

1029 Hwy 201 North
Mountain Home, AR 72653



Phone: 870-424-4330
Fax: 870-424-4330

www.striderconsulting.eng.pro

February 17, 2011

Mrs. Loretta Reiber, P.E.
Arkansas Department of Environmental Quality
NPDES Permits Section, Water Division
5301 Northshore Drive
North Little Rock, AR 72118

Re: The "Chaparral at Cranfield" RV Resort Revised Plans
Baxter County, Arkansas
Permit # AR0051837

Dear Mrs. Reiber:

Enclosed you will find the following for your review and consideration:

1. One (1) set of revised plans for the above captioned project.
2. One (1) amended set of wastewater treatment specifications from Delta Environmental to replace the original Orenco AdvanTex specifications.
3. One (1) set of revised design notes for the project.

The developers have requested a change in the type of sewer treatment system resulting from the comments you stated in the letter addressed to Chip Smith dated December 16, 2010. The new proposed system is the Delta Environmental ECOPOD-N Series fixed film wastewater treatment system.

Please continue review of this project and contact us for any questions or concerns. We can be reached at the above telephone number or at e-mail dellington@striderconsulting.eng.pro. Thank you.

Sincerely,



Danny Ellington, P.E.
Strider Consulting

Enclosures

Cc: Chip Smith

**2011
AMENDED SPECIFICATIONS**

PROJECT:

**“THE CHAPARRAL at CRANFIELD”
A RV RESORT
MOUNTAIN HOME, ARKANSAS**

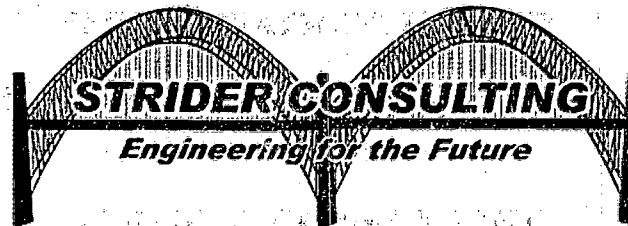
FOR CONSTRUCTION OF:

SEWER TREATMENT FACILITY

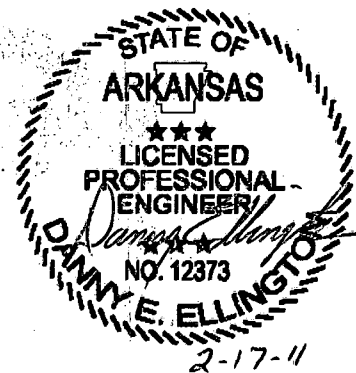
PREPARED BY:

STRIDER CONSULTING

1029 Hwy. 201 North
Mountain Home, Arkansas 72653
Fax/Phone (870) 424-4330



FEBRUARY, 2011



**SPECIFICATIONS FOR
DELTA ENVIRONMENTAL PRODUCTS
ECOPOD-N®
FIXED FILM WASTEWATER TREATMENT SYSTEM**

MEETING ANSI/NSF INTERNATIONAL STANDARD 40, CLASS 1

GENERAL SPECIFICATIONS

The advanced wastewater treatment system described by these specifications is a Delta Environmental Products ECOPOD-N® Fixed Film Wastewater Treatment System Model E150FF. 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 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 1,500 gallons per day average daily flow (ADF) of domestic raw sewage waste with an organic loading of 3.75 pounds of BOD₅. A minimum of 13,824 cubic feet of aeration capacity shall be provided for each pound of BOD₅.

CONSTRUCTION

Construction Options

Fiberglass

The tanks shall be constructed of 3/8 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.

Primary Tank

A primary tank shall be provided as shown on the plans to receive the incoming flow. The pretreatment tank shall provide 12 to 48 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 settle-able 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. Either the chlorinator or the Ultraviolet Light shall be manufactured by the wastewater treatment plant manufacturer.

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 13,824 cubic feet per pound of BOD₅ 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. System shall be ANSI/NSF International certified utilizing UL rated components in an indoor/outdoor NEMA 4X fiberglass 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.

SPECIFICATIONS

DELTA ENVIRONMENTAL PRODUCTS CP 13000 SERIES

DUPLEX / ECOPOD PLC CONTROLLED ELECTRICAL PANEL

GENERAL

Furnish an automatic PLC control panel to provide un-attended automatic operation of the system. The controller shall be completely assembled; wired and tested. The panel manufacturer shall be certified by Underwriters Laboratories, (U.L.) to manufacture U.L. 508A control panels and shall present their certification documentation with submittal drawings.

ELECTRICAL CONTROL PANEL

The control panel shall be enclosed in a NEMA4X weather-proof fiberglass enclosure with an inner safety door to isolate all power components and protect the operator. A locking hasp shall be provided on the exterior of the enclosure. Each pump shall be provided with a circuit breaker and a magnetic starter with Class 10 ambient compensated overload relays. HOA selectors and run lights shall be provided for each pump. An alternating relay shall be provided to alternate pumps on successive cycles of operation. Provisions shall be made to provide simultaneous operation of both pumps on high demand. A terminal strip shall be provided to connect all float switches and remote pilot devices. All electrical devices shall be finger safe or have finger safe covers to prevent incidental contact with energized components. Only control panels with high quality individual industrial components with high withstand capability to power surges will be acceptable. Unitized printed circuit board type control panels will not meet this specification.

SYSTEM FEATURES

The Delta Environmental Products 13000 Series professional series control panel utilizes a programmable logic controller (PLC) to automate all functions in a NEMA 4X hinged door enclosure.

The PLC provides:

- Influent pump control
- Multiple ECOPODs Operation

- Adjustable override dosing times
- Accepts 2, 3, or 4 float arrangements
- Simplex and Duplex
- Multiple power circuits compatibility
- Override counter
- High level counter
- Switch to hand counter

SYSTEM OPERATION

The control panel contains a programmable logic controller (PLC) that periodically turns the influent pumps, located inside the flow equalization tank, on and off. The PLC is capable of time dosing each E150 independently and at different time settings. The control panel is furnished with a Hand-Off-Auto switch located in the panel. The hand mode overrides the PLC timer so the pump can be manually turned on. When the level of water in the flow equalization tank is low, the pump float switch will be in the off position, disabling the pump. The control panel also contains a high level alarm that will sound if a high level is reached in the dose tank which may indicate a system malfunction.

The control panel contains a programmable logic controller (PLC) that manages the pumps and the E150 air blowers. The CP13000 manages either a blower for each E150 or one for all E150s and can be operate a dual blower arrangement. The CP13000 has optional effluent pump circuit that operates simplex or duplex pumps, both on demand and timed dosed. The hand mode overrides the PLC timer so the pump can be manually turned on. When the level of water in the tanks is low, the pump float switch will be in the off position, disabling the pump. The control panel also contains a high level alarm that will sound if a high level is reached in the tanks which may indicate a system malfunction.

ENCLOSURE

The enclosure shall be Nema 4X rated fiberglass and shall be equipped with an inner safety door. The outer door shall be gasketed. All pilot devices shall be mounted on the inner door. All power and control devices shall be mounted behind the inner safety door on a painted white steel or aluminum sub-panel.

TRANSFORMER

A control power transformer (CPT) with fused primary and secondary shall be provided to reduce the control voltage to a maximum of 120 VAC and shall be sized to meet all control requirements. Provide a transformer when the voltage is 3/208 VAC , 3/240 VAC, 3 wire and 3/480 VAC. Transformer may be deleted where a neutral is supplied to provide 120 VAC line to neutral voltage.

