



***ULTRACLEAR***<sup>®</sup>  
*AEROBIC TREATMENT UNIT*

***UC DESIGN MANUAL***

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# **DELTA ENVIRONMENTAL PRODUCTS, INC. ULTRA CLEAR® HOME AEROBIC TREATMENT UNITS**

Delta Environmental Products, Inc., Ultra Clear® Home Aerobic Treatment Units (ATU) are designed for on-site disposal of domestic wastewater. The unit can achieve tertiary quality effluent with total removal efficiencies of 96 to 97 percent of the impurities in the original wastewater. The unit will enhance any type of disposal method used in an on-site disposal system. Delta's Ultra Clear® Aerobic Treatment Unit is used in direct surface discharge, spray irrigation, leaching chamber systems, mound systems, low pressure pipe systems, drip emitter systems, conventional drain fields, or a combination of these. With the enhanced water quality, any one of the above disposal means will function better and longer. For poorer soils, smaller lots, high water tables, and recreational areas, on-site disposal can be achieved effectively and economically.

Most septic tank failures are due to heavy BOD discharge into the soil which causes biological growth to form thus clogging the soil significantly. High OD reduction can only be achieved in advanced secondary processes. Delta Environmental Products, Inc., Ultra Clear® Home ATU is an advanced secondary process. New types of disposal systems are being designed primarily to distribute the effluent evenly in the disposal field, but without considering the effluent quality these systems may not achieve the desired results.

There is growing concern over ground water contamination, Delta's Ultra Clear® Aerobic Treatment Unit can destroy up to 90% of virus, (99% with disinfection) and discharge nitrates less than 10 mg/l.

Delta's ATU is an effective and economical solution for the growing need of on-site disposal systems.

Contact Delta Environmental Products, Inc., for your local distributor.

## PROCESS DESCRIPTION

The Delta Environmental Products, Inc. Ultra Clear® Home Aerobic Treatment Unit utilizes the activated sludge and extended aeration methods of biological waste reduction.

The activated sludge process is a continuous flow biological treatment process characterized by a suspension of aerobic microorganism maintained in a relatively homogeneous state by the mixing and turbulence induced by aeration. The microorganisms oxidize organic impurities in the raw influent wastewater to carbon dioxide and water in the presence of dissolved oxygen produced by the plant's compressor.

Extended aeration is a modified version of the activated sludge process whereby the waste is maintained under long term aeration of typically 24 hours or more. This process produces the minimum amount of sludge and can handle widely varying hydraulic and biological flows. The operating mixed liquor suspended solids (MLSS) in the aeration zone of the unit rises to a relatively high level of 5,000 to 8,000 mg/l (parts per million). Under these conditions, the organisms are starved and forced to undergo partial auto-oxidation. Volatile compounds are partially driven off during aeration and metals are partially removed and accumulate in the sludge. The sludge is periodically removed from the units.

The extended aeration process is probably the most stable and easily operated of all the aerobic processes. A properly operating plant will not produce the "rotten-egg" odor that is common with septic tank systems. Such systems also produce much cleaner effluent with total removal efficiencies of 96% to 97% of the impurities in the original wastewater.

## **DESCRIPTION OF DELTA ULTRA CLEAR® HOME AEROBIC TREATMENT UNIT**

The Delta Ultra Clear® Home Aerobic Treatment Units contain a conical clarifier supported inside the main tank. The space between the clarifier and the main tank wall is the aeration zone in which the raw influent is mixed with the plant's biology (MLSS) where it rapidly decomposes the impurities. The MLSS is hydraulically displaced into the clarifier from the bottom. Inside the clarifier, the clear treated water separates from the MLSS where clear water rises to the top and exits the treatment plant through the effluent pipe. The sludge residue in the clarifier settles back out through the bottom and is re-mixed in the aeration zone.

Multiple PVC air drop lines are placed along the main tank wall in the aeration zone. Air from the compressor is injected at a minimum rate of 2,100 cubic feet per pound of biological oxygen demand (BOD) in the raw wastewater.

The entire unit is suitable for burial with only the inspection ports, compressor and alarm panel above ground. The units are manufactured in sizes between 400 and 1,500 gallons per day and can be furnished in either fiberglass or concrete versions.

All Delta UC series plants are NSF International tested and approved to conform to ANSI/NSF standard #40, Class 1 effluent requirements.

**SPECIFICATIONS FOR DELTA ENVIRONMENTAL  
PRODUCTS, INC  
ULTRA CLEAR® HOME AEROBIC TREATMENT UNIT**

**MEETING ANSI/NSF INTERNATIONAL STANDARD 40, CLASS 1**

**GENERAL SPECIFICATIONS**

The treatment plant described by these specifications is a Delta Environmental Products, Inc. Model \_\_\_\_\_ FF. The plant shall essentially consist of a fiberglass aeration tank, air diffusion system with blower assembly, and inner circular type conical clarifier. Additional features and accessories are as shown on the Delta Environmental job drawing or drawings and as hereinafter specified and described. Plant shall be ANSI/NSF International, Standard 40, Class 1 approved.

