



Delta Environmental
Products™



ECOPOD-N™ Series

FIXED FILM WASTEWATER
TREATMENT SYSTEM

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K4508 09/09

Fixed Film Wastewater Treatment System Design Manual

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NOTICE

This booklet provides operations, installation and warranty information on the **TREATMENT PLANT, ONLY**. Other components which you may have, such as dosing equipment, drip irrigation or other components require additional operations booklets and carry separate warranties.

Be sure that you have all of the correct booklets for each of the component pieces in your system.

Contact your installer or call (800) 219-9183.

DELTA ENVIRONMENTAL PRODUCTS™ QUALITY ASSURANCE TAG	
Serial No. _____	DATE _____
Fiberglass Integrity:	
Barcol Tested	
Thickness Verified	
Clarifier Solid	_____
	(Initial)
Water Tested	

	(Initial)
Compressor Package Complete:	

	(Initial)
Internal Assembly:	
Clarifier Intact	
Air Header Complete & Secured	
Air Drop Lines Complete & Secured	
Discharge Tee Assembly Center & Level	
Cover Attached, Sealed & Secured	

	(Initial)
Component Kit:	
Air Header Complete & Secured	
Air Drop Lines Complete & Secured	
Discharge Tee Assembly Secured	_____
	(Initial)



INTRODUCTION

A WORD ABOUT YOUR DELTA ADVANCED WASTEWATER TREATMENT SYSTEM AND HOW IT WORKS

The ECOPOD-N™ Fixed Film Wastewater Treatment System that you have purchased produces high quality water suitable for various disposal methods. It is used to enhance your on-site wastewater disposal system. You can be proud that in purchasing your ECOPOD-N™ Fixed Film Wastewater Treatment System and with a minimum amount of maintenance, you can directly contribute to a cleaner, safer environment.

All wastewater treatment systems of this type work by using the bacteria that nature has provided. By pumping air into the system, the bacteria grow and thrive in much larger amounts than would occur naturally. The over population of bacteria speeds up the process of breaking down domestic wastewater, making it safe for release into the environment. This entire process takes place within the walls of your specially designed, self-contained ECOPOD-N™ Fixed Film Wastewater Treatment System.

The result of this process is a clear, odorless discharge, which meets or exceeds state water quality standards.

By following the few simple steps that you find in this manual, your ECOPOD-N™ Fixed Film Wastewater Treatment System will provide you with years of service and the knowledge that you are doing your part to protect public health, our ground water, lakes, rivers, and streams.

The ECOPOD-N™ Fixed Film Wastewater Treatment System may be only one of several components required by your health department to provide a complete on-site system.

ECOPOD-N™ DESCRIPTION

Wastewater enters a pretreatment/settling tank similar to conventional septic tanks. In this tank, debris and settleable solids settle to the bottom and are decomposed by anaerobic bacteria.

The effluent leaves the pretreatment tank and enters the ECOPOD-N™ Fixed Film Wastewater Treatment System reactor tank, where it is introduced to an oxygen-rich environment. In this oxygen rich environment, a colony of bacteria, called the biomass, develops and is capable of digesting (breaking down) biodegradable waste into carbon dioxide and water. This is a continuous process as long as the biomass is supplied with incoming wastewater and oxygen. The ECOPOD -N® Fixed Film Wastewater Treatment System is a specially designed containment device that houses an engineered plastic media specifically designed to treat domestic wastewater. The engineered plastic media has a 19mm sheet spacing with a total surface area of 47 square feet/cubic feet of media pack. The ECOPOD -N® Fixed Film Wastewater Treatment System is submerged in a tank of liquid, which operates as a dilution/recirculation clarifier zone. An external air compressor is connected to the tank to provide the necessary air to the system. There are no moving mechanical parts or filters in the ECOPOD -N® Fixed Film Wastewater Treatment System.

In this system, conditions are favorable only to attached growth bacteria. This means that the most common disadvantages of other types of systems are eliminated. No rising sludge, floating sludge or washouts can occur.

In addition to CBOD and TSS reduction, ammonia nitrogen is one of the contaminants reduced by the ECOPOD-N™ Fixed Film Wastewater Treatment Nitrification of the ammonia and denitrification of nitrates occur within the bacteria masses. Complete nitrification occurs in the reactor zone, as the liquid is recirculated in the tank, the nitrates flow through the anoxic zone where they come into contact with the carbon source present in the sludge at the bottom of the tank. The nitrate is stripped of the oxygen molecule converting the nitrate to nitrogen gas. A 50%+ removal rate of total nitrogen is common without any type of recirculation or cycling of the blower.

Fecal Coliforms are yet another constituent of domestic wastewater that, when reduced, are indicative of the overall pathogen reduction performance of the treatment system. The ECOPOD-N™ Fixed Film Wastewater Treatment System is capable of reducing fecal coliforms to under 30,000 counts per 100ml.

By following the few simple steps that you find in this manual, your ECOPOD-N™ Fixed Film Wastewater Treatment System will provide you with years of service and the knowledge that you are doing your part to protect public health, our ground water, lakes, rivers, and streams.

SPECIFICATIONS

TESTED AND LISTED UNDER NSF/ANSI STANDARDS 40 AND 245

General Specifications

The advanced wastewater treatment system described by these specifications is a Delta Environmental Products ECOPOD-N™ Fixed Film Wastewater Treatment System Model E_____. This device shall essentially consist of a media container, engineered media, air diffusion system, specially designed discharge outlet tee, blower assembly, and control/alarm panel. Additional features and accessories are as shown on the Delta Environmental Products™ job drawing or drawings and as hereinafter specified and described. The advanced wastewater treatment system shall be NSF/ANSI Standards 40 and 245 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 BOD₅. A minimum of 4,850 cubic feet of aeration capacity shall be provided for each pound of BOD₅.

Construction

Fiberglass

The tanks shall be constructed of 1/4" 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

The tanks shall be constructed of CONCRETE. The top, bottom, and outer walls of all concrete tanks shall be 3" thick plus or minus 1/4" and constructed of concrete with a minimum compressive strength of 3000 psi. The top, bottom and side walls shall also be reinforced uniformly and completely with 10 gauge steel wire on 6" centers both ways (6x6x10x10) or fibermesh reinforcement at a minimum of 1.2 pounds per yard Harborlight or equal.

Primary Tank

A primary tank shall be provided as shown on the plans to receive the incoming flow. The pretreatment tank shall provide 24 hours hydraulic detention at the ADF rate. The primary 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 settleable solids out of the reactor tank.

Reactor/Dilution Tank

The reactor tank shall be sized to provide a minimum of 33.6 hour hydraulic detention time at the average daily flow (ADF). The dilution zone shall also be designed as to provide optimum liquid-solid separation and shall be sized to provide 24 hours hydraulic detention at the ADF rate.

Air Delivery System

Air delivery system shall be constructed of schedule 40 PVC pipe. Air ports shall be designed for non-clogging and shall be maintenance free.

Disinfection (Optional)

A disinfection system of chlorine or Ultraviolet light shall be included in the treatment system to achieve disinfection of the final effluent.

Aeration Blower

Provide one aeration blower system with sufficient capacity to furnish the treatment units air requirements. The blower(s) shall be capable of delivering a minimum of 4,850 cubic feet per pound of BOD₅ influent at required discharge pressure.

Electrical Controls

An electrical control panel shall be furnished with each unit 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. System shall be NSF/ANSI International certified utilizing UL rated components in an indoor/outdoor NEMA 3R painted steel enclosure. A service label shall be located on or near the system failure signal, with instructions to call Delta Environmental Products at 1-800-219-9183 for assistance.

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 systems. 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 0.25 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.
- .25 pounds BOD/persons day X five persons = 1.25 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.

- Seven persons X 100 GPD/person = 700 GPD.
- .25 pounds BOD/persons per day X seven persons = 1.75 pounds BOD/day.
- A 750 GPD plant can treat 1.88 pounds BOD/day.
Therefore use a 750 GPD plant.

Chart 1

ECOPOD-N™ Fixed Film Wastewater Treatment System Treatment Plants – Sizes/Capacities

Units (U) [®]	Size (GPD)	BOD Treatment Capacity (lbs/day)
E-50-N	500	1.25
E60-N	600	1.5
E75-N	750	1.88
E100-N	1000	2.5
E150-N	1500	3.75

Homeowner Care And Operation Instructions

The ECOPOD-N™ Fixed Film Wastewater Treatment 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 the tank, 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 or when there is a high water level in the treatment plant. 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 an authorized Delta dealer/distributor.

Every 3 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.

Every 6 Months: Inspect and make any necessary adjustments to mechanical and electrical components.

Inspect effluent quality's color, turbidity and check for any odor.

Take a sample from the reactor tank to check the sludge level described in the "Solids Removal" section.

The homeowner must be notified in writing if any improper operation is observed and cannot be corrected at the time of service.

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 and 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 ECOPOD-N™ Fixed Film Wastewater Treatment System is designed to handle domestic wastewater and nothing else should go into it. For anything other than domestic wastewater contact Delta Environmental Products™.



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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. Delta Environmental Products is not responsible for the mechanical or electrical safety of equipment it does not manufacture or supply with its ECOPOD-N™ Fixed Film Wastewater Treatment System. 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 ECOPOD-N™ Fixed Film Wastewater 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 reactor tank and can be done so through the 4" sample port. Allow the sample to settle in a clear one quart jar for one hour. If the solids content exceeds 25 percent of the total volume after settling or more than 13 inches of sludge the treatment unit 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:

- The air pump should be in the off position.
- Remove all of the solids from both the reactor tank and the primary tank.