SINGLE PHASE MOTOR STARTING MODULES

Furnish when required by the pump manufacturer, all necessary start relay(s), start capacitor(s) and run capacitors(s) needed for the correct operation of single phase motors. All start/run components and circuits shall be compatible with the pump motor(s) being used. (Applies to single-phase control panels only.)

CIRCUIT BREAKERS

The power system shall contain two back panel mounted branch thermal magnetic motor circuit breakers. The protector operating mechanism shall be quick make, quick break and trip free.

MOTOR STARTERS

The motor starters shall be full voltage, non-reversing, horsepower rated with Class 10 ambient compensated overload relays and sized for the specified pumps. The overload relays shall contain an additional N.O. (normally open) contact to provide a crossover circuit enabling the opposite pump to run on an overload trip.

MOISTURE DETECTION

Where submersible pumps that have moisture detectors utilized, a moisture detection circuit shall be provided to sense moisture in the pump seals. A warning light inside the panel shall illuminate upon this condition, but shall not cause the pump to lockout. However where the moisture detector is internally connected in series with the over temperature detector, it shall stop the pump.

OVER TEMPERATURE PROTECTION

The panel shall be wired to connect an over temperature device in or on the pump that will activate on high temperature and stop the pump. The temperature device shall automatically reset when the temperature drops to normal.

OPTIONS [Engineer to make selections if any. List is from most common to least common]

The following options shall also be provided:

- * Main disconnect switch accessible from inside panel.
- * Lightning arrester to limit power surges.
- * Elapsed time meters to record pump run times.
- * Phase monitor to protect motors from phase failure (3 phase panels only)
- * Duplex GFCI on outside of enclosure (120/240 single phase panels only)
- * Remote alarm light instead of panel mounted.
- * Stainless steel enclosure instead of fiberglass.
- * Green run lights instead of red.
- * NEMA rated starters
- * High temperature lock out with manual reset push button for non-submersible pumps.
- * Mounting pole, junction box, and seal below panel to prevent gases from entering panel.
- * Intrinsically safe relays.
- * Remote Monitor

Delta
Environmental
Products™



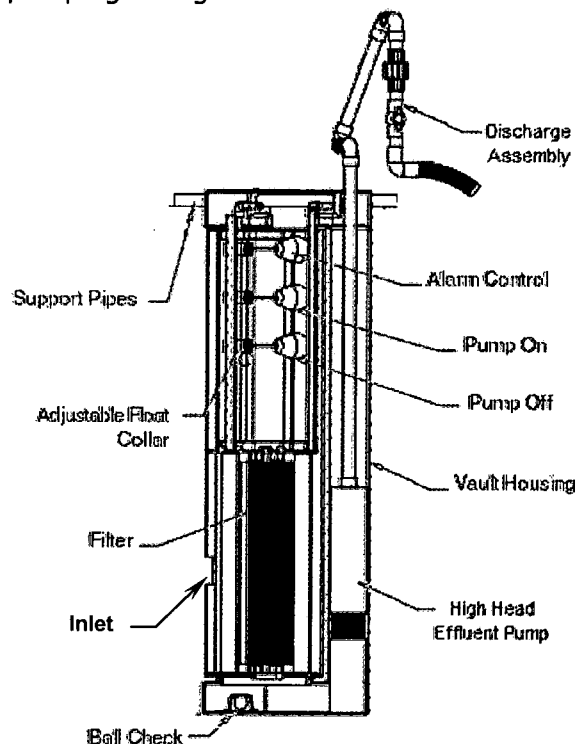
SYSTEM SPECIFICATIONS

PRODUCT USE

Delta Environmental Products ecoFILTER™ Pump Vault systems are designed for septic tank effluent pumping. The ecoFILTER™ can either be used in an advanced wastewater treatment system or in a STEP collection system. The ecoFILTER™ Pump Vault has a unique structural design to ensure long life and performance.

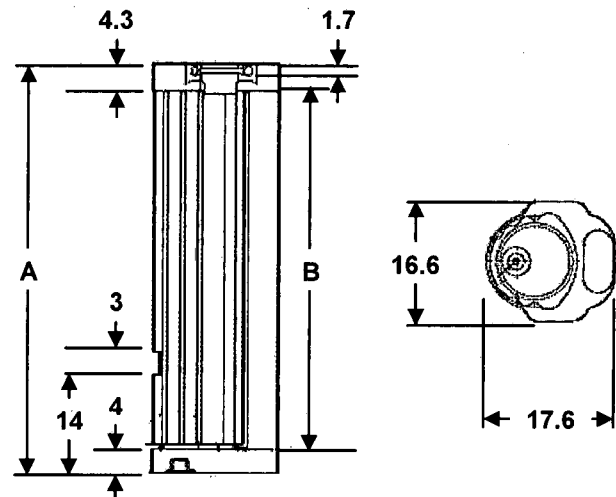
PRODUCT DESCRIPTION

Delta Environmental Products ecoFILTER™ Pump Vault systems include a molded LDPE housing, polypropylene and PVC filter, schedule 40 PVC discharge kit, schedule 80 PVC support pipes, mercury float level controls, submersible high head effluent pump, and control panel. The filter and float tree are designed to allow removal for cleaning without removal of the pump or housing. The housing is capable of accommodating a simplex or pumping configuration.



PUMP VAULT SPECIFICATIONS

Model	DEPV-49-20-1	DEPV-57-20-1
A - Vault Height (in)	49	57
Filter Diameter (in)	9 ¾	9 ¾
B - Filter Height (in)	40 11/16	48 11/16
Filter Screen Opening (in)	0.125	0.125
Filter Surface Area	1848 in ²	2208 in ²
Housing Inlet Height (in)	14	14
Pump Off/On/Alarm Level (from top of vault, in)	14 / 10 / 6.25	22.5 / 17.5 / 12.5



MATERIALS OF CONSTRUCTION

Housing	Low Density Polyethylene
Filter	Polypropylene / PVC
Float Tree	Schedule 40 PVC
Support Pipe	Schedule 80 PVC
Float Control	Narrow Angle, Normally Open Mercury Level Control
Discharge Kit	Schedule 40 PVC

Delta
Environmental
Products™



SYSTEM SPECIFICATIONS

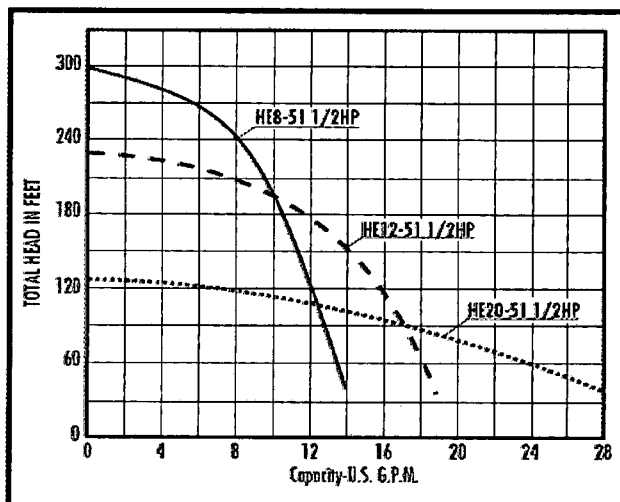
PUMP SPECIFICATIONS

Pump Flow Rate (Gallons per Minute / GPM)	Standard – 20 Optional – 8, 12
RPM	3450
HP	1/2
Voltage	115
Phase	1
Frequency	60 Hz
Full Load Amps	14.5
Motor Protection	Built-in overload and surge protection
Max Starts per Hour	300
Discharge Size	1 1/4"
Cable Length	25'
Cable Type	14-3 Jacketed SJOW- A
Max Liquid Temperature	122°F
Backflow Protection	Built-in check valve