**OPERATING CONDITIONS**

The treatment system shall be capable of treating \_\_\_\_\_ gallons per day average daily flow (ADF) of domestic raw sewage waste with an organic loading of \_\_\_\_\_ pounds of BOD<sub>5</sub>. A minimum of 2100 cubic feet of aeration capacity shall be provided for each pound of BOD<sub>5</sub>.

**CONSTRUCTION**

**Fiberglass Construction**

The treatment plant's main tank shall be constructed of ¼ inch minimum thickness fiberglass. The tank shall be molded of fiberglass reinforced polyester resin manufactured by the lay-up and spray technique to assure that the interior has a smooth resin rich finish.

**Concrete Construction**

The treatment plant's main tank shall be constructed of 3 inch minimum thickness Concrete. The tank shall be constructed of 3500 PSI strength mix. The top bottom and side walls shall be reinforced uniformly and completely with 10 gauge steel wire on 6" centers both ways (6x6x10x10) or fiber mesh reinforcement at a minimum of 1.2 pounds per yard Harborlight or equal.

**Pretreatment Tank (Optional)**

A pretreatment tank shall be provided as shown on the plans to receive the incoming flow. The inlet tank shall be designed to collect large incoming solids. This shall be accomplished by extending the inlet pipe downward below the trash floatable zone and above the settling zone. The discharge pipe shall also be extended downward so as to draw pretreated sewage from the median zone, keeping both floatable and settle-able solids out of the aeration tank.

## **Aeration Tank**

The aeration tank shall be sized to provide a minimum of 24 hour hydraulic detention time at the average daily flow (ADF). Tank design shall be such as to provide efficient mixing and aeration, and to maintain hydraulic velocities sufficient to prevent deposition of solids.

## **Air Diffusion System**

Air diffusion drop pipes of ¾" inch schedule 40 PVC pipe shall supply air to diffusers. Each pipe shall be slotted for proper air diffusion and designed for non-clogging.

## **Clarifier**

The clarifier shall be designed so as to provide optimum liquid-solid separation and shall be sized to provide eight hours hydraulic detention at the ADF rate. The clarifier shall be installed inside the main tank.

## **Chlorinator (Optional)**

An in-line chlorinator shall be included in the treatment system to achieve disinfection by chlorination of the final effluent. The effluent from the treatment plant shall gravity flow through a Delta tablet type chlorinator.

## **Aeration Blower**

Provide one aeration blower system with sufficient capacity to furnish the treatment plant air requirements. The blower(s) shall be capable of delivering a minimum of 2,100 cubic feet per pound of BOD<sub>5</sub> influent at required discharge pressure.

## **Electrical Controls**

An electrical control panel shall be furnished with each compressor that will protect the compressor from overload and failure to start. Included in the panel shall be a pressure switch alarm system that will sound an alarm upon loss of air supply as well as a high water alarm. System shall be ANSI/NSF International certified utilizing UL rated components in an indoor/outdoor NEMA 3R painted steel enclosure.

## **Piping**

All necessary piping and valves inside the plant shall be PVC and be provided by the manufacturer. At the exterior wall of the plant, as shown on the plans, the manufacturer shall provide properly sized inlet and outlet connections. The manufacturer shall not be responsible for piping or valves outside the plant. Contractor or owner shall be responsible for necessary piping and valves between all systems.

## **Workmanship and Experience**

All workmanship and materials shall be of the highest quality. The waste treatment plant shall be the product of an experienced manufacturer actively engaged in manufacturing and research and development of sewage treatment facilities. NSF International test documents shall be available upon request of the Engineer.

## SIZING EXAMPLES

Design flow for residential domestic sewage is normally considered to be 100 gallons per capita per day containing 0.17 pounds of BOD. Some states require sizing based on number of bedrooms and some based on number of people. Check with local and/or state agencies to find out what the actual requirements are. The following examples are reasonable methods for plant sizing:

### **Example 1**

- Select a treatment plant for a four bedroom house with five persons.
- $.17 \text{ pounds BOD/persons day} \times \text{five persons} = .85 \text{ pounds BOD/day}$ .
- A 500-GPD plant can treat 1.25 pounds BOD/day (see chart).

Therefore use a 500 GPD plant.

### **Example 2**

Select a treatment plant for a six bedroom house with four persons. A treatment plant for this house should be designed for expansion of the household to seven persons. Two in one bedroom and one in each of the other five bedrooms.

- $\text{Seven persons} \times 100 \text{ GPD/person} = 700 \text{ GPD}$ .
- $.17 \text{ pounds BOD/persons per day} \times \text{seven persons} = 1.19 \text{ pounds BOD/day}$ .
- A 750 GPD plant can treat 1.88 pounds BOD/day.

Therefore use a 750 GPD plant.

### **Example 3**

Select a treatment plant for a two bedroom house with three people.

- $\text{Three persons} \times 100 \text{ GPD/person} = 300 \text{ GPD}$ .
- $.17 \text{ pounds BOD/person day} \times \text{three persons} = .51 \text{ pounds BOD/day}$ .

A 400 GPD plant can treat 1.0 pounds BOD/day.

Therefore use a 400 GPD plant.

The above are examples of normal domestic sewage plant sizing. Influent from various sources can be converted into equivalent per capita flow for selection of the appropriate size treatment plant.