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 ECOPOD-N™ Fixed Film Wastewater Treatment System

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 Environmental Products™ 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 is not in use for more than three months. Electrical power is turned off and there are no frost conditions.
 - Remove all materials and liquid from tank.
 - Refill with clean water.
 - Turn off air pump.
3. System is not in use for more than three months. Electrical power is on and there are no frost conditions.
 - Leave air pump on and system running; **OR**
 - Remove all material and liquid from tank.
 - Refill with clean water.
 - Turn off air pump.
4. System is not in use. Electrical power is turned off and there are frost conditions.
 - 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

An ECOPOD-N™ Fixed Film Wastewater Treatment System properly operated and maintained should provide the following effluent quality as determined through the analytical methods described in NSF/ANSI 245:

- Biological Oxygen Demand 5 day average (BOD₅) of less than 30 mg/1 (or ppm);
- Suspended Solids (SS) of less than 30 mg/1 (or ppm);
- Volatile suspended solids of less than 30 mg/1 (or ppm);
- PH of 6.0 to 9.0;
- Total Nitrogen reduction of 50% (Minimum) of influent TN
- 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 disinfection device. 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. Biochemical Oxygen Demand (BOD)

Samples for BOD analysis may degrade significantly during storage between collection and analysis, resulting in low BOD values. Minimize reduction of BOD 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. Warm 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 is 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/HgCl₂/L to the samples, especially when they are to be stored for long periods. Do not add either acid or 2CHCl₃ 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 H₂SO₄/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 H₂SO₄ to achieve this pH. If acid preservation is used, neutralize samples with NaOH or KOH immediately before making the determination.



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INSTALLATION INSTRUCTIONS ONLY FOR USE BY CERTIFIED, LICENSED INSTALLERS

Delivery Inspection

The ECOPOD-N® Fixed Film Wastewater Treatment system has been carefully manufactured, inspected and tested at the factory before shipment. Upon receiving the unit, please follow this procedure.

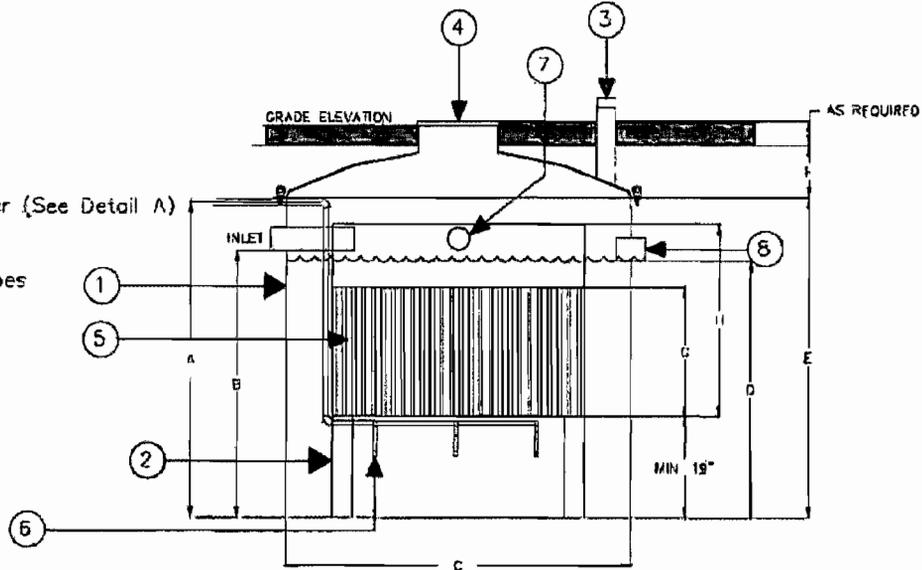
1. Before unpacking, check the packaging for signs of damage. If there is evidence of damage or abuse, notify Delta Environmental Products at 1-800-219-9234

2. After unpacking, inspect the unit to ensure no components are missing. Also inspect for damage to the unit. If any discrepancies are found, notify Delta Environmental Products at 1-800-219-9234

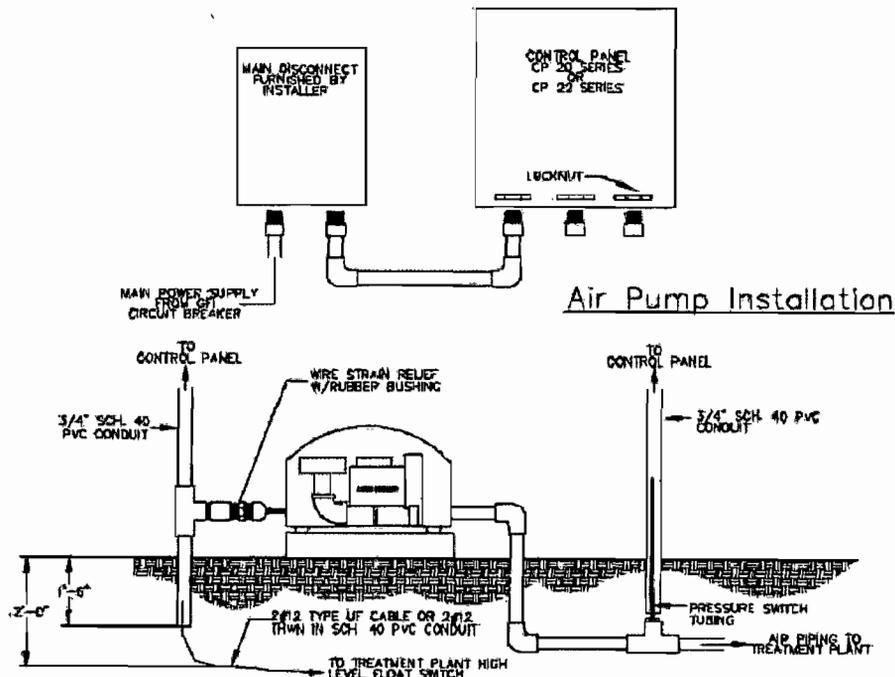
If the unit is free of damage, unpack completely and proceed with the installation.

System Components-Reactor Tank

Trim	Description
1	Tank
2	Media Container (See Detail A)
3	Vent
4	24" Manway
5	Media
6	Air Release Pipes
7	Influent
8	Effluent



Air Pump Installation



INSTALLATION

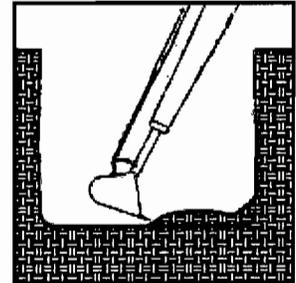
1. Prepare an excavation, having a diameter approximately one foot larger than the tank and a depth that will allow approximately three inches of the inspection port to extend above normal ground level. Backfill with a six inch layer of sand or gravel if otherwise unable to provide a smooth, level, compact base. We recommend that the hole be roped off in some fashion to prevent injury to passersby.
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 or circuit breaker for the air pump. An electrical malfunction in the air pump or wiring to the air pump will cause the fuse to blow or circuit breaker to trip. 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 conduit. 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 of air piping. Connect to the float switch normally open contacts using underground rated compound filled wire nuts. Float switch is not required when a dual pressure switch is utilized which detects high water conditions.
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 (if included) 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.**



DELTA ENVIRONMENTAL PRODUCTS RECOMMENDED INSTALLATION PROCEDURE

1. EXCAVATION:

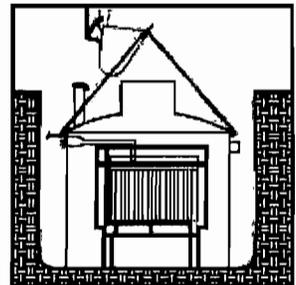
Dig hole from the side for accurate sizing. This reduces the bridging distance between the tank and undisturbed soil and provides good support for inlet and outlet pipes. The bottom of the hole should be undisturbed and level. If leveling is necessary due to over excavation, use sand for fill.



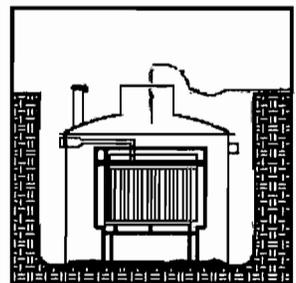
NOTE: Never place tank directly on rock. place at least six inches of sand bedding between the tank and rock surface.

2. TANK PLACEMENT:

Use the back hoe to set the tank. Lifting lugs are furnished to lift the tank.



CAUTION: A small amount of soil or sand should be used around the bottom of the tank to hold it in place. Sand is best. If excavated soil is used, tamp it underneath the tank to provide a good base.



3. FILL TANK WITH WATER:

Place hose in six inch riser. Begin filling tank with water.



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P. O. BOX 969 DENHAM SPRINGS, LA 70727

INSTALLATION PROCEDURE

DWN BY:
C.RACHAL

DATE:
5/18/09

SCALE:
N.T.S.

DWG. NO.:
DEP034B



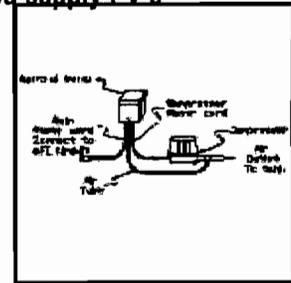
Delta Environmental
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This graphic is low resolution clarity will not be gained when enlarging. Can you supply PV a vector version?

4. GFI CONTROLS AND AIR PUMP :

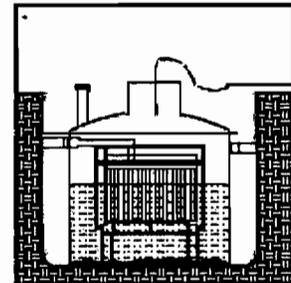
Install duplex or quadruple GFI or GFI protected receptacles at the selected location of the air pump. Mount control panel and install fittings, tubing and piping to tank location.

CAUTION: Do not plug anything but the air pump into the control panel.



5. INLET/OUTLET AND AIR CONNECTIONS :

Properly make solvent cemented inlet, outlet and air connections.