PUMP MATERIALS OF CONSTRUCTION

Pump Housing	300 Series Stainless Steel
Shaft	300 Series Stainless Steel
Impeller	Thermoplastic
Suction Bowl	Chemically Resistant Reinforced Nylon
Discharge Bowl	Corrosion Resistant Reinforced Polycarbonate

PERFORMANCE DATA



CONTROL PANEL SPECIFICATIONS

Enclosure Dimensions	10"x8"x4"
Overall Dimensions	12"x10"x5.5"
Enclosure Type	UL Type 4X with Molded Mounting Feet
Audible Alarm	Includes Normal – Silence switch
Alarm Light	Flashing Red
Controller Temp Range	-140°C thru 185°C
Humidity Range	95% non-condensing
Voltage to Floats	120 - 230 VAC
Voltage to Pump Relays	120 VAC

CONTROL PANEL FEATURES

Standard Features

- Standard control devices
- Pump on/off
- Alarm light and buzzer
- Lockable latch
- HOA switch
- Normal-Silence switch
- Pump and controls circuit breakers
- Motor Magnetic Contactor
- 2 or 3 float operation
- All finger safe components

Available Options

- Elapsed Time Meter
- Cycle Counter
- Run Indication Light
- Power Indication Light

HIGH HEAD EFFLUENT PUMPS SPECIFICATIONS

EFFLUENT PUMPS: Pump(s) shall be Aermotor T Series filtered effluent pumps selected in accordance with the following design criteria:

PUMP – The pump shall be designed to handle septic tank filtered effluent and be capable of passing 1/16 inch spherical solids. The pump shall be capable of handling liquids with temperatures to 140°F intermittent and shall be capable of running dry for short durations without damage to the motor or pump end.

MOTOR – The pump motor shall be of the submersible type rated ½, ¾, 1, 1-½, 2, 3, 5 hp as required. Motor shall operate at 3450 RPM and shall be for 115 volts (1/2 hp), 230 volts single phase, 60 cycles or 230/460 volt 3-phase, 60 cycles. Single-phase motors shall be of the split phase design type. Stator winding shall be hermetically sealed Class B insulation rated for 130°C maximum operating temperature. The winding housing will be filled with anti-track self healing resin to transfer heat from the windings to the outer shell. The motor assembly shall consist of a corrosion resistant exterior construction. The motor incorporates a biac starting switch which provides automatic torque reversal to aid starting in adverse environments and prevents fast cycling.

The motor shall be capable of operating over the full range of the performance curve without overloading the motor causing any objectionable noise or vibration. The motor shaft shall be of 400 series stainless steel and shall be heat shrunk into the die cast motor rotor. The motor shall have two bearings to support the rotor; an upper sleeve bearing to accommodate radial loads and a lower Kingsbury bearing to take thrust loads. Bearings shall be designed for a B-10 file life of 50,000 hours.

POWER CORD – The motor power cord shall be SJOW. The cable jacket shall be sealed at the motor entrance by means of a rubber compression washer and compression nut. A molded rubber tube filled with epoxy shall seal the outer cable jacket and the individual leads to prevent water from entering the motor housing.

SHAFT SEAL – The motor shall be protected by a nitrile rubber lip shaft seal. The seal shall be protected by an acetal seal cover and nitrile rubber slinger.

PUMP IMPELLER – The pump impeller shall be of the six vane enclosed type. The impeller shall be constructed of engineered thermoplastic. A stainless steel wear ring shall be molded into the thermoplastic housing for the plastic impeller to provide a wear surface. The impeller shall have a hexagonal I.D. and be positively driven by a hexagonal 300 series stainless steel pump shaft.

PUMP AND MOTOR ASSEMBLY – The pump end shall consist of corrosion resistant 300 series stainless steel and thermoplastic. The motor construction is 300 series stainless steel, with a 400 series stainless steel shaft.

FASTENERS – All fasteners shall be of 400 series stainless steel.

REVISED DESIGN NOTES

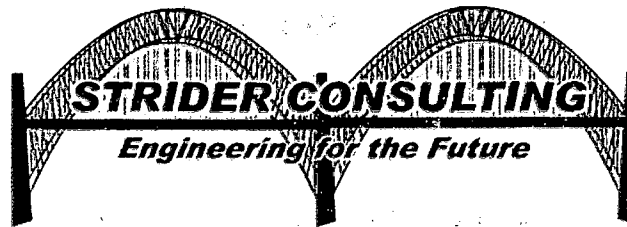
“THE CHAPARRAL at CRANFIELD”
A RV RESORT
MOUNTAIN HOME, ARKANSAS

FOR CONSTRUCTION OF:

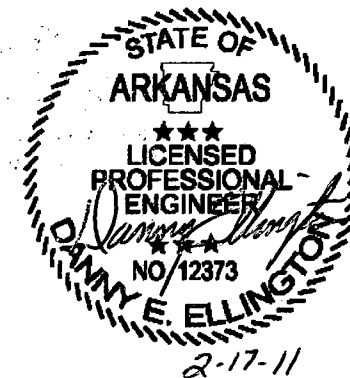
WATER LINES
SEWER LINES
SEWER TREATMENT FACILITY

PREPARED BY:

STRIDER CONSULTING
1029 Hwy. 201 North
Mountain Home, Arkansas 72653
Fax/Phone (870) 424-4330



AUGUST, 2010
REVISED FEBRUARY, 2011



REVISED DESIGN NOTES

The design plans for the Chaparral at Cranfield has been revised because of a change in the wastewater treatment system and the sewer collection system. The water distribution design will basically remain the same as the original design submitted although the daily flow has been reduced from 8870 gpd to 2850 gpd. But the size of the water mains will remain the same to allow for future expansion if necessary.

The treatment system has been changed from the Orenco AdvanTex system to the Delta ECOPOD-N system. This change was due to the Arkansas Department of Environmental Quality (ADEQ) approval of the Orenco system. Some other Orenco systems installed in the state have been unable to meet the Ammonia limits set by ADEQ whether by design or operator error is not known at this time. ADEQ is hesitant about approving their system until corrections have been made and limits can be attained by the existing systems in the state. ADEQ requested documents demonstrating the ability of the AdvanTex system to meet Ammonia numbers not to exceed 8 mg/l and an average of 5 mg/l. The supplier of the Orenco system was unable to furnish these requested results to the developers satisfaction.

The sewer collection system has been changed because of the downsizing of the RV resort from 42 spaces to 16 spaces for cost reasons. Also the collection has been changed to a septic tank effluent/small diameter sewer system.

Sewer Collection System:

The Chaparral at Cranfield is a proposed 16 space Recreational Vehicle Resort located on Cranfield Point Road in Mountain Home, Arkansas. This RV Resort is to provide long-time space rental and no overnight stay patrons. A public sewer system is not available in this area so a private conventional wastewater collection system and a decentralized treatment system will be installed.

The sewer collection system of the resort is shown on the revised design plans as sheet 4. The collection system will include the 16 RV spaces, a service building, and a dump station. Under the Arkansas Department of Health's *Rules and Regulations Pertaining to Mobile Home and Recreational Vehicle Parks*, the sewage treatment/disposal systems for recreational vehicle parks shall be sized according to the estimated daily flow requirements as specified in Appendix B of the *Rules and Regulations Pertaining to Onsite Wastewater Systems, Designated Representatives, and Installers*. The flows are listed as follows:

- Rv space with water & wastewater hookup – 150 gpd
- Service Building, washing machine – 450 gpd Wastewater Engineering- 3rd Edition, Metcalf & Eddy, Table 2-10, Page 28.