# CHART 1

## UC SERIES

### Treatment Plants – Sizes/Capacities

<u>Units I.D.* (lbs/day)</u>	<u>Size (GPD)</u>	<u>BOD Treatment Capacity</u>
UC- 50	500	1.25
UC-50A	500	1.25
UC- 60	600	1.50
UC-75	750	1.88
UC- 90	900	2.25
UC-100A	1,000	2.50
UC-120	1,200	3.00
UC-150	1,500	3.75
UC-150A	1,500	3.25

\*For all fiberglass construction add suffix FF

\*For concrete with fiberglass clarifier add suffix CA

# HOMEOWNER CARE AND OPERATION INSTRUCTIONS

The Ultra Clear® System has been designed and built to provide long term, reliable and efficient service. Once the unit has been installed, (see installation instructions), the unit will operate with a minimum amount of attention.

Please reference the system's Data Plates that are located on aerobic tank 24" cover, air pump, and the alarm panel in the event that a problem arises or service is required.

The following should be accomplished as checks for system failure:

Daily: Observe the warning device which comes on when the power to the air pump has been interrupted or when the air supply system has malfunctioned. If the alarm is activated check for a blown fuse or thrown circuit breaker. Check air pump to be sure it is operating. Once accustomed to the soft humming sound of a properly operating unit, any unusual noise is an indication of malfunction. If an unusual noise is detected or total failure is observed, call your local dealer for service.

Weekly: Check the treatment plant for offensive odor. If such a condition should develop, call service.

Every Three

Months: **The air filter on the air pump should be cleaned.** Rinse with warm water if necessary. (See installation instructions). Do not use oil or other solvents.

Note: To keep maintenance to a minimum and ensure high effluent quality, the following items should **NOT** be permitted to enter the system.

## ITEMS NOT PERMITTED IN SYSTEM

- Strong disinfectants or bleaches, other than small amounts normally utilized in day to day cleaning and laundry (be conservative). Laundry detergents recommended for use are low-sudsing, low phosphates and biodegradable, such as Gain, Arm & Hammer, All, Fresh Start, Dash Bright.
- Discharge from water softener.
- Any type of oils, greases, or other chemical wastes.
- Disposable baby diapers and wipes.
- Sanitary napkins, condoms or other similar items.
- Hair, bandages, rags or string.
- Latex, plastic or metallic objects.
- Coffee grounds or cigarette butts.
- Mud or sticks.
- Paper towels, napkins or Kleenex
- Tidy Bowl type products.
- Beer waste or any other rich liquids.
- Garbage disposal should be used sparingly, not as a method of disposing all solid food waste. In order to ensure good plant operation, waste should be disposed of in the garbage container.

**The Ultra Clear<sup>®</sup> System is designed to handle domestic wastewater and nothing else should go into it. For anything other than domestic wastewater contact Delta Environmental Products, Inc.**

## **WARNINGS**

1. The proper operation of this or any other home sewage system depends upon proper organic loading and the life of the microorganisms inside the system. Delta is not responsible for the in-field operation of a system, other than the mechanical and structural workings of the plant itself. We cannot control the amount of harsh chemicals or other harmful substances that may be discharged into the system by the occupants of a household; we can only provide a comprehensive owner's manual that outlines substances that should be kept out of the system.
2. Hydraulic overloading (flows in excess of design flow) may cause the sewage treatment system not to perform to the fullest capabilities.
3. Ants have been shown to be destructive to the air pump. Regular care should be taken to prevent infestation of ants near the system. Damage or destruction by ants is not covered under manufacturer's warranty.
4. Your State or Local Health Department may require other pieces of equipment to function separately or in conjunction with equipment manufactured by Delta Environmental Products, Inc. Delta Environmental Products, Inc. is not responsible for the mechanical or electrical safety of equipment it does manufacture or supply with its aerobic treatment unit. Particular care should be used in evaluating the electrical or mechanical safety of equipment manufactured by others. This may include but not be limited to electrical control panels or air pumps.
5. If electrical service has not been installed for checking air distribution system during installation, and if an extension cord is used to test the air pump, never leave the extension cord plugged in. Remove it after testing is completed.
6. Due to a possible fire hazard, DO NOT plug into service equipment or power pole and DO NOT use extension cords. All electrical work performed by the installer or others must be in accordance with the National Electrical Code and Local Codes.

## **SOLIDS REMOVAL**

The Ultra Clear® Treatment System is designed to provide years of trouble free operation.

Determination of the need for solids removal can be done through a simple test. A one quart sample should be pulled from the aeration tank and can be done so through the 4" sample port. Allow the sample to settle in a clear one quart jar for 30 minutes. If the solids content exceeds 60% of the total volume after settling, the treatment plant should be pumped out. Call your local authorized sewage disposal service to have the tank contents pumped out and disposed of properly.

The method of pumping out should be as follows:

- Remove any floating solids by skimming.
- The air pump must be operating to keep the solids in suspension.
- Plump out two thirds of the tank volume with the suction pipe opening being placed at the tank bottom.

After the pump-out process is complete, fill the tank with fresh water to normal operating level.

Refer to the Installation Instructions to get the treatment plant back into operation.

Should indication of improper operation be observed at any point in time, contact your local distributor.

