

## AQUAROBIC MINI-PLANT™

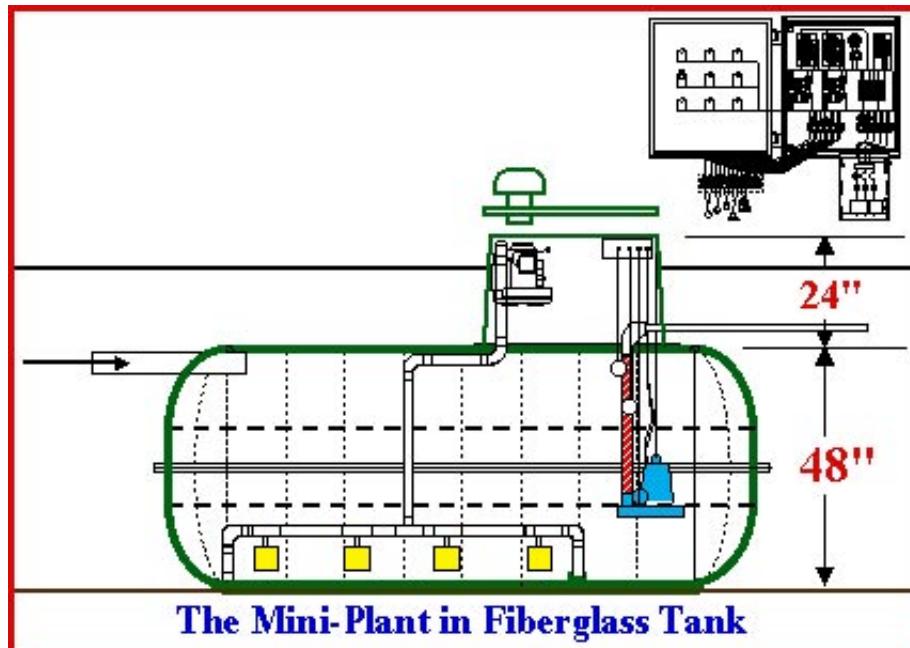
### Process Description

The **Mini-Plant™** is a Sequential Batch Reactor (SBR) system, controlled by a factory set programmer that regulates aeration, settling, and pump functions. The system discharges a batch of aerobically treated effluent (7 BOD & 11 SS) to the disposal area once a day.

The program is set to aerate for 20 hours, 6:00 A.M until 2 A.M., supplying the wastewater with fine diffused air. Air diffusers create thousands of fine air bubbles supplying oxygen for the aerobic digestion process. At 2:00 A.M. the program turns the compressor off and a 3 hour quiescent settling period follows. During this period, the aeration tank becomes the settling tank and the batch process uses this time to separate the solids from the clear supernatant.

After the **Mini-Plant™**'s 3 hours of perfectly quiescent settling period, the clear supernatant (effluent) is discharged (5:00 A.M. to 6:00 A.M.), and solids are retained.

The **Mini-Plant™** begins the new day's cycle, aerating to further digest the retained organic solids and the incoming wastewater.



# MINI-PLANT™ Components

The **Mini-Plant™** has three main sections; the processing tank with its in tank components, the manway, and the control panel.

## **Processing Tank:**

The processing tank is sized to hold a volume of three (3) times the daily wastewater flow, providing 100% or more overload capacity. The processing tank can be either our own custom manufactured fiberglass tank, or a locally-manufactured one compartment concrete tank.