The showers and bathrooms in the service building are for the use of customers staying at the resort only, so these flows are included with the RV space with water and sewer

hookup flow. The same would be said about the flows from the dump station. The primary use of the dump station would be customers cleaning their RV sewage tank upon leaving the resort. The service building is to provide one washer and dryer for the customers. The total flow is as follows:

RV Spaces = 2400 gpd
Service Building = 450 gpd
Total Design Flow = 2850 gpd

The developers would like to utilize a Septic Tank Effluent/Small Diameter Collection System. Every 4 RV spaces will be connected to a 1250 gallon septic tank. Since no solids will be flowing in the pipe, all sewer mains will be 4 inch SDR 26 PVC pipe. The service lines will be either 4 inch schedule 40 pipe or 4 inch SDR 26 PVC pipe.

A spreadsheet has been derived showing the design flows and capacity of the pipes (see Attachment A). A peaking factor of 4 was multiplied to the design flows. The maximum depth of flow calculated for any pipe was 0.84 inches which was due mainly to the low slope of 0.64 %. The 4 inch pipe will easily handle the flows for the resort.

Wastewater Treatment System:

A Delta ECOPOD-N Fixed Film wastewater Treatment System will be used in conjunction with the collection system and a surface dispersal. Wastewater will be collected in septic tanks with minimum 48 hour hydraulic retention time. The septic tank effluent will then travel into one (1) 1500 gallon dosing tank, which is then pumped to one (1) of two (2) 1500 gallon reactor E150-N tanks. The effluent from the pods is directed to the tablet chlorinator and thence into the 2,000 gallon coagulation/settling/aeration tank. From this tank, the treated effluent flows by gravity to a hydrologic conduit discharging into Norfolk Lake.

Arkansas Department of Environmental Quality will be supplied a copy of the sewer system. A discharge permit from ADEQ will have to be granted before the sewer treatment system can become operational. Any future installations will require a whole new system.

The following are the design calculations for the proposed system.

Design Calculations:

Total Design Flow = 2,850 gpd

Required ECOPODS = 2 (1500 gallon tanks)

Max Pump Dose Volume per Minute = 25 gal

Max Duration @ Minutes Interval = 2 minutes @ 15 min. intervals.

Septic Tankage (48 hrs retention) = 5,700 gal

Use five (5) 1250 gal septic tanks and one (1) 1500 gal dosing tank

Disinfection Calculations:

Max. flow daily = 2,850 gpd

Tablet chlorinator range = 200 to 20,000 gpd (Norweco ITR 2000-S)

Max pod dose flow rate = 25 gpm

Detention basin = 2,000 gal

Detention time = 2,000 gal / 25.0 gpm = 80 minutes

(102.44 Ten State Standard = 15 minutes @ max. flow rate)

(10.5.5.4 Rules and Regulations Pertaining to Onsite Wastewater Systems = 30 minutes retention time)

Phosphorus Removal:

In Baxter County, ADEQ requires a discharge limit on phosphorus (1.0 mg/l). For this reason, a method for phosphorus removal will be added to the system. Phosphorus removal with metal salts, typically aluminum or iron is by far the most popular method used in the United States. Systems utilizing metal salt

addition can effectively achieve 80-95 percent total phosphorus removal and effluent-P concentration less than 1.0 mg/l (EPA – Phosphorus Removal 1987).

After treatment, effluent shall flow through the tablet chlorinator and into a 2000 gallon, three compartment coagulation/settling/post aeration tank. The wastewater shall flow into the coagulation chamber where rapid mixing and flocculation shall occur using a submersible aerator. The coagulant dosing pump shall be energized when the recirculation tank pump operates. Flocs shall flow into the second compartment and settle as precipitated sludge. A submersible pump shall be used to remove the sludge and return it to the primary septic tank (optional). The final compartment shall contain a submersible aerator to ensure the effluent dissolved oxygen is > 6 mg/l.

This tank will also be used as the chlorine detention basin. The amount of chemicals will be determined through sampling after the system is operational.

Alkalinity Dosing System:

If the alkalinity is not sufficient for the phosphorus removal process to function properly, an alkalinity dosing system has been incorporated into the system. Typically, a solution of sodium bicarbonate is used as the alkalinity source. The operator will mix the solution using a ¼ HP mixer with a single propeller which shall be fed automatically using a chemical feed pump and timer.

Expected Incoming Effluent Strength:

BOD₅ = 150 mg/l
TSS = 150 mg/l
TKN = 65 mg/l
G&O = 20 mg/l

Targeted Treatment Quality:

BOD₅ = 10 mg/l
TSS = 15 mg/l
NH₃-N = 10.3 mg/l May – March and 3.9 mg/l in April
DO = 6 mg/l
Fecal Coliform = 200 col/100 ml
pH: 6 to 9 S.U.
Phosphorus (P) = 1 mg/l

Attachment B presents the process flow diagram of the system.

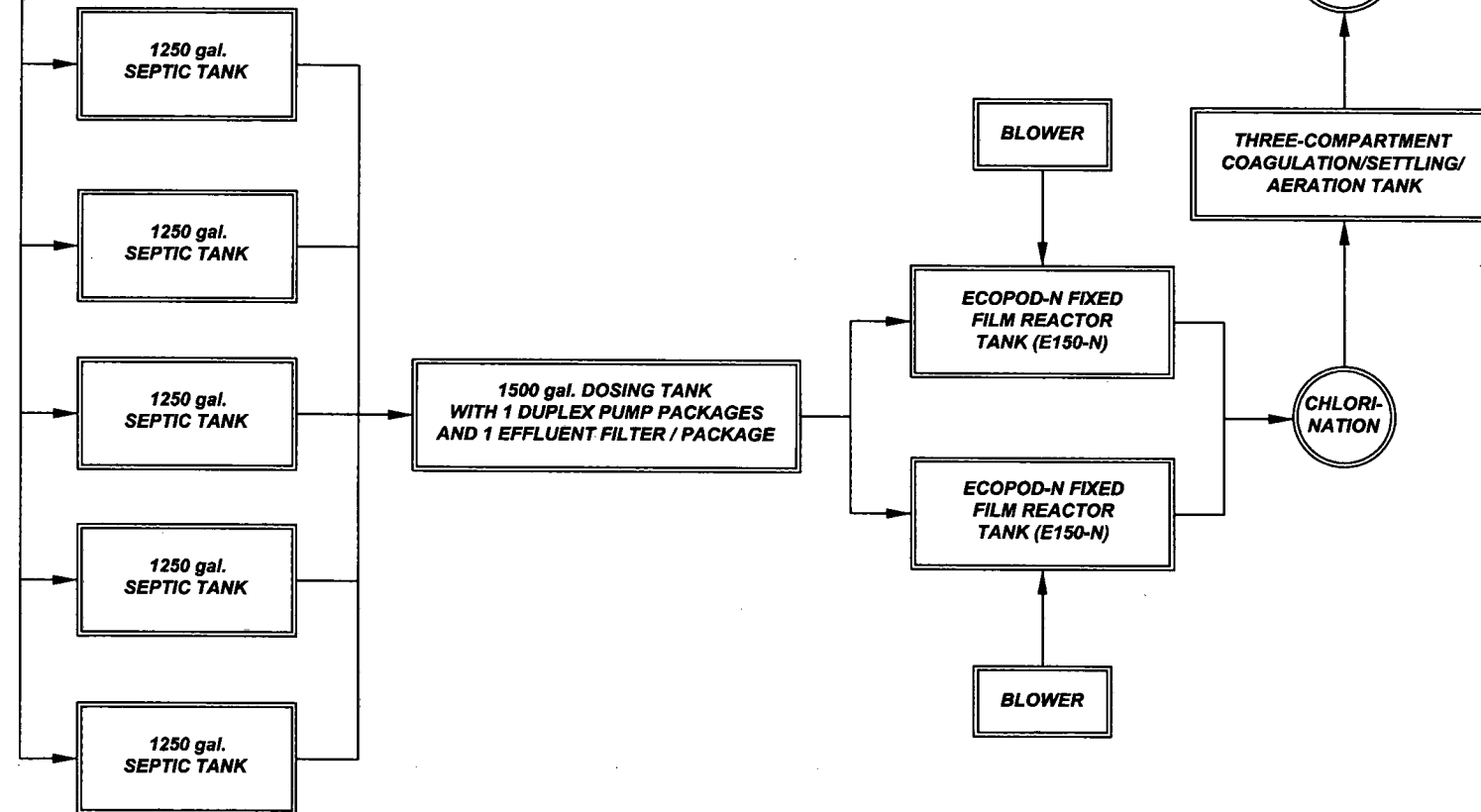
ATTACHMENTS

- A: Sewer Design Flows.
- B: Process Flow Diagram
- C: Test Data & Case Study
- D: Design Manual & Guidelines