**NOTE: THE COST ASSOCIATED WITH PUMPING THE TREATMENT SYSTEM IS NOT COVERED UNDER WARRANTY AND IS NOT INCLUDED IN THE SERVICE POLICY.**

## **SEASONAL USE GUIDELINES OF ULTRACLEAR AEROBIC TREATMENT UNIT**

These guidelines are for conditions as outlined below and apply for systems that are not in use for periods of time indicated. Site conditions not covered by the following must be forwarded to Delta for recommended guidelines to meet the particular site conditions.

1. System not in use for more than one month and less than three months. Electrical power is left on and there are no frost conditions.
  - Leave air pump on and system running.
2. System not in use more than three months. Electrical power is turned off and there are not frost conditions.
  - While system is operating with the air pump on, remove all material and liquid from tank.
  - Refill with clean water.
  - Turn off air pump.
3. System not in use more than three months. Electrical power is on and there are not frost conditions.
  - Leave air pump on and system running; **OR**
  - While system is operating with the air pump on, remove all material and liquid from tank.
  - Refill with clean water.
  - Turn off air pump.
4. System not in use. Electrical power is turned off and there are frost conditions.
  - While system is operating with the air pump on, remove all material and liquid from tank.
  - Turn off air pump.
  - If high ground water is present, fill with clean water.
  - If no ground water is present, leave tank empty.

**UNDER NO CIRCUMSTANCES SHOULD THE AIR PUMP BE TURNED OFF FOR MORE THAN A FEW DAYS WITHOUT REMOVING TANK CONTENTS.**

## SAMPLE REQUIREMENTS

A Ultra Clear® Aerobic Treatment Plant properly operated and maintained should provide the following effluent quality of:

Carbonaceous Biochemical Oxygen Demand 5 day average (CBOD <sub>5</sub> ) of	less than 30 mg/1 (or ppm);
Suspended Solids (SS) of	less than 25 mg/1 (or ppm);
Volatile suspended solids of	less than 30 mg/1 (or ppm);
PH of	6.0 to 9.0;
Dissolved oxygen	1.5 to 3.0 mg/1 (or ppm).

### Taking Effluent Samples:

Samples must be taken in the effluent discharge line or an effluent pump or after the chlorine contact tank. We recommend allowing the effluent to flow through the discharge pipe for a minimum of two minutes before taking the sample. This will allow any solids to be flushed out that might have accumulated in the discharge pipe. Please find attached drawings of a Sample Port.

SAMPLING SHOULD BE TAKEN BY A LOCAL CERTIFIED TESTING LABORATORY OR BY FOLLOWING THEIR PROCEDURES. THE FOLLOWING RECOMMENDED GUIDELINES MAY BE USED IF LOCAL PROCEDURES ARE NOT AVAILABLE.

1. Carbonaceous Biochemical Oxygen Demand (CBOD)  
Samples for CBOD analysis may degrade significantly during storage between collection and analysis, resulting in low CBOD values. Minimize reduction of CBOD by analyzing the sample promptly or by cooling it to near freezing temperature during storage. However, even at low temperature, keep the holding time to a minimum. Warn the chilled samples to 20 C before analysis; some storage time can be used to accomplish this conveniently.
  - a. Grab Samples: If analysis is begun within two hours of collection, cooling is unnecessary. If analysis not started within two hours of sample collection, keep sample at or below 4 C from the time of collection. Begin analysis within six hours of collection; when this is not possible because the sampling site is distant from the laboratory, store at or below 4 C and report length and temperature of storage to the Lab. In no case, start analysis more than 24 hours after grab sample collection. When samples are to be used for regulatory purposes, make every effort to deliver samples for analysis within six hours of collection.
2. Total Suspended Solids (TSS)  
Use resistant-glass or plastic bottles, provided that the material in suspension does not adhere to container walls. Begin analysis as soon as possible, because of the impracticality of preserving the sample. Refrigerate sample at 4 C to minimize microbiological decomposition of solids.
3. Phosphorous  
If phosphorus forms are to be differentiated, filter samples immediately after collection. Preserve by freezing at or below -10 C. Add 40 mg/HgCl<sub>2</sub>/L to the samples, especially when they are to be stored for long periods. Do not add either acid or 2CHCl<sub>3</sub> as a preservative when phosphorus forms are to be determined. If total phosphorus alone is to be determined, add 1 ml concentration HCL or freeze without any additions.

Do not store samples containing low concentrations of phosphorus in plastic bottles unless kept in a frozen state because phosphates may be absorbed onto the walls of plastic bottles.

Rinse all glass containers with hot diluted HCL, then rinse several times in distilled water. Never use commercial detergents containing phosphate for cleaning glassware used in phosphate analysis.

#### 4. Ammonia Nitrogen

Most reliable results are obtained on fresh samples. Destroy residual chlorine immediately after sample collection to prevent its reaction with ammonia. If prompt analysis is impossible, preserve samples with 0.8-ml concentration  $H_2SO_4/L$  samples and store at 4 C. The PH of the acid-preserved samples should be between 1.5 and 2. Some wastewater may require more concentration  $H_2SO_4$  to achieve this pH. If acid preservation is used, neutralize samples with NaOH or KOH immediately before making the determination.

