SINGULAIR WASTEWATER TREATMENT SYSTEM MODEL 960 DN
for enhanced nitrogen removal

A. PRODUCT BACKGROUND

The SINGULAIR wastewater treatment system is designed to treat domestic sewage for individual homes, clusters of homes or commercial developments. The system was patented in the late 1970's and received Class 1, Standard 40 certification by the National Sanitation Foundation International. The SINGULAIR is approved in most of the states in the United States and has received nation-wide approvals in many foreign countries. The system was improved over the years with the most advanced model (960 DN) developed for enhanced nitrogen removal.

The SINGULAIR is constructed of 5,000 psi reinforced concrete. The tank is delivered to the project site ready for installation, similar to the septic tank it replaces.

B. PROCESS DESCRIPTION

The SINGULAIR utilizes the extended aeration method of wastewater treatment to achieve the level of treatment demonstrated by the NSFI Certification. The treatment process takes place in the three-compartment precast concrete tank. The first compartment is an anaerobic pretreatment chamber, the second is the aeration chamber and the third is the settling and filtration chamber.

1. Pretreatment Chamber

The first chamber acts as an anaerobic settling area for the incoming wastewater stream. In this chamber the heavy solids settle and the anaerobic decomposition process preconditions the wastewater during its approximately 12 hours of residence. The outlet of the pretreatment camber is equipped with a cast-in-place Tee that extends vertically into the liquid so that only the preconditioned and equalized flow from mid-height in the chamber is displaced into the next compartment. The Tee and the submerged transfer port are sized to handle the peak flows without high velocities that would transfer settled solids. A removable inspection cover is placed at the top of the pretreatment chamber to allow the inspection of the depth of settled solids and the precast Tee.

2. Aeration Chamber

The aeration chamber provides in excess of twenty-four hours of detention time during which the wastewater is aerated. Aeration is performed via the action of the aerator motor and an aspirator shaft which draws the air into the water. A cast-in vent cap in the access riser's cover allows air to flow freely into the chamber. The aeration system is of sufficient size to provide a minimum of 5 cubic meter of air per kilogram of BOD. The aeration

chamber's length-width-depth ratio is designed to ensure uniform mixing for optimal treatment.

3. Final clarification chamber

The clarifier is designed to provide satisfactory settling and clarification for the aerated wastewater. In the inlet zone at the bottom of the chamber all transfer turbulence is dissipated and the liquid is hydraulically displaced in an upward direction. In the mid-zone of the chamber settling takes place and the solids deposit on the slanted sides of the hopper and slide down to the inlet zone where the turbulence returns it to the aeration chamber for further processing. This recirculation of the activated sludge if further enhanced by the Bio- Static sludge return located in the clarification chamber.

The clarified liquid is contained in the final settling zone at the top where it enters the filtration system through the flow equalizer ports.

4. Bio-Kinetic filter

The Bio-Kinetic filter is located totally within the clarification chamber but the flow equalizing ports are within the final settling zone. The filter provides flow equalization, filtration, optional chlorination and dechlorination and final settling to ensure acceptable effluent quality. The assembly consists of the following elements: a micronically woven filter fabric, baffled perimeter settling zone, flow equalization ports, flow deck, level indicator and adjustment lugs, optional chlorine tablet feed tube, contact basin, thirty-seven baffled chamber settling plates, effluent stilling well, discharge weir, optional dechlorination tablet feed tube and the outlet connection.

All components are manufactured with inert synthetic materials or corrosion resistant stainless steel, assembled into the cylindrical filter and connected to a plastic outlet coupling cast into the tank.

The optional chlorine tablet feed tube is totally inside the filter housing making contact with water outside the filter impossible. The incoming clarified liquid makes contact with the lowest tablet in the tube and the tablet slowly dissolves and provides the disinfection necessary during a minimum of twenty minute mixing time. In a similar fashion, the chlorinated liquid contacts the dechlorinating tablet in the second feed tube prior to discharge to remove the residual chlorine in the water.

5. Mechanical aerator

The air and the mixing needed during the treatment process is provided by the aerator. It is installed in the concrete riser at the center of the aeration chamber. The aerator motor is supplied with plated mounting brackets, moisture resistant electrical connector, foam

deflector and a stainless steel aspirator shaft with a plastic aspirator. Only the aspirator and the lower portion of the shaft is in contact with the wastewater. There are no other submerged components such as pumps, motors, bearings or air piping. The motor is a single phase 1/6 HP, 115V, 60 Hz unit operating at 1,720 RPM. Operation time is adjustable but the NSFI certification is with a 50% running time (30 minutes of every hour).

6. Electrical control panel

Aerator controls are mounted in a weather-tight plastic enclosure for protection. Included are: manual reset circuit breaker, on-off-automatic selector switch, adjustable timer mechanism and an audible/visual warning system to report malfunction.

7. DeNitrification Recirculation System

A small pump located within a plastic pipe placed immediately after the Singulair tank re-circulates approximately 12% to 18% of the treated wastewater to the inlet pipe of the first chamber. This process provides the required food source for the completion of the de-nitrification process.

C. CAPACITIES

The SINGULAIR Model 960 DN is available in a number of treatment volume capacities. The various models may be used individually or in parallel format to provide treatment to larger volumes of wastewater.

Model	Capacity	Capacity	Width	Length	Depth
960/N	1.9 M3	500 gal.	168 cm 5'-6"	282 cm 9'-3"	183 cm 6'-0"
960/2.8	2.8 M3	750 gal.	168 cm 5'-6"	282 cm 9'-3"	213 cm 7'-0"
960/3.8	3.8 M3	1,000 gal	168 cm 5'-6"	282 cm 9'-3"	183 cm 6'-0"
960/4.7	4.7 M3	1,250 gal	168 cm 5'-6"	282 cm 9'-3"	213 cm 7'-0"
960/5.7	5.7 M3	1,500 gal	168 cm 5'-6"	282 cm 9'-3"	244 cm 8'-0"

D. CONSTRUCTION INFORMATION

In appearance and from the transportation or setting viewpoint the Singulair is very similar to a standard septic tank. Detailed installation instructions are provided with each purchase and the assistance of Siegmund Environmental Services, Inc. is available at no additional cost.

1. Transportation.

The Singulair is transported to the site on a boom truck. Generally the top and bottom castings are already assembled and sealed, requiring minimum on-site work.

2. Setting.

The Singulair is generally set by the driver of the boom truck into the excavation prepared by the installer of the entire septic system. The excavation must be properly prepared to the right grade: the bottom should be level with a minimum of 6 inches of compacted gravel or crushed stone. The excavation must also be accessible for the boom truck to set the tank.

3. Electricity.

It is the responsibility of the installer to wire the controller and to provide a dedicated 15 amp circuit. Detailed placement instructions and wiring diagram are supplied with each controller.

4. Installation of mechanical components.

The mechanical components (the aerator, filter, and re-circulation pump) are installed by authorized representatives of Siegmund Environmental Services, Inc. after all plumbing and piping is in place and the tank is filled with water. The installation of the equipment is also the start-up procedure as the system is completed and ready to treat the domestic wastewater.

E. OPERATION AND MAINTENANCE

With the purchase of a Singulair the owner is provided with a **2-year** free maintenance and inspection service contract. Service is provided through SESi The visits are in 6 month intervals unless local or state requirements dictate otherwise. Continuation of the service contract is available at a yearly fee.