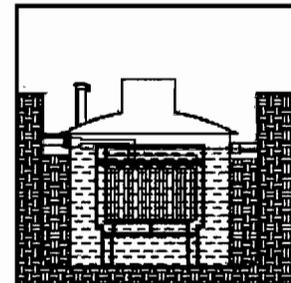


6. FILLING THE TANK :

Finish filling tank with water until it drains out of outlet. Begin backfilling with natural soil or a good back fill material.

7. AIR DISTRIBUTION :

Turn the air pump on and check all air connections and piping for air tightness.



NOTE: If electrical GFI receptacle has not been installed, for checking air distribution system during installation. Use an extension cord to run the air pump. Never leave the extension cord plugged in. Remove it after inspection is completed.

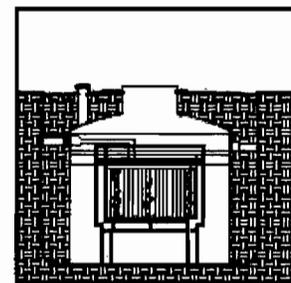
WARNING: Possible Fire Hazard

Do Not plug into main service equipment on power pole.

Do Not use extension cords

8. FINAL BACK FILLING :

Back fill Should be mounded above grade slightly to allow for settling. Tamp the back fill beneath the inlet, outlet and air piping to provide good support.



DELTA ENVIRONMENTAL PRODUCTS
P. O. BOX 969 DENHAM SPRINGS, LA 70727

INSTALLATION PROCEDURE

DWN BY:
C.RACIAL

DATE:
5/18/09

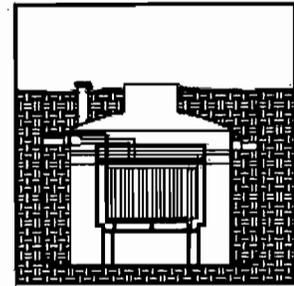
SCALE:
N.T.S.

DWG. NO.:
DEP034A



9. TRIM INSPECTION RISERS:

Trim inspection risers to proper length. The 4" aeration inspection riser also serves as a vent for the tank.

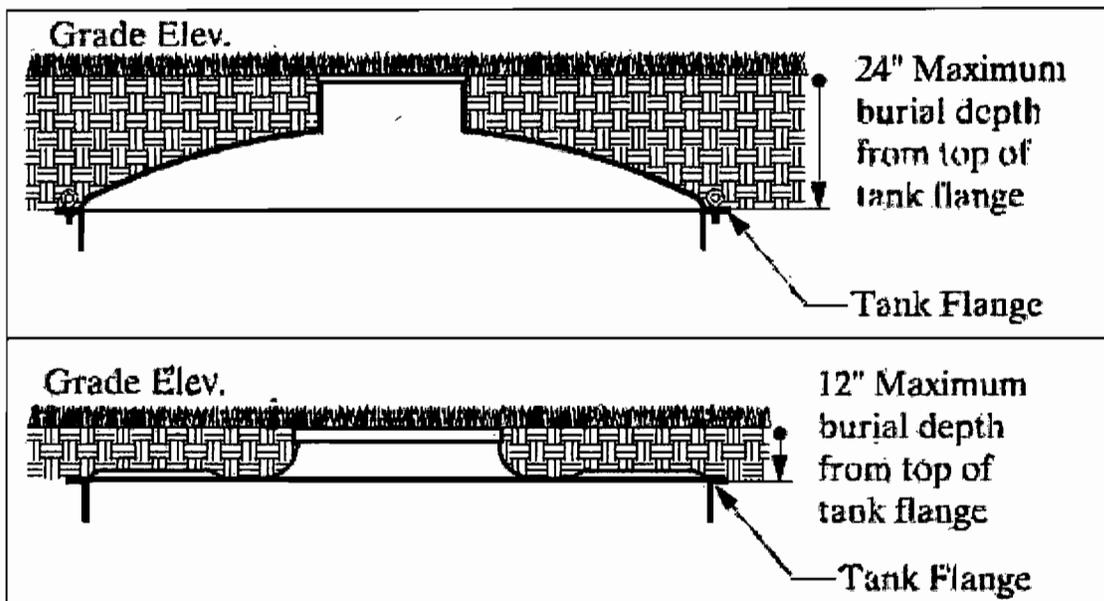


Caution: The bottom of the 4" aeration riser must be above the water level for both visual inspection and ventilation. Both of the optional 6" and 4" top caps must be above ground level to prevent ground water from entering the risers.

Caution: Care must be taken not to push the optional 6" Clarifier Inspection Riser down too far. This may cause damage to the effluent discharge tee assembly and the clarifier.

Caution: Maximum burial depth - 2 feet from top of tank flange with dome or 24" manways and 1 foot from top of tank flange with flat lids. For burial depths beyond 2 feet contact the factory.

For further details refer to the installation manual.



DELTA ENVIRONMENTAL PRODUCTS
P. O. BOX 969 DENHAM SPRINGS, LA. 70727

INSTALLATION PROCEDURE

DWN BY:
C.RACHAL

DATE:
5/18/09

SCALE:
N.T.S.

DWG. NO.,
DEP034



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TROUBLESHOOTING GUIDE FOR DELTA ECOPOD-N™ FIXED FILM WASTEWATER TREATMENT SYSTEM

Procedure for Visual and Olfactory Evaluation of System

1. Check to be sure that the air system is working properly. This will be evident in the reactor as the liquid will be forcefully agitated. A septic (rotten egg) odor could mean that the system is not getting enough air. If the air system is 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 and 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 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. Primary treated wastewater from the primary tank should not enter directly into the dilution zone because of improperly installed or loose seals or gaskets where pipe goes through the tank 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 reactor tank should be the relatively clear in both the reactor and dilution zone. 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 dilution zone should be clear. 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.



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Component Replacement Procedure

1. Air Pump – Follow same procedure as outlined in the “Installation Instructions”.
2. Float Switch – Remove 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. Re-install 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 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.

ECOPOD-N™ Fixed Film Wastewater Treatment System Unit Specifications

Treatment Plant	Treatment Capacity (GPD)	Primary Tank Total Volume (Gal)	Reactor Tank Volume (Gal)	Reactor Tank Dilution Volume (Gal)	Media Size	Air Requirements
E50-N	500	500	710	580	2' x 2' x 4'	12 CFM
E60-N	600	600	916	736	3' x 2' x 4'	14.4 CFM
E75-N	750	750	1089	909	3' x 2' x 4'	18 CFM
E100-N	1000	1000	1427	1186	4' x 2' x 4'	24 CFM
E150-N	1500	1500	2130	1771	6' x 2' x 4'	36 CFM

Materials Of Construction

Suffix FF	Reactor Tank	Fiberglass
	Cover	Fiberglass
	Media Container	Fiberglass
Suffix CA	Reactor Tank	Concrete
	Cover	Concrete
	Media Container	Fiberglass

These are standard production units. Other configurations are available upon request.



Electrical Requirements

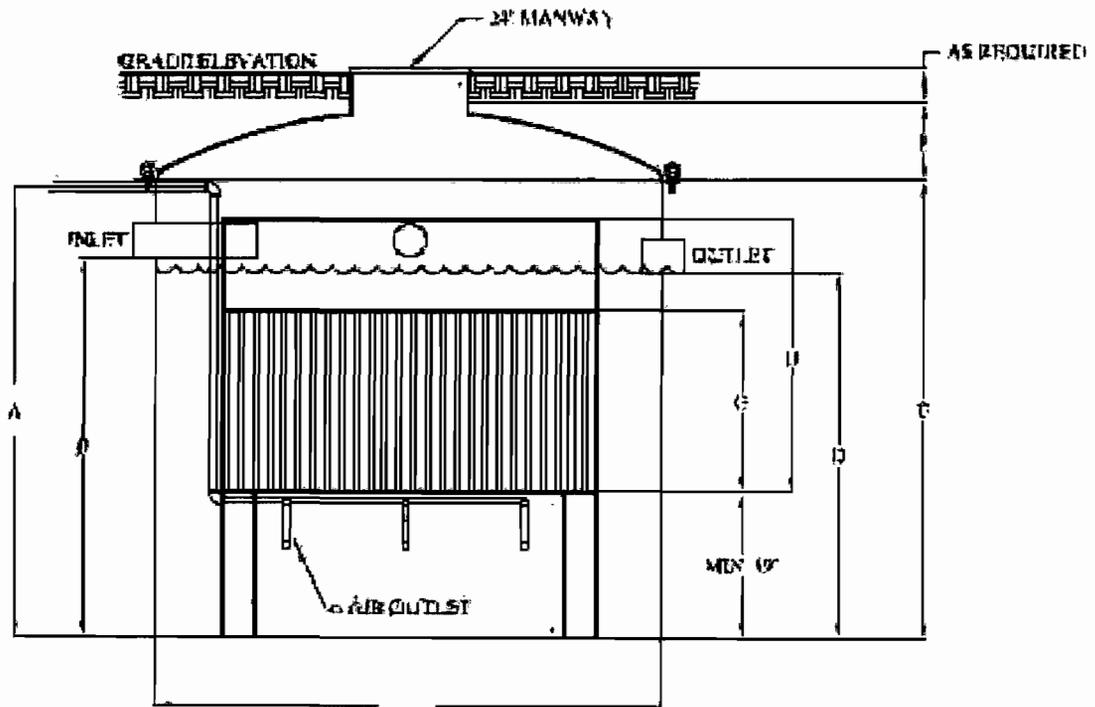
Model	Compressor	Motor (full load Amps)	Measured Operating Watts	Electrical Requirements
E50-N	Delta Model E50	3.5	185	115 volt - single phase
E60-N	Delta Model E60	4.7	280	115 volt - single phase
E75-N	Delta Model E75	4.7	280	115 volt - single phase
E100-N	Delta Model E100	7.1	475	115 volt - single phase
E150-N	Delta Model E150	7.1	475	115 volt - single phase