Attachment A: Sewer Design Flows

Attachment B: Process Flow Diagram

INFLUENT FROM SYSTEM
2,850 GPD



**"THE CHAPARRAL AT CRANFIELD"
WASTEWATER TREATMENT SYSTEM**

BAXTER COUNTY, ARKANSAS

PROCESS FLOW DIAGRAM
2,850 GPD

PROJECT NO.:
10-0013
SCALE:
N.T.S.
DATE:
02-04-11

PFD-1

Attachment C: Test Data & Case Study



EXECUTIVE SUMMARY

Testing of the Delta ECOPOD E50-N was conducted under the provisions of NSF/ANSI Standard 40 for Residential Wastewater Treatment Systems (August 2005 revision). NSF/ANSI Standard 40 was developed by the NSF Joint Committee on Wastewater Technology.

The performance evaluation was conducted at the Gulf Coast Test Facility located in Baton Rouge, Louisiana, using wastewater diverted from a lift station servicing a residential neighborhood in Ascension Parish. The Gulf Coast Test Facility is a Standard 40 subcontractor to NSF. The evaluation consisted of sixteen weeks of dosing at design flow, seven and one half weeks of stress testing, and two and one half weeks of dosing at design flow. Dosing was initiated on August 4, 2008. After a three-week start up period, test site operations were temporarily shut down due to a power outage caused by a hurricane. After power at the test site was restored and dosing of the system resumed, the test was officially started on September 17, 2008. Sampling started in the summer and continued through the winter, covering a range of operating temperatures.

Over the course of the evaluation, the average effluent CBOD₅ was 9 mg/L, ranging between 4 and 20 mg/L, and the average effluent total suspended solids was 8 mg/L, ranging between <2 mg/L and 30 mg/L.

The ECOPOD E50-N produced an effluent that successfully met the performance requirements established by NSF/ANSI Standard 40 for Class I effluent:

The maximum 7-day arithmetic mean was 15 mg/L for CBOD₅ and 24 mg/L for total suspended solids, both below the allowed maximums of 40 and 45 mg/L, respectively. The maximum 30-day arithmetic mean was 9 mg/L for CBOD₅ and 13 mg/L for total suspended solids, both below the allowed maximums of 25 mg/L and 30 mg/L, respectively.

The ECOPOD E50-N met the requirements for noise levels (less than 60 dBA at a distance of 20 feet), color, threshold odor, oily film and foam. The effluent pH during the evaluation ranged between 6.7 and 7.7, within the required range of 6.0 to 9.0. The ECOPOD E50-N met the requirements for noise levels (less than 60 dbA at a distance of 20 feet), color, threshold odor, oily film and foam.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 14-Sep-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 1

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber					
	effluent	a	a	5.4	5.3	9.9
Temperature (C)	influent	a	a	24	23	24
	aeration chamber					
pH	effluent	a	a	24	24	23
	influent	a	a	7.5	7.1	7.0
Biochemical Oxygen Demand (mg/L)	aeration chamber					
	effluent	a	a	7.4	7.4	7.6
Suspended Solids (mg/L)	influent	a	a	210	170	240
	effluent (CBOD ₅)			12	8	10
Volatile Suspended Solids (mg/L)	influent	a	a	280	240	250
	aeration chamber					
45 Minute Settleable Solids (mL/L)	effluent	a	a	12	5	6
	influent	a	a	130	160	78
45 Minute Settleable Solids (mL/L)	aeration chamber					
	effluent	a	a	6	3	4

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes: Following completion of three weeks of start up testing, test site operations were shut down on 8/24 due to Hurricane Gustov. The test site was without power for an extended period of time as a result of the storm. After power and dosing to the system under test resumed, pre-existing conditions were achieved and testing continued.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 21-Sep-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 2

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	4.5	4.5	4.7	4.3	3.7
	effluent	5.1	5.3	4.8	5.8	5.4
Temperature (C)	influent	24	24	24	21	23
	aeration chamber	24	25	24	23	24
pH	effluent	24	24	23	22	23
	influent	6.9	7.4	7.3	6.8	7.5
Biochemical Oxygen Demand (mg/L)	aeration chamber	7.3	7.2	7.1	7.2	7.3
	effluent	7.2	7.4	7.3	7.3	7.4
Suspended Solids (mg/L)	influent	250	210	280	230	250
	effluent (CBOD ₅)	9	11	11	11	5
Volatile Suspended Solids (mg/L)	influent	380	230	220	170	240
	aeration chamber	470	110	110	140	260
45 Minute Settleable Solids (mL/L)	effluent	12	7	6	4	6
	influent	46	102	62	100	140
45 Minute Settleable Solids (mL/L)	aeration chamber	40	40	24	68	140
	effluent	4	3	6	4	3

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 28-Sep-08 Plant Code: ECOPOD E50-N
 Weeks Into Test: 3
 Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	3.5	2.6	2.2	3.1	3.1
	effluent	4.8	3.9	6.3	4.5	5.1
Temperature (C)	influent	24	22	22	22	24
	aeration chamber	24	24	24	23	24
	effluent	24	23	23	23	23
pH	influent	7.3	7.4	6.9	7.3	7.1
	aeration chamber	7.3	7.2	7.2	7.3	7.2
	effluent	7.4	7.4	7.6	7.4	7.5
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	300	300	71	101	300
	effluent (CBOD ₅)	5	8	5	7	13
Suspended Solids (mg/L)	influent	110	130	140	190	120
	aeration chamber	270	460	960	450	550
	effluent	5	5	7	17	14
Volatile Suspended Solids (mg/L)	influent	43	78	79	120	57
	aeration chamber	100	190	280	240	330
	effluent	2	3	6	6	7
45 Minute Settleable Solids (mL/L)	aeration chamber	30	25	30	45	30

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 5-Oct-08 Plant Code: ECOPOD E50-N
 Weeks Into Test: 4
 Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	2.4	2.0	2.4	1.9	1.9
	effluent	7.8	4.5	4.8	5.3	6.3
Temperature (C)	influent	25	24	23	23	21
	aeration chamber	24	25	24	23	23
	effluent	24	24	21	21	21
pH	influent	7.5	7.1	7.2	7.4	7.0
	aeration chamber	7.2	7.1	7.2	7.0	7.0
	effluent	7.4	7.4	7.4	7.4	7.5
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	200	240	200	230	220
	effluent (CBOD ₅)	10	14	7	12	9
Suspended Solids (mg/L)	influent	190	190	240	180	290
	aeration chamber	560	780	380	670	620
	effluent	9	9	14	9	12
Volatile Suspended Solids (mg/L)	influent	120	120	74	120	210
	aeration chamber	190	340	76	360	380
	effluent	4	8	9	7	6
45 Minute Settleable Solids (mL/L)	aeration chamber	70	90	40	70	70