## **INSTALLATION INSTRUCTIONS ONLY FOR USE BY CERTIFIED, LICENSED INSTALLERS**

1. Prepare an excavation, having a diameter approximately one foot larger than the tank and a depth that will allow approximately three inches of the inspection port to extend above normal ground level. Backfill with a six inch layer of sand or gravel if otherwise unable to provide a smooth, level, compact base. We recommend that the hole be roped off in some fashion to prevent injury to passerby.
2. Utilizing lifting lugs provided, place the plant in the excavation so that the inlet and outlet line up with the sewer piping. The inlet line should slope down toward the plant and the outlet line should slope down away from the plant. The plant should be level within one-half inch, edge to edge.
3. Position inlet and outlet lines and make connections as necessary, depending upon the construction materials. The inlet line should be inserted and glued into the inlet elbow and the discharge line should be inserted and glued into the outlet coupling. Note: Open inspection port and make sure discharge tee assembly is level and centered in clarifier prior to attaching discharge piping. Fill the tank with water until water flows from the discharge before back-filling. Backfill around plant, up to the bottom of the discharge connections.
4. Do not install the air pump(s) in a low lying area where water may accumulate. The air pump should be installed near the control panel and within one hundred feet of the tank. Air pump can be installed outdoors or in a clean, well ventilated area, such as a tool room, garage, etc. **If the linear air pump is to be installed in an additional enclosure, the enclosure must be approved by Delta in writing.**
5. Mount the control panel in an area such that the alarm can be heard and be readily observed. A 3-wire grounded GFI circuit is required for safety. Install a disconnect switch near the panel to visually disconnect the control panel from the power source. All electrical work shall be done according to NEC and local code requirements. The control panel must be grounded. Connect the source ground wire to the ground location in the panel.
6. The control panel is rated for indoor and outdoor use and contains a fuse for the air pump. An electrical malfunction in the air pump or wiring to the air pump will cause the fuse to blow. The control panel also contains a pressure switch and visual and audible alarm. Loss of air pressure caused by the air pump system malfunction or a high water level in the treatment plant will cause the alarm to sound and light to illuminate.
7. Attach control panel to suitable mounting surface using all four mounting holes on back of box. Use proper screws of sufficient length to insure a secure and permanent mounting.
8. Control panel is rated for outdoor service; however, do not place it where it can be immersed in rising water or where run-off water such as from a roof will fall on it. Do not mount it where it is subject to wetting from sprinklers, hoses, etc.

9. The control panel must never be connected to a circuit that is not properly grounded. Never connect the unit to a non-grounded circuit. If there is doubt, have a qualified electrician check for proper grounding. The control panel must be connected to a 20 amp maximum electric source equipped with a ground fault interrupter (GFI) circuit breaker. A standard circuit breaker can be replaced with a GFI circuit breaker which can be obtained from almost any store that sells electrical supplies.
10. After the control panel is properly mounted, connect conduit and install wiring as shown on drawings bound herein.
11. Install float switch wire from the control panel to the treatment plant. Wire can be direct burial type UF 600 volt or can be installed in schedule 40 PVC conduits. Use type THWN, 600 volt if installed in conduit. Wire must be buried in accordance with NEC table 300-5. If in doubt, bury 24 inches deep. Keep sufficient distance or depth from air line to avoid confusion of pipes or damage to wiring during installation or repair or air piping. Connect to the float switch normally open contacts using underground rated compound filled wire nuts.
12. Connect the pressure air tubing to the 1/8" barb-fitting in the air piping system. The air tubing should be protected by conduit as shown on drawing.
13. Install 3/4" schedule 40-PVC piping between air pump and treatment unit. A minimum of 12 inches ground cover is recommended.
14. Turn power on to control panel. Air pump should start.
15. Check air piping joints for leakage using a soapy water solution. Repair if necessary and then carefully backfill air line and inlet and discharge piping and cover plant to grade level.
16. Re-check water level in the tank.
17. Plant is ready to receive incoming sewage. No special start-up procedures are required. The process is naturally occurring and does not require any special additives
18. Test alarm circuit by momentarily squeezing air tubing and allowing air pressure to decrease. This should take a few minutes. Alarm should occur. Release air tubing and alarm should stop. Lift float in tank to horizontal position. Alarm should occur. Release float. Alarm should stop. The audible alarm can be turned off by flipping the toggle switch on the panel front door to the left.
19. Close cover to control panel, and lock if necessary.
20. In the event that a fuse blows, replace with time delay or slow blow, 125 volt minimum voltage rating and the same amp rating as the existing fuse.
21. The distribution of air to all drop lines must be uniform. If the air flow is not evenly distributed, check the air pump or the main air line.