## **Air Compressor:**

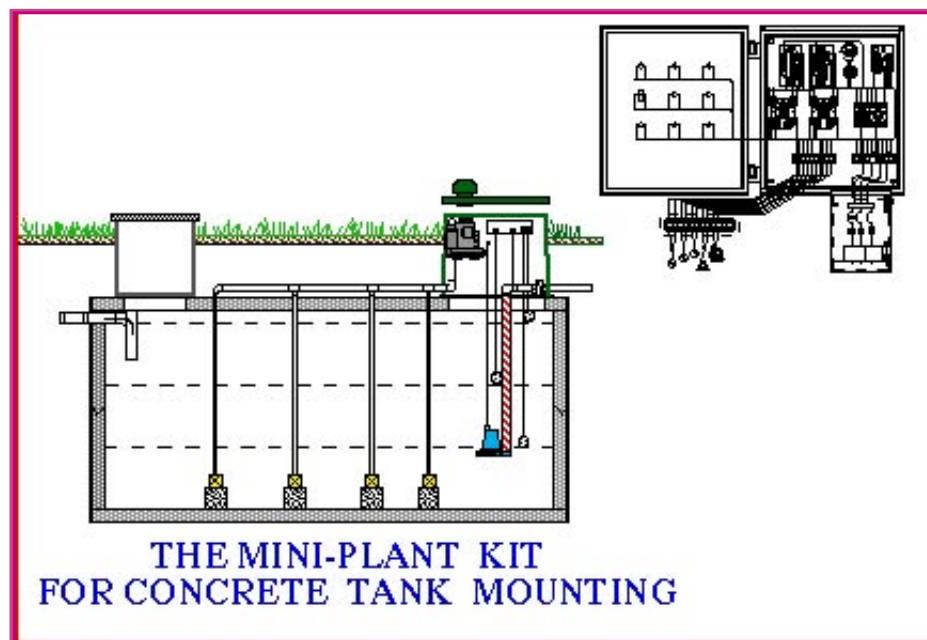
The air compressor is a CSA approved regenair energy efficient ring type that supply's up to 52 cubic feet of air per minute to the diffusers. It operates on 230 volts, 60 Hz., and varies in HP. and amps. depending on size and BOD5 loading requirements of the **Mini-Plant™**. It is wired to the waterproof junction box and piped to the air manifold and diffusers.

## **Effluent Pump:**

The effluent pump is a CSA approved stainless steel with side intake that ranges from 1/2 hp. to 1 1/2 hp., depending on the required volume and total dynamic head of the **Mini-Plant™**'s application.

## **Level Sensors:**

The level sensor float switches with weights are CSA approved. The three sensors regulate the normal pump cycle, the high level alarm, and the emergency pump functions of the **Mini-Plant™**'s operation.



### **Manways:**

The manways are manufactured from heavy fiberglass reinforced polyester with locking access lids. They protect and provide access to the air compressor, effluent pump, electrical junction box, and the mechanical connections. Inside the manway, an energy efficient ring type air compressor is mounted along with a watertight junction box, level sensors, and suspended effluent pump.

### **Control Panel:**

The panel box is both UL and CSA approved type 3 enclosure suitable for outdoor/indoor mounting. It contains contactors, motor starters, program timer, control relays, alarm buzzer, and terminal block. A separate circuit breaker load center panel is mounted onto the bottom of the Aquarobic control panel. The load center panel is UL listed with a main rating 120 / 240 / Vac. 3-wire 125 Amp. With 8 poles, normally with a 20 amp double breaker 240 volts for the blower and pump power, a 15 amp single phase breaker 115 volts for the control circuit and another 15 amp single phase breaker 115 volts for the alarm circuit. 230-volts single-phase supplies line (3 wires with ground # 10 gage.) from the main power source. A control panel schematic guides the qualified serviceman or electrician to trouble shoot any part of the system. A visual, audible, and remote signal is provided to monitor and ensure continuous proper operation.



## Mini-Plant™ Add-on Components

### Spin Clear Filter:

The **Mini-Plant™** uses an API - Spin Clean® filter to further reduce S.S. and BOD on discharging to a filter area. The filter is installed on the 1 1/2" pump line and continually cleans itself when the pump is running. With a 50-micron stainless steel screen filter, approx. 15 % of the discharge is returned to the front of the processing tank. The unique self-cleaning spinning action cleans the stainless steel screen even under the most severe conditions.