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 12-Oct-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 5

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.3	0.1	0.1	0.1	0.6
	effluent	5.9	7.0	8.0	8.0	6.7
Temperature (C)	influent	23	23	23	23	24
	aeration chamber	25	24	25	24	24
pH	influent	7.2	7.1	7.1	7.3	7.6
	aeration chamber	7.1	7.0	7.0	6.9	7.3
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	280	240	270	230	270
	effluent (CBOD ₅)	8	6	6	17	14
Suspended Solids (mg/L)	influent	240	120	130	140	190
	aeration chamber	900	310	1300	1200	600
	effluent	6	5	5	3	<2
Volatile Suspended Solids (mg/L)	influent	150	86	88	120	150
	aeration chamber	430	180	440	720	400
	effluent	3	<2	2	2	<2
45 Minute Settleable Solids (mL/L)	aeration chamber	80	70	125	50	75

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 19-Oct-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 6

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	1.7	1.6	0.9	0.3	2.2
	effluent	5.6	5.0	5.9	5.4	5.8
Temperature (C)	influent	21	24	21	24	22
	aeration chamber	21	21	22	23	21
pH	influent	7.3	7.2	7.3	7.4	7.1
	aeration chamber	7.3	7.3	7.2	7.1	7.1
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	230	240	230	240	240
	effluent (CBOD ₅)	9	7	8	11	9
Suspended Solids (mg/L)	influent	210	190	210	200	180
	aeration chamber	2000	5500	1900	2900	1800
	effluent	16	11	9	8	7
Volatile Suspended Solids (mg/L)	influent	90	120	82	160	130
	aeration chamber	800	2100	500	1500	1100
	effluent	7	4	10	7	4
45 Minute Settleable Solids (mL/L)	aeration chamber	150	40	80	45	30

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: 26-Oct-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 7

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.0	0.1	0.8	2.4	1.2
	effluent	4.5	5.5	6.1	6.7	6.4
Temperature (C)	influent	23	20	17	20	16
	aeration chamber	22	19	18	19	18
pH	influent	7.3	7.2	7.5	7.7	7.0
	aeration chamber	7.0	7.0	7.0	7.1	7.1
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	250	210	130	170	280
	effluent (CBOD ₅)	11	9	7	7	9
Suspended Solids (mg/L)	influent	100	130	140	180	100
	aeration chamber	1000	700	500	500	400
	effluent	4	13	5	12	9
Volatile Suspended Solids (mg/L)	influent	<2	56	4	74	35
	aeration chamber	92	200	56	220	210
	effluent	3	7	2	6	6
45 Minute Settleable Solids (mL/L)	aeration chamber	125	125	100	50	90

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: 2-Nov-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 8

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.03	0.03	0.03	0.02	0.04
	effluent	3.8	5.4	4.0	4.7	3.5
Temperature (C)	influent	23	20	19	22	23
	aeration chamber	21	21	20	21	22
pH	influent	7.6	7.8	7.2	7.5	7.7
	aeration chamber	6.9	7.2	7.1	7.1	7.0
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	160	180	290	270	200
	effluent (CBOD ₅)	6	7	7	8	9
Suspended Solids (mg/L)	influent	76	130	140	150	130
	aeration chamber	1900	1500	1700	600	1500
	effluent	9	13	11	9	7
Volatile Suspended Solids (mg/L)	influent	25	20	45	35	31
	aeration chamber	600	700	600	400	900
	effluent	6	7	4	5	5
45 Minute Settleable Solids (mL/L)	aeration chamber	30	150	100	60	75

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 9-Nov-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 9

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	2.9	0.04	0.9	0.1	0.04
	effluent	7.3	5.0	8.9	5.7	5.1
Temperature (C)	influent	19	23	23	19	23
	aeration chamber	19	20	22	20	22
pH	influent	7.9	7.5	7.8	7.4	7.3
	aeration chamber	7.1	6.9	7.0	7.3	6.8
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	220	230	170	190	220
	effluent (CBOD ₅)	7	9	11	12	10
Suspended Solids (mg/L)	influent	210	100	190	150	240
	aeration chamber	800	2000	1000	1700	2800
	effluent	9	12	6	10	12
Volatile Suspended Solids (mg/L)	influent	48	72	30	8	74
	aeration chamber	500	1000	400	1000	1300
	effluent	3	8	2	4	9
45 Minute Settleable Solids (mL/L)	aeration chamber	30	80	85	125	200

- (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other
- Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 16-Nov-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 10

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.2	0.05	0.04	0.07	0.02
	effluent	6.1	6.2	6.2	8.9	7.0
Temperature (C)	influent	19	19	17	20	17
	aeration chamber	17	18	15	17	17
pH	influent	7.7	7.5	7.9	7.6	7.9
	aeration chamber	6.8	6.9	6.9	7.1	7.2
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	200	200	250	280	230
	effluent (CBOD ₅)	7	11	10	10	6
Suspended Solids (mg/L)	influent	140	88	98	160	180
	aeration chamber	1000	400	700	500	500
	effluent	11	5	3	5	8
Volatile Suspended Solids (mg/L)	influent	22	74	78	120	30
	aeration chamber	300	170	250	270	280
	effluent	6	6	2	4	4
45 Minute Settleable Solids (mL/L)	aeration chamber	160	150	150	125	70

- (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other
- Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 23-Nov-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 11

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	1.2	0.0	0.5	1.4	1.3
	effluent	5.8	8.0	6.3	6.0	5.8
Temperature (C)	influent	21	21	16	19	17
	aeration chamber	21	19	17	20	20
	effluent	21	19	17	20	20
pH	influent	7.4	7.4	7.5	6.9	7.0
	aeration chamber	6.9	6.9	7.0	7.1	7.0
	effluent	7.5	7.5	7.5	7.4	7.4
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	210	200	210	230	220
	effluent (CBOD ₅)	8	8	9	10	7
Suspended Solids (mg/L)	influent	180	150	120	130	140
	aeration chamber	2400	1700	840	1400	2000
	effluent	5	5	2	5	2
Volatile Suspended Solids (mg/L)	influent	7	48	4	44	52
	aeration chamber	240	500	110	700	940
	effluent	4	2	<2	3	<2
45 Minute Settleable Solids (mL/L)	aeration chamber	100	125	125	100	125

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 30-Nov-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 12

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.1	0.1	1.5	2.7	5.5
	effluent	5.4	5.9	5.5	5.3	6.8
Temperature (C)	influent	18	16	20	21	15
	aeration chamber	17	18	17	20	16
	effluent	16	18	18	20	16
pH	influent	7.3	7.8	7.7	7.5	6.9
	aeration chamber	7.0	7.0	6.9	7.2	7.3
	effluent	7.4	7.3	7.4	7.4	7.3
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	160	140	230	200	280
	effluent (CBOD ₅)	6	9	10	9	7
Suspended Solids (mg/L)	influent	460	82	130	160	130
	aeration chamber	1800	3100	3100	2900	2400
	effluent	4	2	4	5	5
Volatile Suspended Solids (mg/L)	influent	30	16	20	58	40
	aeration chamber	750	1500	1400	1000	700
	effluent	<2	<2	3	<2	<2
45 Minute Settleable Solids (mL/L)	aeration chamber	150	110	80	60	60

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 7-Dec-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 13