Dimensions

TREATMENT PLANT	A	B	C	D	E	F	G	H
E50-N	4'-11 $\frac{3}{8}$ "	4'-2"	6'-0"	4'	5'-0"	10"	2'	3'
E60-N	5'-7 $\frac{3}{4}$ "	4'-6"	6'-3"	4'-4"	5'-0"	11 $\frac{1}{2}$ "	2'	3'
E75-N	6'- $\frac{1}{2}$ "	4'-11"	6'-9"	4'-9"	5'-9"	11 $\frac{1}{2}$ "	2'	3'
E100-N	6'-5'- $\frac{5}{8}$ "	5'-5"	7'-6"	5'-4"	6'-2"	1'-0"	2'	3'
E150-N	8'-3'- $\frac{5}{8}$ "	5'-9"	8'	5'-8"	6'-4"	1'-3 $\frac{3}{4}$ "	2'	3'

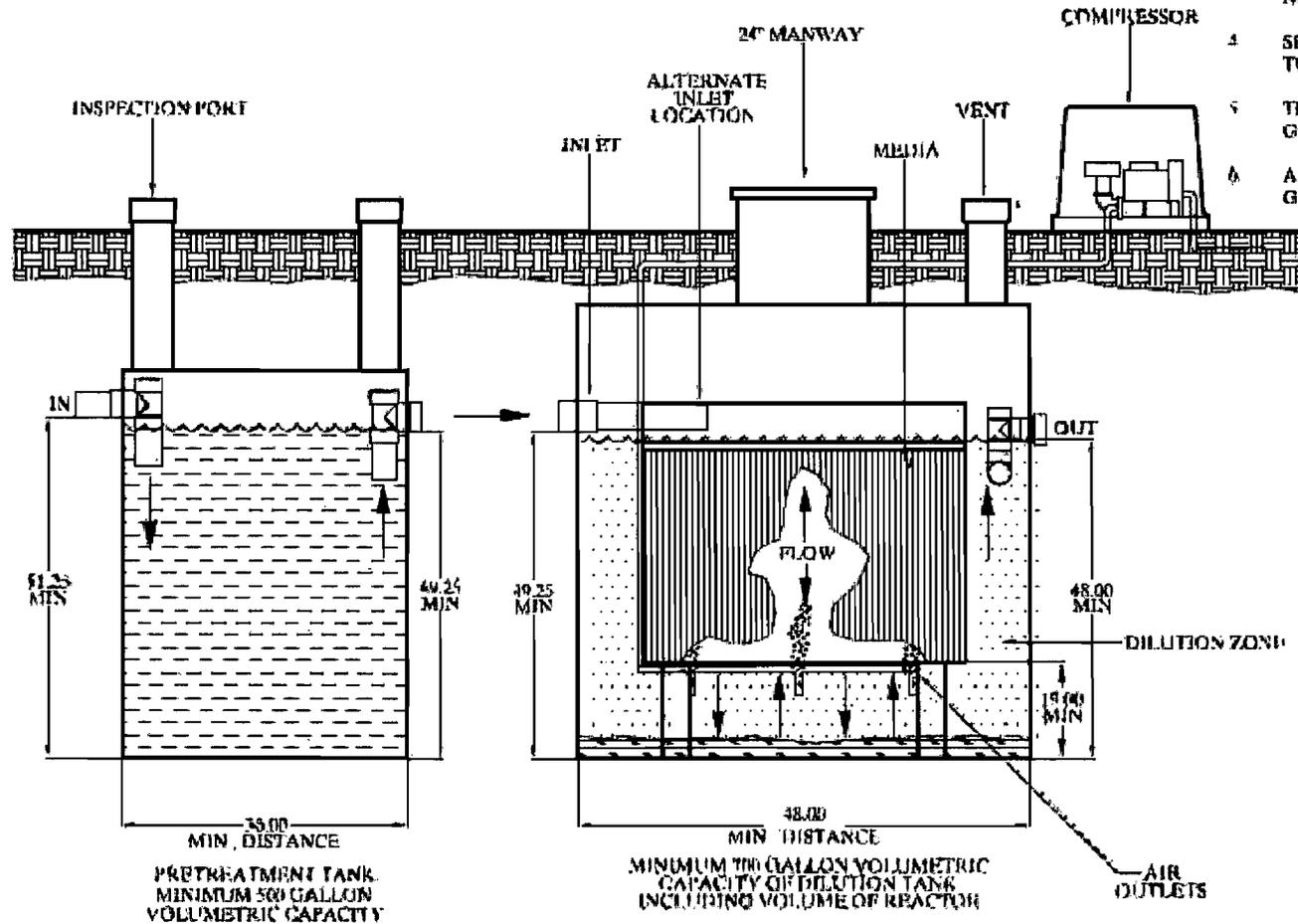
REFER TO TREATMENT PLANT DRAWINGS ON THE ABOVE DIMENSIONS.

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).



ECOPOD-N INSTALLATION INSTRUCTIONS

1. ANCHOR (4) CORNER LEGS TO THE BASE OF THE TANK.
2. THE AIR SUPPLY IN THE ECOPOD MUST BE SECURE SO AS TO PREVENT DAMAGE.
3. SECURE 4" PVC INLET PIPE INTO GASKETED REACTOR INLET.
4. SECURE 3" X 4" DISCHARGE TEE ASSEMBLY TO THE OUTLET OF THE TANK.
5. THE VENT SHALL BE LOCATED ABOVE FINISH GRADE OR HIGHER.
6. AIR COMPRESSOR SHALL BE LOCATED ABOVE GRADE IN A WELL VENTILATED AREA.



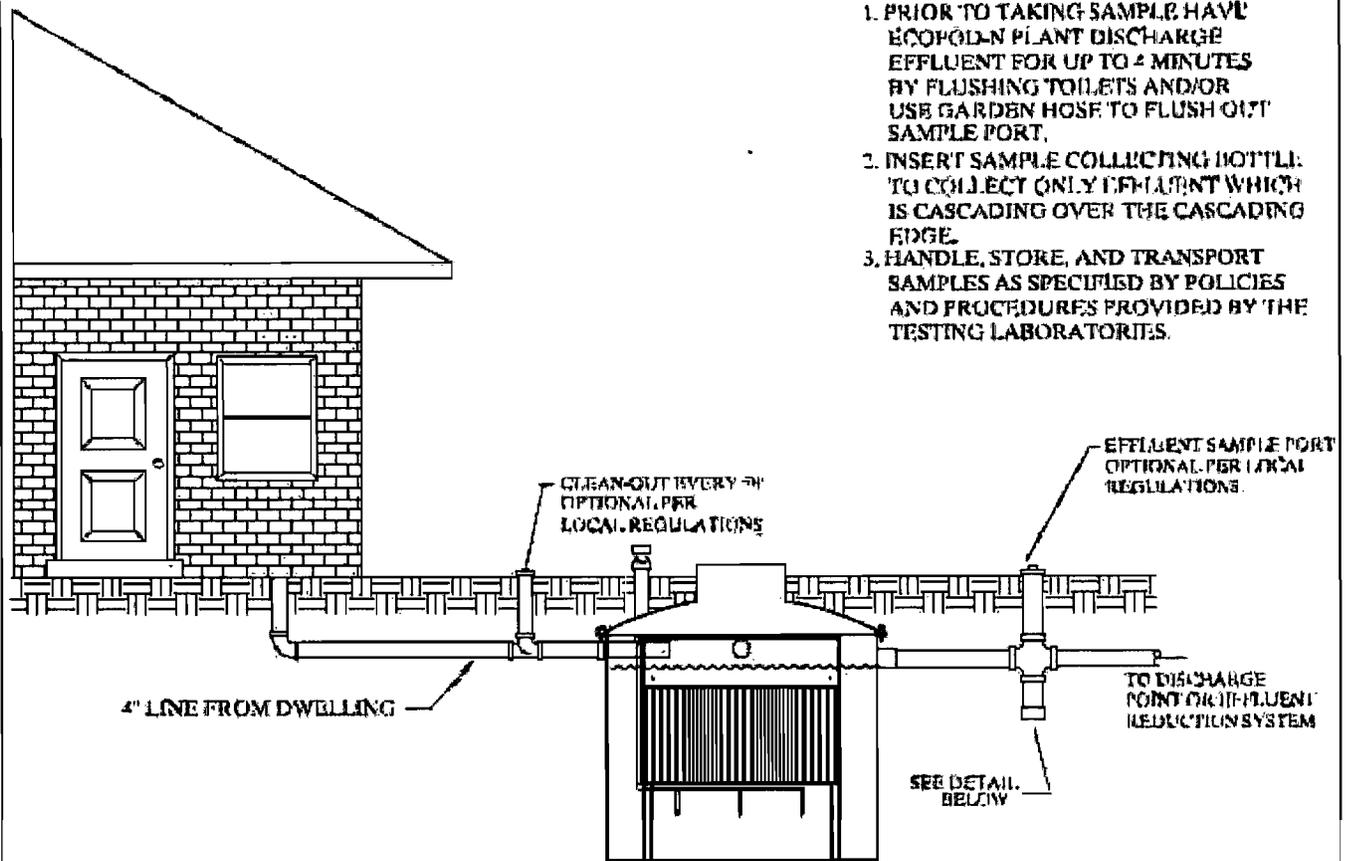
PATENT PENDING


DELTA ENVIRONMENTAL PRODUCTS
 P. O. BOX 969 DENHAM SPRINGS, LA 70727

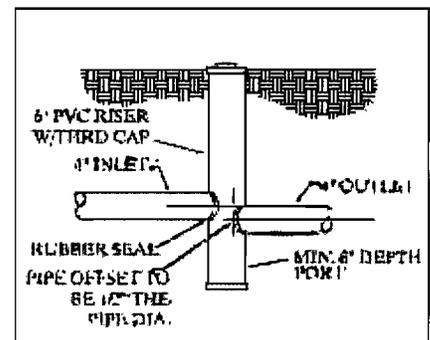
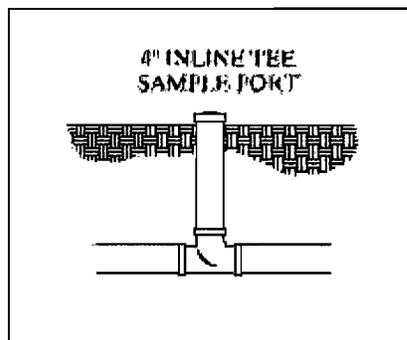
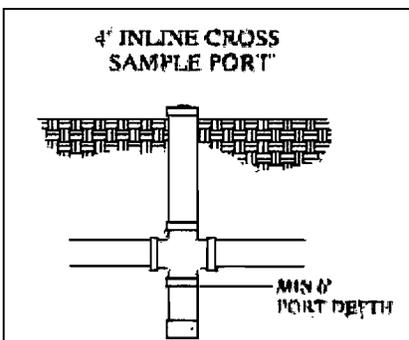
ECOPOD-N FLOW PATTERN			
DWN BY: CRACHAL.	DATE: 3/19/09	SCALE: N.T.S.	DWG. NO. ECOPOD-N FLOW PATTERN