22. Spend time with your customer whenever possible. Review operation instructions. Be sure that the customer has a manual to keep. This saves valuable time avoiding return visits.
23. Retain these instructions for future reference.
24. **WARNING: CONTROL PANEL CONTAINS HIGH VOLTAGE AND MUST ONLY BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.**

# **TROUBLE SHOOTING GUIDE FOR DELTA ENVIRONMENTAL PRODUCTS, INC.**

## **AIR SUPPLY MALFUNCTION**

1. Check to be sure all airdrops are working properly. They should be bubbling evenly and forcefully. A septic (rotten egg) odor could mean that the system is not getting enough air. If the air drops are not working, partially working or working very little (slight bubbles), check the following:
  - a. Check to be sure the air pump is working.
    - Check timer if one is used;
    - Bypass timer temporarily connect directly to source;
    - Check the electrical source;
    - If electrical source is okay, check service guide on pump unit for troubleshooting information;
    - Wash air filter on pump;
    - Consult manufacturer for servicing information.
  - b. Check to be sure tank is not severely out of level. Air follows a path of least resistance. The pressure differences at the bottom of drop lines can be enough to prevent or restrict air flow.
  - c. Check for broken or cracked air lines both outside and inside the tank.
  - d. Ants will destroy an air pump. Check to see if there is an ant nest around the air pump.
  - e. Air pump should be protected from rising water.
  - f. Always check to see if inlet and outlet lines are correctly installed.

## **INTERNAL ASSEMBLY MALFUNCTION**

1. Raw, untreated sewage from the aeration chamber (bubble zone) should not enter the clarifier (quiet zone), because of improperly installed or loose seals or gaskets where pipe goes through the clarifier wall. Check the size of holes to be sure that there is no clearance for matter to pass through the wall around the piping.
2. Check to be sure all internal piping and connections are tight.

## **DESIGN OVERLOAD**

1. The system could be hydraulically overloaded (there is too much water going through the system for the size of the system).
2. The system could be biologically overloaded (there is too much waste for the size of the system).

## **IMPROPER INSTALLATION OR SETTLING**

1. You should follow the manufacturer installation procedures very carefully.
2. Where settling is common, approximately 2 inches of sand should be placed and tamped in the bottom of the hole.
3. Proper installation is the first step in preventing call backs for service problems.
4. Whenever possible, it is important to spend time with the homeowner. Be sure they have an operations book. A few minutes invested in the beginning will avoid service calls later.

## **NO HARSH CHEMICALS SHOULD BE PUT INTO THE SYSTEM**

1. Water in the aeration chamber (bubble zone) should be the color of chocolate milk. Blue or gray/blue water indicates heavy use of detergents or other chemicals. If water appears sudsy, there is too much detergent being used.
2. Water in the clarifier (quite zone) should be clear but scum and debris may appear on the surface. Water is discharged into the discharge tee at a minimum of 6-8 inches below water surface. You MAY not be able to see clear water by looking into the tank. Samples must be taken at the sample port.
3. Oils and grease should be kept to a minimum. Grease tends to form in white balls.

## **TROUBLE SHOOTING ELECTRICAL SYSTEM**

1. Air pump does not run:
  - a. Check main service for power;
  - b. Check and/or replace fuse with same rating as is in control panel.
2. Alarm does not occur when air pump is off:
  - a. Malfunctioning pressure-switch – replace.
  - b. Malfunctioning light or buzzer – replace.
3. Alarm occurs continuously even when air pump is running:
  - a. Air-leak in main air system or air tubing to pressure switch – repair leak or replace air line.
  - b. Malfunctioning pressure-switch – replace.
  - c. High water level in tank – inspect for cause.
  - d. Short in float switch wire or float switch – repair or replace.

**NOTE:** All replacement parts are available from your local dealer.

**CAUTION:** Electrical shock or hazard may occur if unit is not serviced properly. The manufacturer recommends that a licensed electrician be called when electrical problems occur.

## **COMPONENT REPLACEMENT PROCEDURE**

1. Air Pump – Follow same procedure as outlined in the “Installation Instructions”.
2. Float Switch – Remove Aerobic Treatment Plant’s Riser or 24 inch cover. Locate float switch cable. Untie knot. Cut float switch cable. Slip float switch cable through rubber grommet into the plant. Replace with exact replacement float switch. Reinstall by reversing procedure. Reconnect float switch wires using Underground Rated Compound filled wire nuts. See Float Switch Mounting Detail.
3. Pressure Switch – Turn all power off to control panel. Remove back plate. Remove screws securing pressure switch as well as connectors and tubing. Reverse procedure to install new pressure switch.
4. Buzzer – Turn all power off to control panel. Remove screw attaching buzzer to back plate as well as connectors. Reverse procedure to install new buzzer.
5. Lamp-holder – Turn all power off to control panel. Remove lock nut securing lamp-holder to door as well as connectors. Remove lamp-holder. Install new lamp-holder with gaskets furnished. Continue with reverse procedure.
6. Lamp – Turn all power off to control panel. Remove red lamp cover from front of control panel. Remove and replace lamp which is a push in type. Replace lamp cover and cover gasket.
7. Fuse – Turn all power off to control panel. Pull top of fuse holder outward. Remove and replace fuse. Push fuse back into place.
8. Buzzer Switch – Turn all power off to control panel. Remove rubber boot on switch. Remove hex nut from switch on panel front as well as connectors on switch. Reverse procedure to install new switch.

### **GENERAL COMMENTS**

1. Only factory approved equipment can be used for replacement on individual treatment systems.
2. If the decision is made to pump out a system, be sure to contact a licensed waste hauler.
3. If a chronic problem develops and all items listed have been checked, consult with the factory.
4. Taking pictures of systems when troubleshooting will help document activity in the field.
5. Keep good records.