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	2.0	0.07	0.03	0.03	3.6
	effluent	6.2	5.6	8.1	6.2	8.3
Temperature (C)	influent	19	23	20	15	15
	aeration chamber	17	21	18	15	15
pH	influent	7.2	7.4	7.0	7.0	7.5
	aeration chamber	6.9	7.1	6.9	6.9	6.9
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	200	190	140	63	130
	effluent (CBOD ₅)	8	5	8	20	12
Suspended Solids (mg/L)	influent	180	150	140	130	130
	aeration chamber	3500	2200	3000	4500	2000
Volatile Suspended Solids (mg/L)	influent	46	40	70	40	60
	aeration chamber	200	900	900	2100	1200
45 Minute Settleable Solids (mL/L)	influent	2	2	6	9	2
	aeration chamber	150	200	150	300	60

- (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other
- Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 14-Dec-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 14

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.05	4.5	0.02	0.05	0.04
	effluent	10.9	5.8	6.8	4.2	4.4
Temperature (C)	influent	24	20	23	23	21
	aeration chamber	21	19	21	21	21
pH	influent	7.2	7.2	7.1	7.1	6.7
	aeration chamber	6.7	6.8	6.9	6.6	6.6
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	280	250	240	220	260
	effluent (CBOD ₅)	8	7	8	8	8
Suspended Solids (mg/L)	influent	280	170	190	150	150
	aeration chamber	2500	1700	1400	3000	2200
Volatile Suspended Solids (mg/L)	influent	23	30	19	20	26
	aeration chamber	40	24	16	48	42
45 Minute Settleable Solids (mL/L)	influent	60	300	200	900	1100
	aeration chamber	<2	<2	5	10	5
45 Minute Settleable Solids (mL/L)	influent	80	80	150	160	150
	aeration chamber	80	80	150	160	150

- (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other
- Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems

Plant Effluent

Week Beginning: 21-Dec-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 15

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.1	2.8	0.9	2.0	1.0
	effluent	13.6	7.0	5.9	6.9	5.5
Temperature (C)	influent	17	17	20	20	21
	aeration chamber	16	16	21	20	20
pH	influent	6.8	7.2	6.9	7.0	6.9
	aeration chamber	6.3	6.8	7.0	6.9	7.0
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	190	150	180	170	190
	effluent (CBOD ₅)	7	7	9	7	8
Suspended Solids (mg/L)	influent	160	200	120	180	190
	aeration chamber	910	1100	1000	1200	1200
Volatile Suspended Solids (mg/L)	influent	12	82	52	80	98
	aeration chamber	430	450	580	450	750
45 Minute Settleable Solids (mL/L)	influent	7	7	6	3	5
	aeration chamber	220	80	125	130	130

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems

Plant Effluent

Week Beginning: 28-Dec-08

Plant Code: ECOPOD E50-N

Weeks Into Test: 16

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	2.1	1.7	0.8	0.4	1.0
	effluent	6.0	7.9	6.3	5.4	5.4
Temperature (C)	influent	18	16	18	17	22
	aeration chamber	18	16	18	17	20
pH	influent	19	16	17	17	20
	aeration chamber	6.7	6.5	6.5	6.7	6.7
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	6.7	6.9	7.5	6.9	7.0
	effluent (CBOD ₅)	120	190	120	170	102
Suspended Solids (mg/L)	influent	18	16	10	9	4
	aeration chamber	240	280	220	96	66
Volatile Suspended Solids (mg/L)	influent	3400	3000	4000	4000	2200
	aeration chamber	14	9	10	5	6
45 Minute Settleable Solids (mL/L)	influent	4	92	54	58	47
	aeration chamber	700	1300	700	1600	1200
45 Minute Settleable Solids (mL/L)	influent	3	<2	8	2	2
	aeration chamber	170	225	200	175	225

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 4-Jan-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 17

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber		5.9					
	effluent		5.6					
Temperature (C)	influent		21					
	aeration chamber		23					
	effluent		22					
pH	influent		6.9					
	aeration chamber		7.1					
	effluent		6.8					
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)		78					
	effluent (CBOD ₅)		6					
Suspended Solids (mg/L)	influent		160					
	aeration chamber		1400					
	effluent		5					
Volatile Suspended Solids (mg/L)	influent		4					
	aeration chamber		400					
	effluent		4					
45 Minute Settleable Solids (mL/L)	aeration chamber		150					

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes: Wash day stress 1/5 through 1/9.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 11-Jan-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 18

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber		0.04	2.7	0.9	5.9	0.7	0.9
	effluent		7.0	7.1	6.5	6.5	7.2	6.8
Temperature (C)	influent		16	17	15	16	13	16
	aeration chamber		16	15	13	14	13	16
	effluent		16	16	14	14	13	15
pH	influent		7.3	7.1	7.3	7.4	7.0	7.0
	aeration chamber		6.4	6.7	6.6	7.0	7.7	7.5
	effluent		6.7	7.1	7.1	7.0	7.2	7.2
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)		210	190	230	200	120	130
	effluent (CBOD ₅)		9	11	5	10	13	9
Suspended Solids (mg/L)	influent		130	82	74	130	200	170
	aeration chamber		900	500	700	600	700	600
	effluent		4	8	<2	7	3	6
Volatile Suspended Solids (mg/L)	influent		40	62	56	110	170	110
	aeration chamber		400	300	300	400	400	200
	effluent		4	4	<2	7	3	2
45 Minute Settleable Solids (mL/L)	aeration chamber		200	175	260	225	250	200

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes: Working parent stress started on 1/17.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 18-Jan-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 19

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber							0.9
	effluent							4.9
Temperature (C)	influent							16
	aeration chamber							17
	effluent							16
pH	influent							7.0
	aeration chamber							6.9
	effluent							7.4
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)							230
	effluent (CBOD ₅)							8
Suspended Solids (mg/L)	influent							130
	aeration chamber							1600
	effluent							7
Volatile Suspended Solids (mg/L)	influent							160
	aeration chamber							1100
	effluent							3
45 Minute Settleable Solids (mL/L)	aeration chamber							190

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes: Working parent stress completed on 1/21.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 25-Jan-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 20

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		500	500	500	500	500	Zero	
Dissolved Oxygen (mg/L)	aeration chamber	0.7	0.9	0.04	0.03	0.05		
	effluent	4.8	5.4	5.9	5.7	5.4		
Temperature (C)	influent	17	18	21	20	17		
	aeration chamber	16	17	20	18	16		
	effluent	16	17	19	18	16		
pH	influent	7.0	7.8	7.7	7.1	7.4		
	aeration chamber	6.8	6.9	6.7	6.6	6.6		
	effluent	7.1	7.3	7.3	7.2	7.0		
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	210	190	160	230	180		
	effluent (CBOD ₅)	10	5	7	12	16		
Suspended Solids (mg/L)	influent	45	150	240	270	140		
	aeration chamber	2700	2300	2700	2600	2500		
	effluent	8	7	5	4	8		
Volatile Suspended Solids (mg/L)	influent	58	28	42	94	66		
	aeration chamber	800	700	700	500	1100		
	effluent	3	3	3	2	3		
45 Minute Settleable Solids (mL/L)	aeration chamber	225	175	250	300	450		

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes: Power/equipment failure stress 1/29 through 1/31.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 1-Feb-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 21

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber				2.4	2.3	4.2	4.5
	effluent				6.8	8.4	8.0	7.2
Temperature (C)	influent				16	16	19	19
	aeration chamber				15	14	17	18
	effluent				15	14	17	18
pH	influent				6.5	7.2	6.6	7.0
	aeration chamber				6.5	6.7	6.7	6.8
	effluent				6.8	7.0	7.1	7.1
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)				140	160	170	200
	effluent (CBOD ₅)				9	7	9	7
Suspended Solids (mg/L)	influent				200	180	170	220
	aeration chamber				2400	1900	2100	1200
	effluent				4	8	6	9
Volatile Suspended Solids (mg/L)	influent				120	130	110	66
	aeration chamber				1600	1400	1200	1000
	effluent				2	3	3	3
45 Minute Settleable Solids (mL/L)	aeration chamber				255	260	225	250