SAMPLE PROCEDURES:

1. PRIOR TO TAKING SAMPLE HAVE ECOPOD-N PLANT DISCHARGE EFFLUENT FOR UP TO 2 MINUTES BY FLUSHING TOILETS AND/OR USE GARDEN HOSE TO FLUSH OUT SAMPLE PORT.
2. INSERT SAMPLE COLLECTING BOTTLE TO COLLECT ONLY EFFLUENT WHICH IS CASCADING OVER THE CASCADING EDGE.
3. HANDLE, STORE, AND TRANSPORT SAMPLES AS SPECIFIED BY POLICIES AND PROCEDURES PROVIDED BY THE TESTING LABORATORIES.



EXAMPLES OF SAMPLE PORTS



DELTA ENVIRONMENTAL PRODUCTS
P. O. BOX 969 DENHAM SPRINGS, LA 70727

SAMPLE PORTS

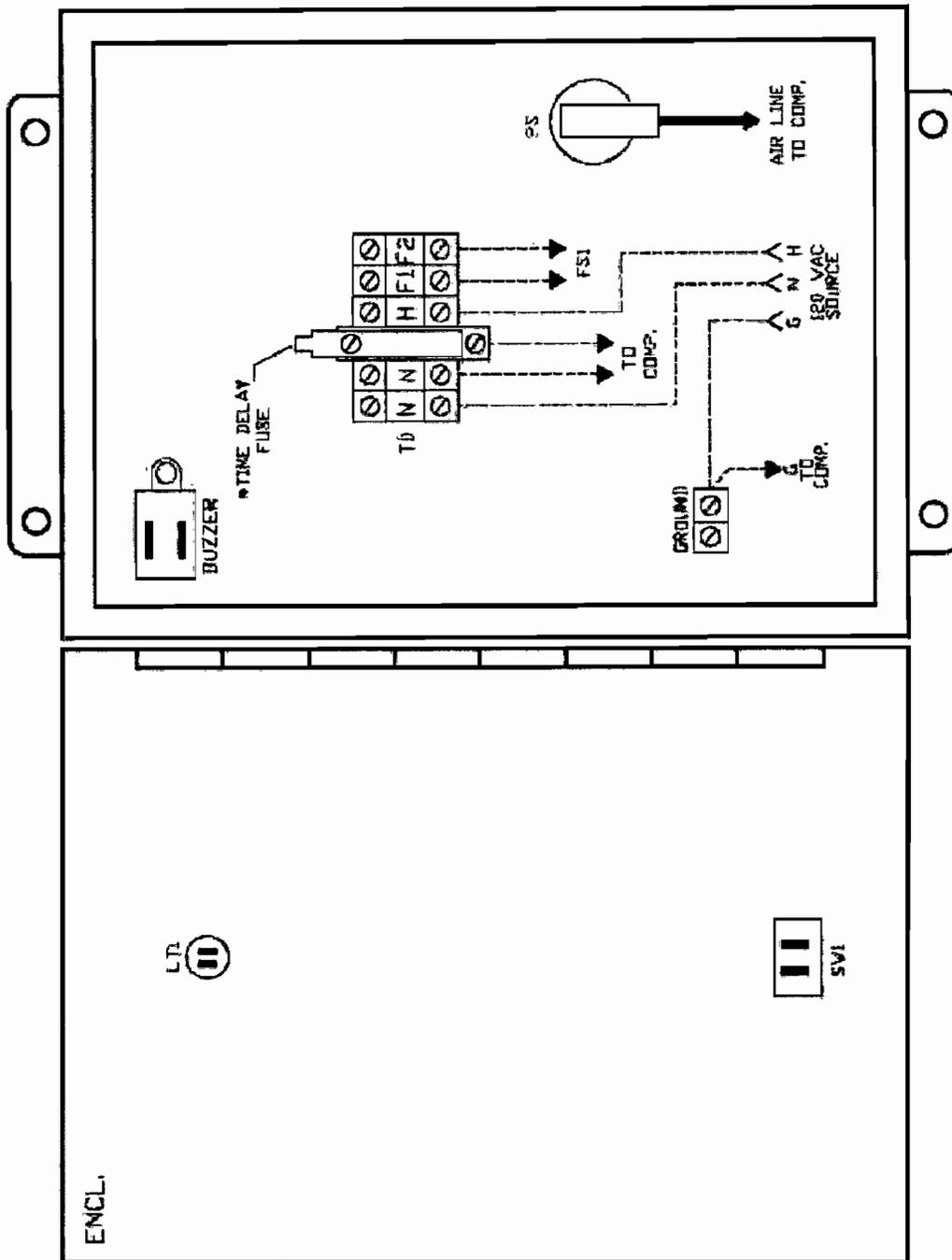
DWN BY:
C. RACHAL

DATE:
5/18/09

SCALE:
N.T.S.

DWG. NO.:
EP-N Sample Ports





FRONT VIEW
 DOOR OPEN
 CP20

FS1-FLOAT SWITCH IN TREATMENT PLANT
 * FUSE SIZE VARIES WITH COMPRESSOR SIZE
 PER NATIONAL ELECTRIC CODE



DELTA ENVIRONMENTAL PRODUCTS
 P. O. BOX 969 DENHAM SPRINGS, LA 70727

CP20 PANEL

DWN BY:
C.RACHAL

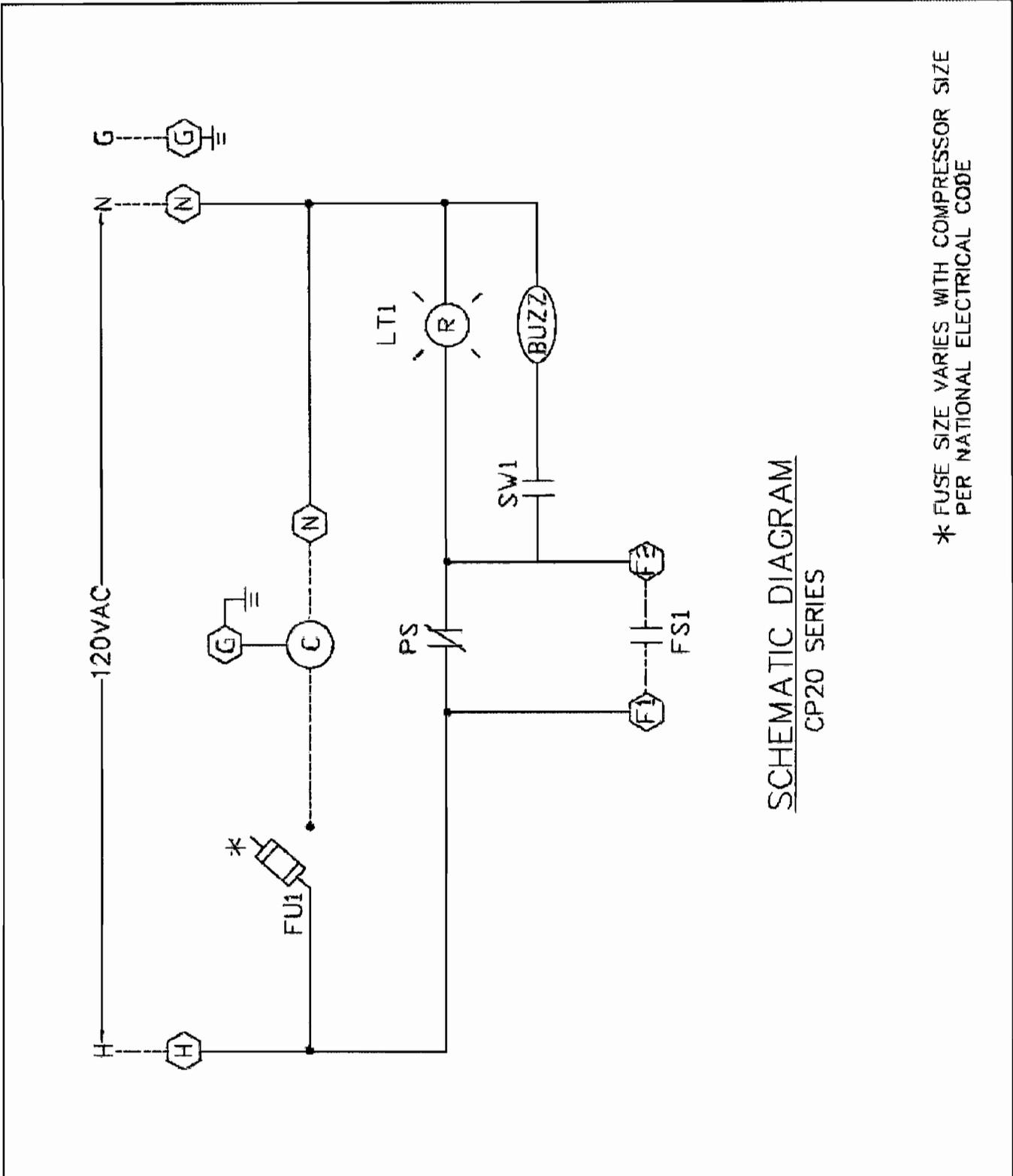
DATE:
 5/18/09

SCALE:
 N.T.S.