**NOTE:** If the entire cover needs to be removed on any one of the various model treatment plants, the existing silicone or strip seal must be removed and replaced with a new one. This will provide a positive seal which will not allow any infiltration into or out of the treatment plant.

# **SYSTEM LAYOUT DRAWINGS**

**APPENDIX A  
SPECIFICATIONS, DIMENSIONS AND  
TREATMENT PLANT DRAWINGS**

## **SPECIFICATIONS**

TREATMENT PLANT	TREATMENT CAPACITY (GPD)	TOTAL VOLUME (GAL)	AERATION VOLUME (GAL)	CLARIFIER VOLUME (GAL)	BOD LOADING (LBS/DAY)	NO. OF AIR DROPS
UC50	500	764	596	168	1.25	3
UC50A	500	909	720	189	1.25	3
UC60	600	1147	867	280	1.5	3
UC75	750	1438	1100	338	1.88	3
UC90	900	1428	1050	378	2.25	3
UC100A	1000	1926	1429	497	2.5	3
UC120	1200	2013	1493	520	3.0	3
UC150	1500	2882	2227	655	3.75	8
UC150A	1500	2358	1838	520	3.25	3

### **MATERIALS OF CONSTRUCTION:**

Suffix <b>M</b> -	Aeration Tank	-Steel
	Cover	-Steel
	Clarifier	-Fiberglass
Suffix <b>FF</b> * -	Aeration Tank	-Fiberglass
	Cover	-Fiberglass
	Clarifier	-Fiberglass
Suffix <b>CA</b> *	Aeration Tank	-Concrete
	Cover	-Concrete
	Clarifier	-Fiberglass

**\*Standard Production Units. Other configurations are available upon special request.**

## **DIMENSIONS**

<b>TREATMENT PLANT</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
UC50	4'-8"	5'-6"	4'-6"	5'-0"	10"	6'-0"
UC50A	4'-8 3/16"	6'-0"	4'-5 9/16"	5'-0"	10"	6'-6"
UC60	5'-4"	6'-3"	5'-1 1/2"	5'-9"	11 1/2"	6'-9"
UC75	5'-8 1/2"	6'-9"	5'-6"	6'-2"	11 1/2"	7'-3"
UC90	5'-8"	6'-9"	5'-6"	6'-0"	10"	7'-3"
UC100A	5'-6"	8'-0"	5'-3"	6'-0"	1'-0"	8'-6"
UC120	6'-2"	7'-8"	6'-0"	6'-6"	1'-2"	8'-2"
UC150	8'-0"	8'-0"	7'-9 1/2"	8'-6"	1'-0 3/4"	8'-6"
UC150A	7'-2"	7'-8"	7'-3"	7'-6"	1'-2"	8'-2"

**REFER TO TREATMENT PLANT DRAWINGS ON THE ABOVE DIMENSIONS.**

**NOTE: For special cargo or container shipments 12 inches must be added to the diameters of all fiberglass units (due to the fiberglass flange and lifting lugs).**



UC-120	(2) 5100S (1) QR-0080 (2) DM 100	(2) 2.8 (1) 10.4 (2) 2.8	(2) 107 Watts (1) 640 Watts (2) 107 Watts	115 volt - single phase
UC-150	(3) 5100S (1) QR-0100 (3) DM 100	(3) 2.71 (1) 10.4 (3) 2.71	(3) 110 Watts (1) 850 Watts (3) 110 Watts	115 volt - single phase
UC-150A	(2) 5100S (1) QR-0080 (2) DM 100	(2) 2.1 (1) 10.4 (2) 2.1	157 Watts 640 Watts 157 Watts	115 volt - single phase

**DELTA ENVIRONMENTAL PRODUCTS. INC.  
FIBERGLASS TEST REPORT**

**TENSILE PROPERTIES  
ASTM D 638**

SPECIMEN I.D.	WIDTH INCHES	DEPTH INCHES	AREA SQUARE INCH	MAXIMUM LOAD (POUNDS)	TENSILE STRENGTH (PSI)
1	0.748	0.242	0.181	3,580	19,800
2	0.751	0.230	0.173	3,560	20,600
3	0.758	0.273	0.207	4,040	19,500
4	0.752	0.245	0.184	3,980	21,600
5	0.760	0.265	0.201	4,150	20,600
AVERAGE					20,420
STD. DEV.					820

**FLEXURAL PROPERTIES  
ASTM D790**

SPECIMEN I.D.	WIDTH B	DEPTH D	MAX. LOAD P	FLEXURAL STRENGTH (PSI)	SLOPE M	FLEXURAL MODULUS (PSI)	
1	0.511	0.253	177.7	32,600	648	1.25 E+06	
2	0.501	0.275	209.9	33,240	768	1.18 E+06	
3	0.487	0.238	139.2	30,280	468	1.14 E+06	
4	0.508	0.265	185.0	31,110	724	1.23 E+06	
5	0.520	0.243	188.1	36,760	568	1.22 E+06	
AVERAGE				32,800	AVERAGE		1.20 E+06
STD.DEV.				2,506	STD.DEV.		4.39 E+04