### Up-flow filter:

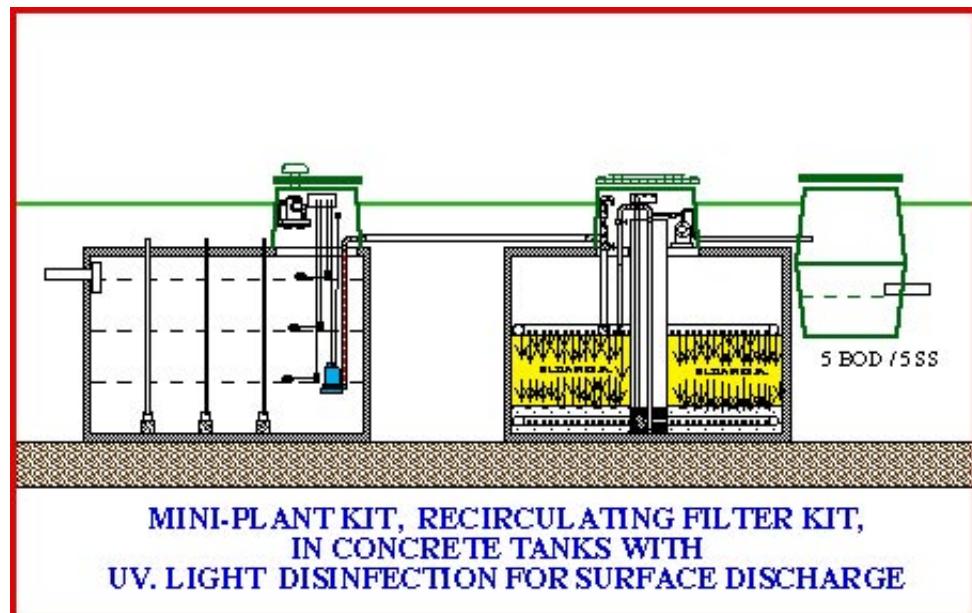
The clear supernatant is pumped down to a perforated manifold at the base of the up-flow filter chamber where it rises slowly through the filter media. At the top of the filter the polished clear liquor then overflows by gravity to the last chamber where the effluent is further treated for nitrogen removal, disinfected using UV light, chlorine, or iodine crystals. The effluent can be recycled back for toilet flushing, lawn watering and other non-potable uses. When the filter cycle ends, the remaining fluid in the up-flow filter is returned to the aeration chamber by the filter backwash pump located in a perforated well tile in the center of the filter media. The rapid return rate flushes back accumulated solids from the filter and as the liquid is removed from the filter media, air re-enters thereby maintaining a healthy aerobic biomass reducing the pollution load from incoming batches.

### Re-circulating filter:

The filter is installed in a separate fiberglass tank or in a "kit" form to install onto a locally built two compartment concrete tank. The effluent from the **Mini-Plant™** is pumped into a 4" distribution manifold at the top of the filter material (1/4" to 1/2" beet or peat gravel). The effluent flows slowly down through the filter media where it is collected by another 4" perforated pipe manifold at the bottom of the filter material and flows to the center 16" PVC re-circulating filter pump well. A pre-determined volume allowance in the center well activates the re-circulating pump switch, which starts to pump the liquid around and back into the top 4" perforated manifold for continuous filtering. The filter tank is designed to hold the daily wastewater flow from the **Mini-Plant™**, in the empty space above the filter, and in the filter media.

### **UV Light Disinfection:**

The UV light is always "on" intensifying the bacterial kill. Because the effluent is discharged once per day, treatment time can be extended to further polish the effluent. The re-circulating pump line's restricting valve can be adjusted to create back-pressure on the line forcing some of the re-circulating liquid out through a small pipe that leads to the UV disinfection system. The restriction valve determines the effluent amount circulating in the disinfection area. Depending on the size of the unit, an adjustment to affect the flow of less than one gallon per minute can increase the treatment time and efficiency of the UV.



### **Advantages of the Aquarobic Mini-plant™ Up-flow or Re-circulating Filter Units:**

- Tertiary treatment producing high quality effluent. (Less than 5 BOD<sub>5</sub> and 5 Suspended Solids (SS.)
- The entire operation is automatically programmed for the specified hydraulic flow pattern of each application.