DWG. NO.:-
 CP20



Delta Environmental
 Products™



SCHEMATIC DIAGRAM
CP20 SERIES

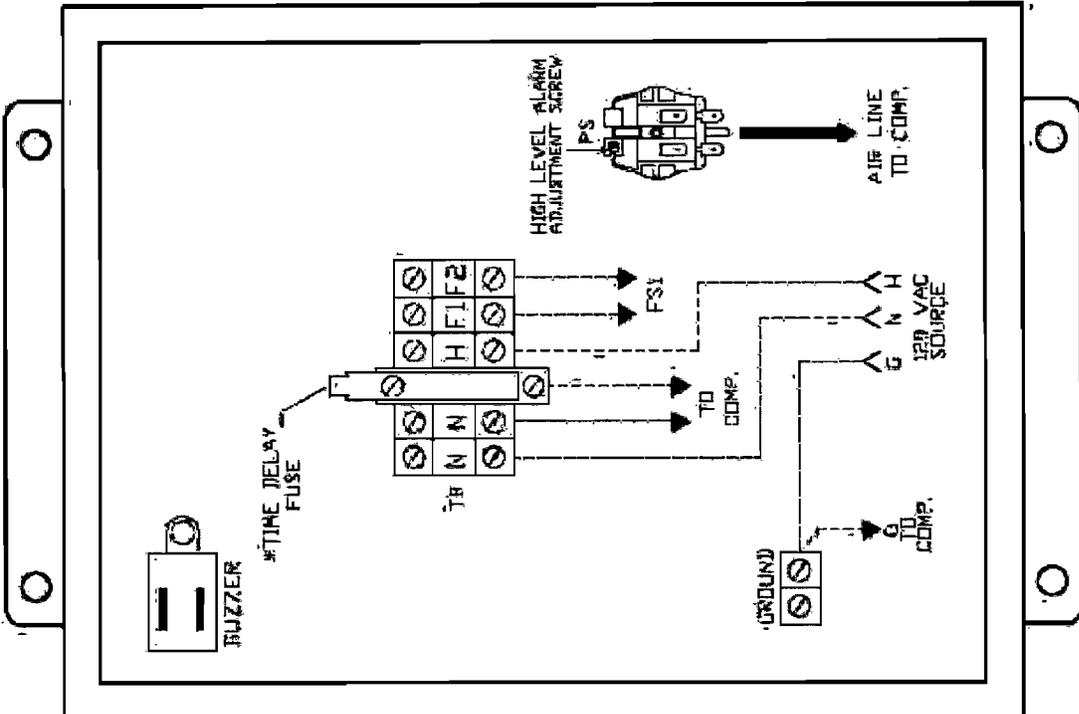
* FUSE SIZE VARIES WITH COMPRESSOR SIZE
PER NATIONAL ELECTRICAL CODE



DELTA ENVIRONMENTAL PRODUCTS
P. O. BOX 969 DENHAM SPRINGS, LA 70727

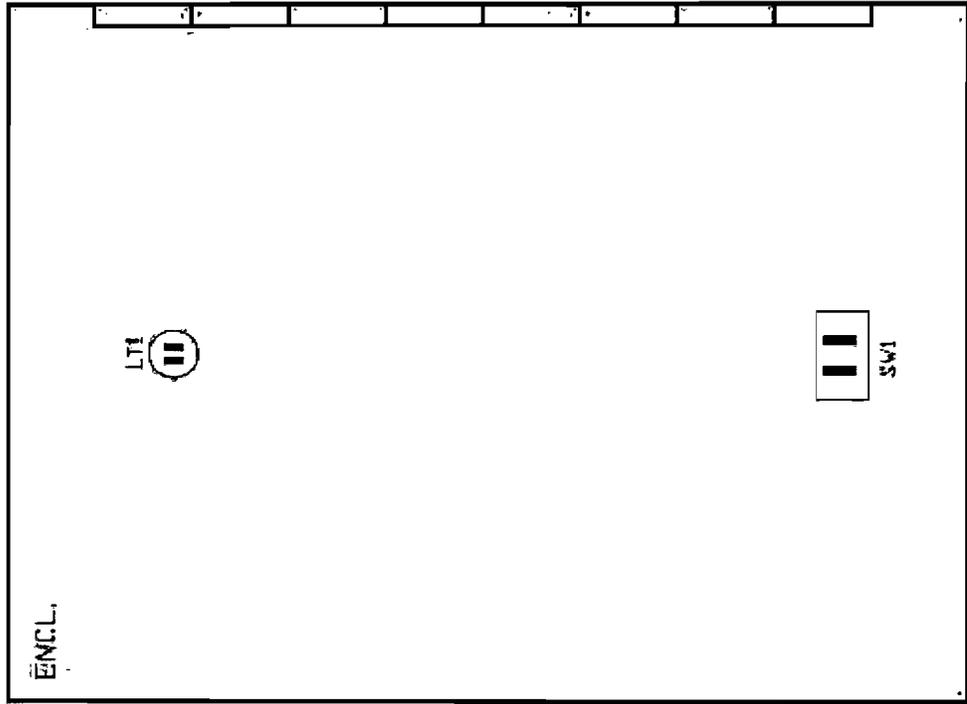
CP20 WIRING DIAGRAM

DWN BY: C.RACHAL	DATE: 5/18/09	SCALE: N.T.S.	DWG. NO.: CP20
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FROM VIEW
 DOOR OPEN
 CP 22

FSI-FLOAT SWITCH IN TREATMENT PLANT
 * FUSE SIZE VARIES WITH COMPRESSOR SIZE
 PER NATIONAL ELECTRIC CODE



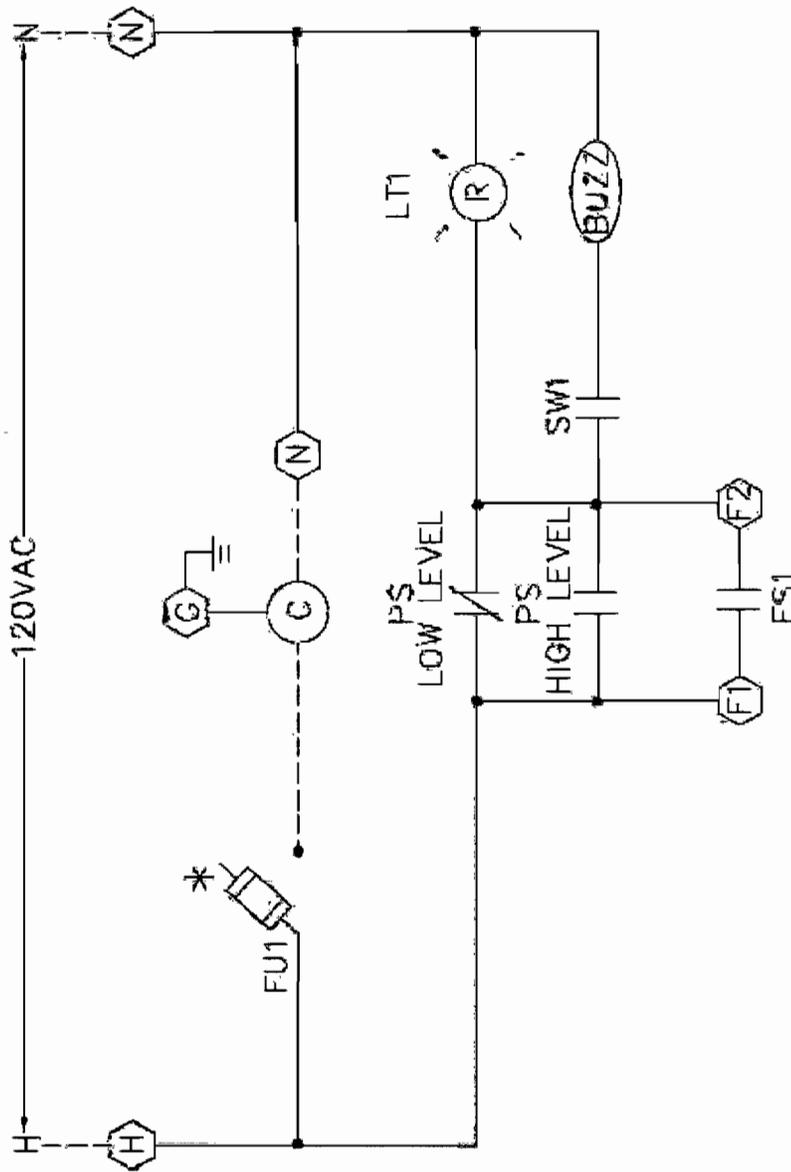
DELTA ENVIRONMENTAL PRODUCTS
 P. O. BOX 969 DENHAM SPRINGS, LA 70727

CP 22 PANEL

QWS OF CRITICAL	DATE: 3/8/88	SCALE N.T.S	DESIGNED BY CP 22 Engineering
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 Products™



SCHEMATIC DIAGRAM
CP22 SERIES

FS1— H.I.L. FLOAT SWITCH (OPTIONAL)

* FUSE SIZE VARIES WITH COMPRESSOR SIZE PER NATIONAL ELECTRICAL CODE

—A SEPERATE DISCONNECT IS REQUIRED.