**VOID CONTENT OF REINFORCED RESIN  
ASTM D 2734**

SPECIMEN I.D.	ASTM D 792 DENSITY	ASTM D 2584 RESIN/GLASS	THEORETICAL DENSITY	CALCULATED VOIDS %
1	1.516	56.3 / 43.7	1.634	7.2
2	1.519	56.0 / 44.0	1.630	6.8
3	1.523	56.0 / 44.0	1.630	6.6
AVERAGE	1.519	56.1 / 44.9	1.631	6.9
STD. DEV.	0.004	0.17	0.002	0.31

**APPENDIX B**  
**ELECTRICAL CONTROL PANELS**

**ADDITIONAL MATERIALS  
NEEDED FOR CONTROL PANEL ELECTRICAL INSTALLATION**

<u>QUANTITY</u>	<u>ITEM</u>	<u>MANUFACTURER OR EQUAL</u>
As required	2# 12UF w/ground	
2	300 volt silicon filled underground service wire nuts	King-6T
As required	Conduit and fittings as Shown on drawings Herein.	
1	20 AMP minimum A/C type disconnect switch or equal. Required on CP20 series panel only.	

# **APPENDIX C NAMEPLATES**

# TREATMENT PLANT DATA PLATES

4"

**ULTRA CLEAR**  
Delta Environmental Products, Inc.  
8275 Florida Boulevard  
Denham Springs, LA 70726  
Phone: 1-800-219-9183  
Model UC XXX-X  
ANSI/NSF STD 40  
XXX GPD Class I

Serial No.



2"

4"

**ALARM MALFUNCTION ELECTRICAL PANEL**  
**ULTRA CLEAR**  
Delta Environmental Products, Inc.  
8275 Florida Boulevard  
Denham Springs, LA 70726  
Phone: 1-800-219-9183  
Model UC XXX-X  
ANSI/NSF STD 40  
XXX GPD Class I

Serial No.



3"

**APPENDIX D**  
**SERVICE POLICY, WARRANTIES**  
**AND NSF POLICIES**

**DELTA ENVIRONMENTAL PRODUCTS, INC.  
INDIVIDUAL MECHANICAL WASTEWATER TREATMENT  
SYSTEM SERVICE POLICY**

**INITIAL POLICY:**

A two year initial service policy shall be furnished to the user by the manufacturer or the distributor through the dealer. This policy is included in the original price and shall provide the following:

1. An inspection/service call every six months, which includes inspection, adjustment, and servicing of the mechanical and electrical component parts as necessary to ensure proper function.
2. An effluent quality inspection every six months consisting of a visual check for color, turbidity, scum overflow, and an examination for odors.
3. If any improper operation is observed which cannot be corrected at that time, the user shall be notified immediately in writing of the conditions and the estimated date of correction.

**CONTINUING SERVICE POLICY:**

An annually renewable service policy affording the same coverage as the Initial Service Policy is available. Consult your dealer for pricing information.

**PARTS:**

Replacement parts or components may be obtained from your local distributor or directly from Delta Environmental Products, Inc.

**COMPLAINTS:**

In order for Delta Environmental Products, Inc. to properly address complaints, we require that you put in writing the date and nature of the complaint as detailed as possible. This must include the Serial Number of your system.

Send to: Delta Environmental Products, Inc.  
P. O. Box 969  
Denham Springs, LA 70727-0969

## LIMITED WARRANTY

Delta Environmental Products, Inc. warrants the parts in each treatment system as follows: air pump: limited pro-rated five (5) years – first two (2) years 100%, third (3) year 75%, fourth (4) year 50%, fifth (5) year, 25%; fiberglass tanks: limited ten (10) years, metal tanks: limited two (2) years, and concrete tanks: limited two (2) years. All warranty questions shall be resolved through Delta Environmental Products, Inc. The warranty on the treatment device is that the device is free from defects in material and workmanship from the date of installation treating household wastewater. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply. Sole obligation under this warranty is as follows: Delta Environmental Products, Inc. shall fulfill this warranty by repairing or exchanging any component part, F.O.B. factory that in Delta Environmental Products, Inc. judgment shows evidence of defects, provided said component part has been paid for and is returned through an authorized dealer, transportation prepaid. The warrantee must also specify the nature of the defect to the manufacturer.

The warranty does not cover treatment processes/devices that have been flooded, by external means, or that have been disassembled by unauthorized persons, improperly installed, subjected to external damage or damaged due to altered or improper wiring or overload protection.

This warranty applies only to the treatment process/device and does not include any of the house wiring, plumbing, drainage, or disposal system. Delta Environmental Products, Inc. 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 damage or expenses arising from the manufacture, sale or use of this process/device.

Delta Environmental Products, Inc. reserves the right to revise, change or modify the construction and design of the treatment process/device for household wastewater or any component part or parts thereof without incurring any obligation to make such changes or modifications in previously sold equipment. Delta Environmental Products, Inc. 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 replaced.

Under no circumstances will Delta Environmental Products, Inc. be responsible to the warrantee 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 damages are caused by a defect in material and/or workmanship in its parts. Some states do not allow the exclusion of limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

The warranty is expressly in lieu of any other express or implied warranty, excluding any warranty of merchantability or fitness and of any other obligation on the part of Delta Environmental Products, Inc.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

**\*The 3, 4, and 5 year pro-rated portion of this warranty is only valid with a continuing Service Policy in effect. Proof of this continuing Service Policy must be provided.**