicator is the Low Air Alarm light and an audible alarm. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

UV Alarm (optional): Triggers when there is a UV lamp failure and/or when the lamp is not transferring enough ultraviolet radiation to be effective and needs to be replaced. The local indicator is the UV Alarm light and an audible alarm. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

Power Failure: Indicated when the green light on the front of the panel is not illuminated.

Spare Alarm: Triggered when the spare alarm contact is open. The local indicator is both the high-level and low air lights, together, and audible alarm active. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

Remote Alarm Input: The system has a remote alarm input that allows alarms (120V input) from a remote panel to connect through the EnviroServer Panel. This Interface has no local alarms and only sends a signal to the optional telemetry unit.

Communication Failure (With Telemetry option): No exterior local notifications. The system will notify the service provider of the failure once this condition occurs.

Floats

High-Level Float: Activates an audible alarm and the red light on the front of the panel. If equipped with telemetry remote notification, an alert will be sent to the service provider.

Peak Float (included with discharge pump control panels): Activates the discharge pump(s) regardless of timer settings. If duplex discharge pumps are required, this float operates the second pump rather than overriding the timer on the first pump. If the system contains a telemetry monitoring system, the service provider will automatically be notified when the condition occurs.

On/Off (timer enable) (included with discharge pump control panels): Activates the pump in a demand-dose application or enables the timer in a time-dose application.

Redundant Off (optional with discharge pump control panels): Deactivates discharge pumps when the water level is too low to prevent the pump from running dry and activates an audible alarm. If equipped with telemetry remote notification, an alert will be sent to the service provider.

Maintenance Policy

NOTE: There are no user-serviceable parts on the EnviroServer System. All service must be performed by MicroSepTec Authorized Personnel.

All MicroSepTec systems must be covered by an on-site parts and labor maintenance agreement with a local MicroSepTec Authorized Service Provider.

This maintenance agreement should provide:

- ◊ Response with-in 24 hours of alarm conditions and emergency system problems.
- ◊ Periodic on-site service inspections by MicroSepTec Authorized Service Technicians.
- ◊ Any required reporting to local regulatory agencies, in accordance to the permit

Recommended Maintenance

The following is a list of recommended maintenance items during the initial two years of operation to ensure the high quality of treatment in the EnviroServer CS Series system. After the initial two years of maintenance, the Authorized Service Provider should recommend maintenance frequency based on usage. Ongoing maintenance is recommended after the initial two year warranty period, and in some areas may be required by local regulations.

Item	Frequency	Maintenance
Air Compressor	3-Month or as required	Inspect and clean filter. Rebuild as needed
Air Compressor	6- Month or as needed	Replace filter
Sludge/Scum Level 1st Compartment	3-Month or as required	Inspect and pump as needed
Sludge/Scum Level 4th Compartment	3-Month or as required	Inspect and pump as needed
Airlift Recirculation Pump	3-Month or as required	Inspect and clean if needed
Effluent Filter	3-Month or as required	Inspect and clean if needed
Controller & Sensors	3-Month or as required	Inspect and test
Discharge Pump (option)	3-Month or as required	Inspect and clean
UV Disinfection (option)	3-Month or as required	Inspect and Clean. Replace bulb every 2 years, even if still working, or as needed.
Diffusers	3-Month or as required	Inspect and clean

Monitoring Agreement (optional)

It is preferred that the system have the telemetry option installed and in some jurisdictions it is required. MicroSepTec offers remote monitoring of the EnviroServer for an annual fee. This system will automatically alert the authorized service provider of any equipment malfunctions.

NOTE: The MicroSepTec Tank delivery form, Installation Sign-Off Form and/or Start-Up Form must be completed upon installation, start-up of the system, and submitted to MicroSepTec to initiate manufacturer's warranty. These forms verify that the system was installed according to manufactures recommendations, that the system was started properly, and according to manufactures recommendations. It is highly recommended that copies of these forms are accompanied with pictures of major components installation to ease the warranty submission process as proof of correct installation, should there ever be a need for warranty claims. A copy of these forms is shipped with each system or can be obtained from your local EnviroServer Distributor or by contacting MicroSepTec.

Additionally, inspections must be completed bi-annually, and inspection forms submitted to MicroSepTec for the initial two years of service in order to continue validation of warranty. Ongoing maintenance is recommended after the initial two year warranty period and in some areas may be required by local regulations. The frequency of maintenance needed should be established by your service provider, be determined according to system use, the components of the system, and local jurisdictional code.

Limited Warranty

MicroSepTec EnviroServer CS Series

What is covered: MST Manufacturing, Inc. ("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. In order to activate warranty the Tank Installation Sign-Off Form and Startup Form must be submitted to MST.

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 warranted specifying the nature of the defect.

What this warranty does not cover: This warranty covers only normal commercial, non industrial, non-toxic 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 CS Series 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 on-site system because they can overtax or destroy the biological digestion or clog pumps and pipes and constitute misuse and/or abuse of the system: water softeners; excessive amounts of fat, grease or oil; coffee grounds; disposable diapers; feminine hygiene products; condoms; cigarette butts; gauze or adhesive bandages; cotton swabs; 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 right 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.

THIS WARRANTY AND REMEDY PROVIDED ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND, UNLESS STATED HEREIN, ANY STATEMENTS OR REPRESENTATIONS MADE BY ANY OTHER PERSON OR FIRM ARE VOID. THE DURATION OF ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON YOUR ENVIROSERVER SYSTEM SHALL BE LIMITED TO THE DURATION OF THE EXPRESS WARRANTY SET FORTH ABOVE. EXCEPT AS PROVIDED IN THIS WRITTEN WARRANTY, NEITHER MICROSEPTec NOR ITS AFFILIATES SHALL BE LIABLE FOR ANY LOSS, INCONVENIENCE, OR DAMAGE INCLUDING DIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OR INABILITY TO USE THE ENVIROSERVER, WHETHER RESULTING FROM BREACH OF WARRANTY OR ANY OTHER LEGAL THEORY.