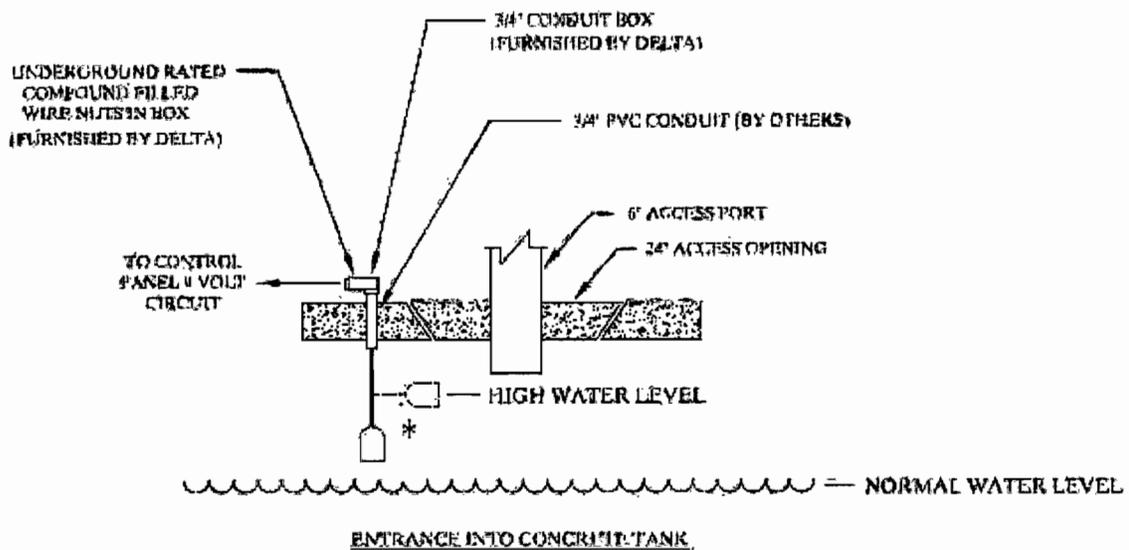
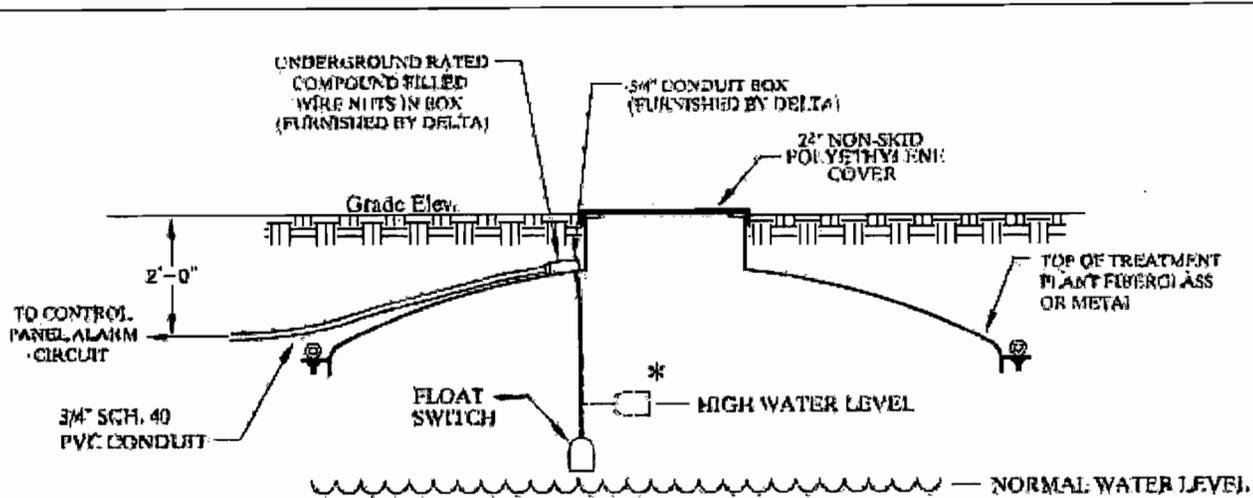


DELTA ENVIRONMENTAL PRODUCTS
P. O. BOX 869 DENHAM SPRINGS, LA 70727

CP 22 WIRING DIAGRAM

OWN BY: CKACIAL	DATE: 5/1/80	SCALE: N.T.S.	DWG. NO. CP22 Schematic
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NOTES:

1. GROMMET TO BE SELECTED FOR TIGHT FIT AROUND CABLE AND IN L.I.D.
2. WIRE TO CONTROL PANEL TO BE 18 GAUGE AND RATED FOR DIRECT BURIAL SERVICE. WOODS WIRE-886 OR EQUAL.
3. WIRE NUTS TO BE RATED FOR UNDERGROUND SERVICE IDEAL-DB PLUS MODEL #0 OR EQUAL.
4. FLOAT SWITCH TO BE NORMALLY OPEN MDI-AS10Y(500) OR EQUAL.
5. SMALL ACCESS PORT SHOWN ON DRAWING LARGE ACCESS PORTS MAY BE SUPPLIED.
6. MINIMUM AMOUNT OF CONDUIT SHOWN ABOVE IS REQUIRED EVEN WITH TYPE LP CABLE.

* HIGH LEVEL FLOAT NOT REQUIRED WHEN USING CP22 SERIES CONTROL PANELS



DELTA ENVIRONMENTAL PRODUCTS
P. O. BOX 969 DENHAM SPRINGS, LA 70727

FLOAT SWITCH MOUNTING

DWN BY:
C.RACHAL

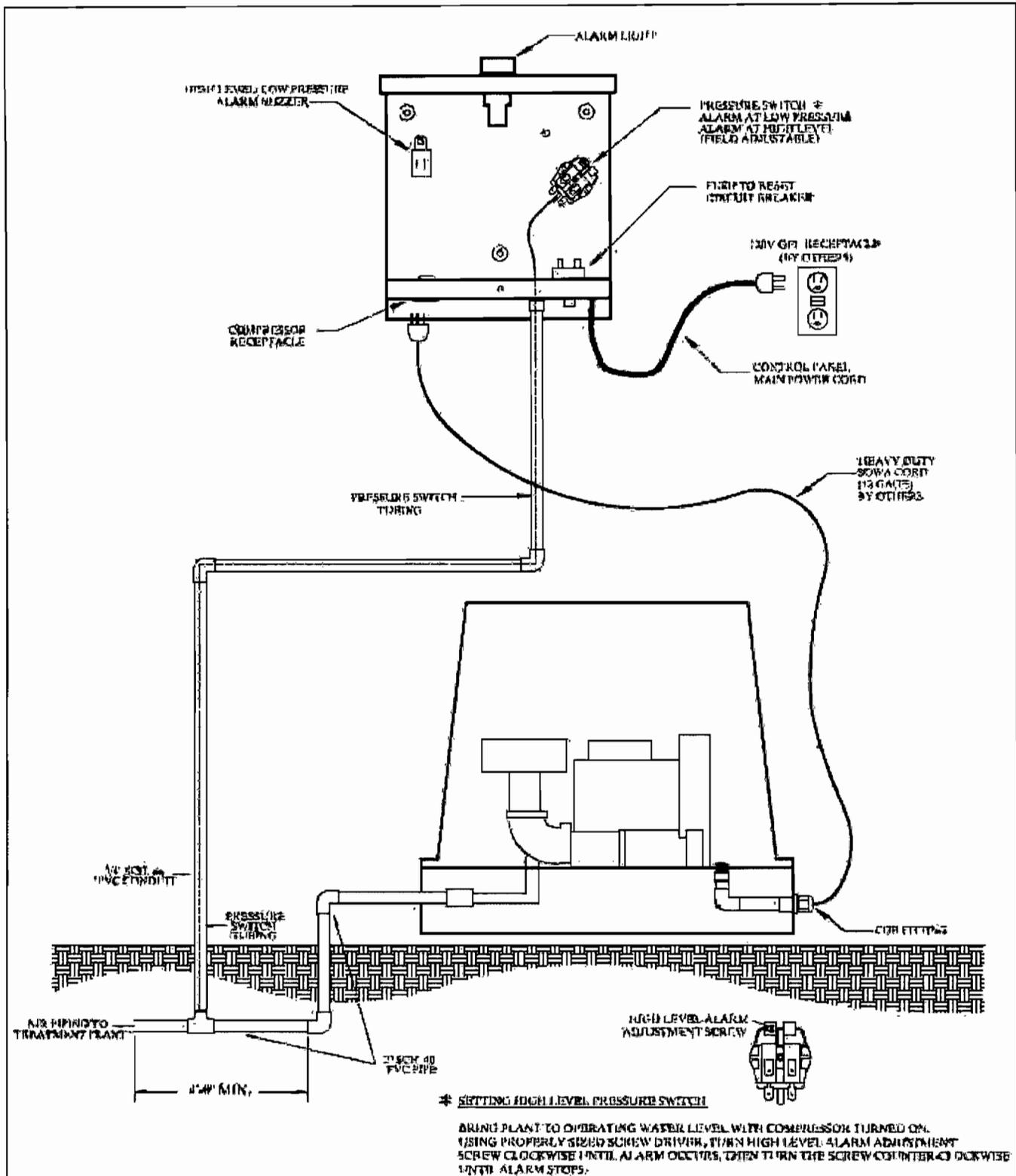
DATE:
5/18/09

SCALE:
N.T.S.

DWG. NO.:
Flt Sw Mtg



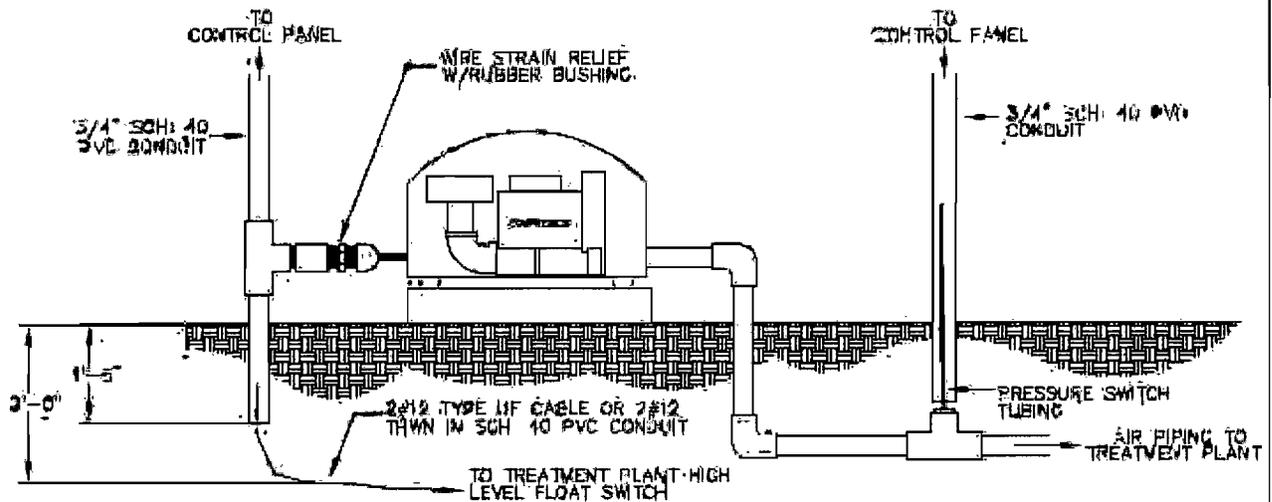
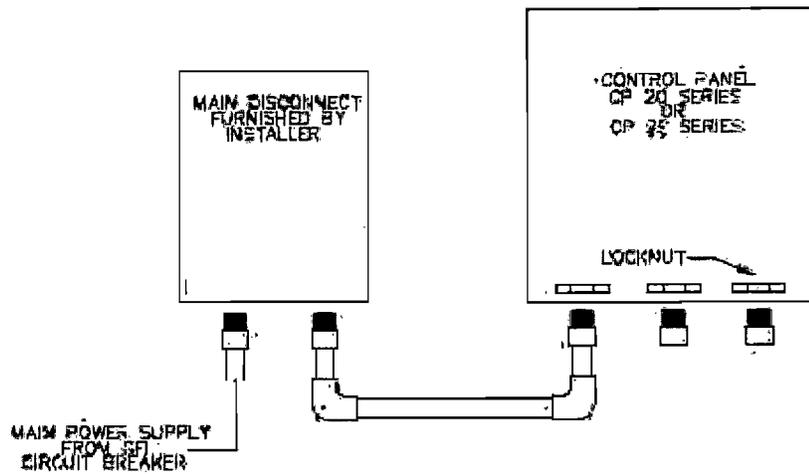
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Products™




 DELTA ENVIRONMENTAL PRODUCTS
 P. O. BOX 969 DENHAM SPRINGS, LA 70727

**CONTROL PANEL CONNECTIONS
 USING REGENERATIVE SERIES COMPRESSORS**

DWN BY: C. RACHAL	DATE: 5/18/09	SCALE: N.T.S.	DWG. NO.: CP Con Regen
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DELTA ENVIRONMENTAL PRODUCTS
P. O. BOX 969 DENTHAM SPRINGS, LA 70727

CONTROL PANEL CONNECTIONS USING LINEAR COMPRESSOR

DWN BY:
C. RACHAL.

DATE:
5/18/09

SCALE:
N.T.S.

DWG. NO.:
CP Con



Delta Environmental
Products™

TREATMENT PLANT DATA PLATES

4"

ECOPOD-U
Delta Environmental Products
8275 Florida Boulevard
Denham Springs, LA 70726
Phone: 1-800-219-9183
Model E XXX-X
XXX GPD Class I



Certified to NSF/ANSI Standards 40 & 245
Serial No. XX-XXXXX XX

2"

4"

ALARM MALFUNCTION ELECTRICAL PANEL

ECOPOD-U
Delta Environmental Products
8275 Florida Boulevard
Denham Springs, LA 70726
Phone: 1-800-219-9183
Model E XXX-X
XXX GPD Class I



Certified to NSF/ANSI Standards 40 & 245
Serial No. XX-XXXXX XX

3"



DELTA ENVIRONMENT PRODUCTS 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. A sample shall be pulled from the aeration tank every six months as described in the "SOLIDS REMOVAL" section to determine if there is an excess of solids in the treatment plant. If the test results determine a need for solids removal, the user will bear the cost and responsibility for doing so.
4. 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.

COMPLAINTS:

In order for Delta Environmental Products 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
P. O. Box 969
Denham Springs, LA 70727-0969

LIMITED WARRANTY

Delta Environmental Products warrants the parts in each treatment system for a limited two (2) years. All warranty questions shall be resolved through Delta Environmental Products. 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 shall fulfill this warranty by repairing or exchanging any component part, F.O.B. factory that in Delta Environmental Products 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 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 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 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 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.

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

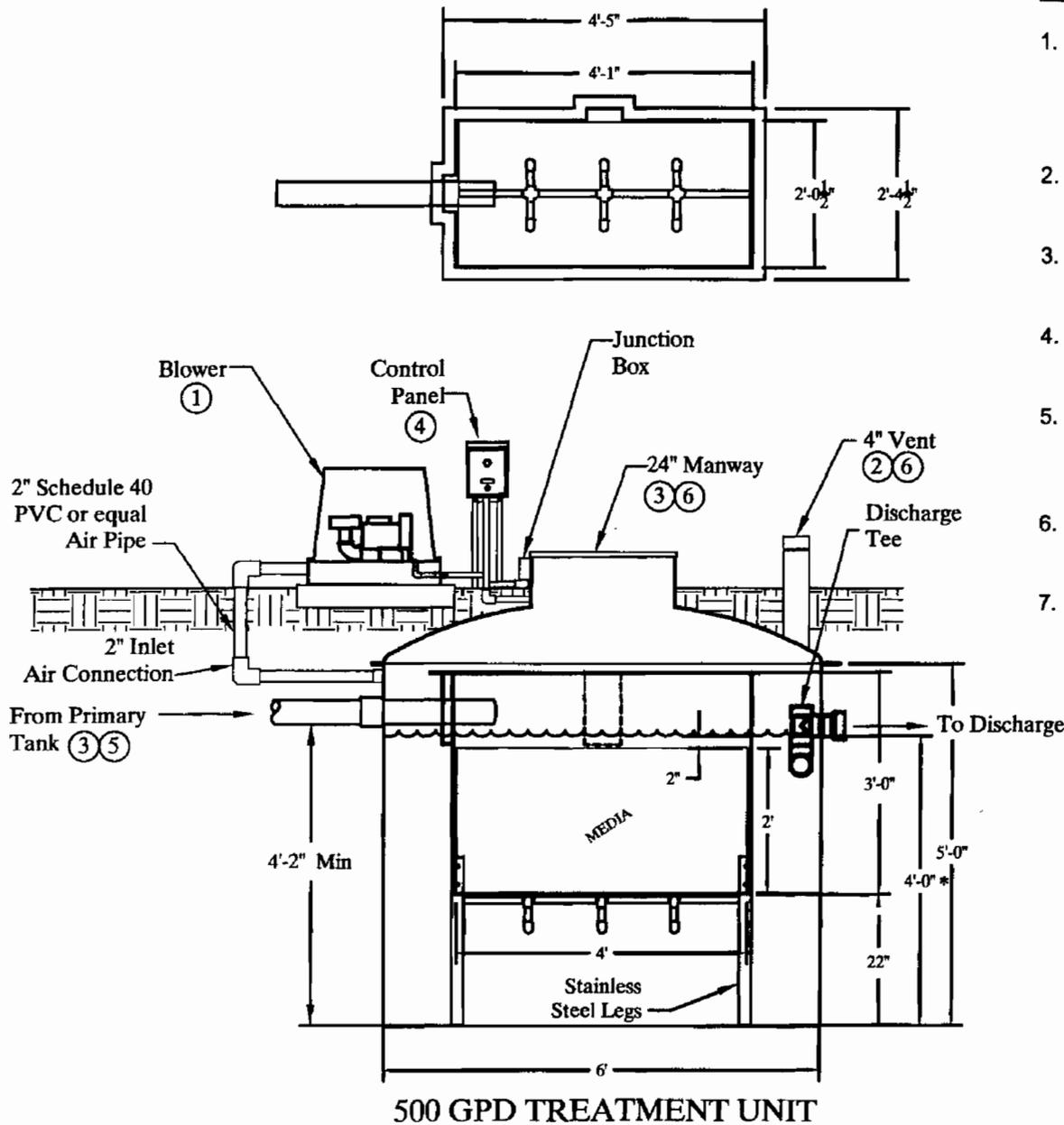


**Delta Environmental
Products™**

Pentair Water
1101 Myers Parkway
Ashland, Ohio 44805-1969
419-289-1144

NOTES:

1. Blower piping to ECOPOD not to exceed 100 FT total length and use a maximum of 4 elbows in the piping system (@ 100 FT). For distances greater than 100 FT, consult factory. Blower must be located above flood levels on a concrete base.
2. Vent to be located above finish grade or higher to avoid infiltration. Cap on vent must be secured with a stainless steel screw.
3. All other tanks to/ from ECOPOD must conform to all applicable country, state, province, and local plumbing electrical codes.
4. Control Panels for Delta systems are engineered and manufactured by Delta Environmental.
5. The primary tank/ compartment must be 1 to 2 times the rated ECOPOD GPD. Primary and Reactor tank volumes are listed in the ECOPOD Design Manual.
6. All manways, pump out ports, and vents must be secured to prevent accidental or unauthorized access.
7. The ECOPOD media must be a minimum of 19" from bottom of tank. For distances less than 19", consult factory for alternant design options.



500 GPD TREATMENT UNIT	
Discharge From Tank	4'-0"
Reactor Volume	700 Gallons
Minimum Distance Under Reactor Box	19"
* 48" - 55" Range	

 Delta Environmental™ Pentair Water	E50N REACTOR IN TANK		
	DWN BY: C.RACHAL	DATE: 4/21/09	SCALE: N.T.S.