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 8-Feb-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 22

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		500	0	0	0	0	0	0
Dissolved Oxygen (mg/L)	aeration chamber	4.4						
	effluent	7.4						
Temperature (C)	influent	18						
	aeration chamber	18						
	effluent	17						
pH	influent	6.9						
	aeration chamber	6.9						
	effluent	7.0						
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	180						
	effluent (CBOD ₅)	7						
Suspended Solids (mg/L)	influent	260						
	aeration chamber	1800						
	effluent	8						
Volatile Suspended Solids (mg/L)	influent	130						
	aeration chamber	1000						
	effluent	3						
45 Minute Settleable Solids (mL/L)	aeration chamber	225						

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes: Vacation stress started on 2/8.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 15-Feb-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 23

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		0	0	0	475	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber						0.1	0.4
	effluent						4.8	6.2
Temperature (C)	influent						17	17
	aeration chamber						14	18
	effluent						11	17
pH	influent						7.6	6.5
	aeration chamber						6.7	6.9
	effluent						7.4	7.3
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)						99	150
	effluent (CBOD ₅)						6	8
Suspended Solids (mg/L)	influent						100	170
	aeration chamber						4800	4800
	effluent						3	3
Volatile Suspended Solids (mg/L)	influent						8	98
	aeration chamber						740	720
	effluent						<2	<2
45 Minute Settleable Solids (mL/L)	aeration chamber						350	300

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes: Vacation stress completed on 2/17.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 22-Feb-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 24

		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)		500	0	0	0	0	200	500
Dissolved Oxygen (mg/L)	aeration chamber	0.5						
	effluent	6.4						
Temperature (C)	influent	18	a	a	a	a	a	
	aeration chamber	18						
	effluent	18						
pH	influent	6.7	a	a	a	a	a	
	aeration chamber	6.8						
	effluent	7.2						
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	180	a	a	a	a	a	
	effluent (CBOD ₅)	8						
Suspended Solids (mg/L)	influent	140	a	a	a	a	a	
	aeration chamber	4800						
	effluent	4						
Volatile Suspended Solids (mg/L)	influent	86	a	a	a	a	a	
	aeration chamber	660						
	effluent	<2						
45 Minute Settleable Solids (mL/L)	aeration chamber	310						

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes: The sewage line feeding the test site broke on 2/22, resulting in a loss of dosing to the system under test until a repairs were completed on 2/27.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 1-Mar-09 Plant Code: ECOPOD E50-N

Weeks Into Test: 25

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.02	0.08	1.5	0.03	5.6
	effluent	8.1	8.3	8.4	7.9	5.5
Temperature (C)	influent	18	18	18	22	20
	aeration chamber	15	16	17	20	19
	effluent	15	17	19	20	19
	influent	7.2	7.2	7.3	6.9	7.4
pH	aeration chamber	6.7	6.8	6.8	6.9	6.9
	effluent	7.6	7.4	7.6	7.5	7.4
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	300	290	300	160	160
	effluent (CBOD ₅)	7	8	8	8	8
Suspended Solids (mg/L)	influent	200	210	290	160	240
	aeration chamber	3200	3900	3300	3400	3100
	effluent	10	6	11	11	8
Volatile Suspended Solids (mg/L)	influent	4	50	14	4	100
	aeration chamber	800	1500	500	1400	1400
	effluent	7	<2	6	6	4
45 Minute Settleable Solids (mL/L)	aeration chamber	345	210	250	245	200

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 8-Mar-09 Plant Code: ECOPOD E50-N

Weeks Into Test: 26

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.04	0.03	0.04	1.6	0.03
	effluent	5.3	5.5	5.3	7.8	6.8
Temperature (C)	influent	23	22	21	20	21
	aeration chamber	23	21	21	20	20
	effluent	24	22	23	20	21
pH	influent	6.8	6.7	6.8	7.4	7.8
	aeration chamber	6.7	6.7	6.7	6.8	6.8
	effluent	7.2	7.1	7.1	7.3	7.3
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	430	300	200	160	130
	effluent (CBOD ₅)	6	d	4	14	8
Suspended Solids (mg/L)	influent	290	190	64	210	110
	aeration chamber	3700	5400	4800	2700	3900
	effluent	12	6	2	24	20
Volatile Suspended Solids (mg/L)	influent	42	66	4	96	42
	aeration chamber	1500	2300	2600	1600	2500
	effluent	7	<2	20	11	10
45 Minute Settleable Solids (mL/L)	aeration chamber	250	245	160	200	150

- Notes: (d) Effluent pumps down
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 15-Mar-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 27

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.04	0.04	0.02	0.06	0.06
	effluent	9.1	8.2	8.3	1.9	7.2
Temperature (C)	influent	21	22	20	22	19
	aeration chamber	20	21	20	21	20
pH	effluent	20	22	20	21	19
	influent	6.7	6.4	6.6	6.4	6.6
	aeration chamber	6.6	6.6	6.6	6.6	6.7
Biochemical Oxygen Demand (mg/L)	effluent (CBOD ₅)	7.0	7.0	6.9	6.6	7.0
	influent (BOD ₅)	120	130	210	190	320
Suspended Solids (mg/L)	effluent (CBOD ₅)	8	8	10	10	10
	influent	150	110	82	1000	250
	aeration chamber	1900	4800	2500	1800	1900
Volatile Suspended Solids (mg/L)	effluent	10	11	10	9	11
	influent	60	44	32	360	110
	aeration chamber	700	1600	1000	700	600
45 Minute Settleable Solids (mL/L)	effluent	6	6	8	6	9
	aeration chamber	425	200	250	200	160

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

NSF International
Standard 40 - Residential Wastewater Treatment Systems
 Plant Effluent

Week Beginning: 22-Mar-09

Plant Code: ECOPOD E50-N

Weeks Into Test: 28

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	0.09	0.02	0.02	0.1	0.01
	effluent	5.9	7.2	7.7	4.9	6.3
Temperature (C)	influent	21	21	23	21	22
	aeration chamber	21	21	24	21	22
pH	effluent	21	21	22	21	22
	influent	6.7	6.7	7.3	6.2	6.5
	aeration chamber	6.6	6.6	6.5	6.5	6.5
Biochemical Oxygen Demand (mg/L)	effluent (CBOD ₅)	7.2	7.1	7.1	6.8	6.9
	influent (BOD ₅)	280	270	280	280	140
Suspended Solids (mg/L)	effluent (CBOD ₅)	11	10	9	10	10
	influent	84	130	220	160	230
	aeration chamber	6800	2800	8100	5700	6500
Volatile Suspended Solids (mg/L)	effluent	9	10	11	9	10
	influent	28	76	74	60	95
	aeration chamber	400	300	200	700	1500
45 Minute Settleable Solids (mL/L)	effluent	3	<2	<2	8	<2
	aeration chamber	210	350	400	250	200

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Notes:

RUSSELL CROSSROADS WASTEWATER TREATMENT PLANT RESULTS

DATE	BOD	TSS	TKN	FECAL	PH
1-12-10	<1	2	1.77	72	7.6
1-28-10	3.9	2	4.29	<1	7.8
2-11-10	4.7	2	3.9	<1	7.4
2-25-10	6.1	4	3.78	<1	7.8
3-11-10	14.6	15	3.38	<1	7.4
3-26-10	6.8	11	7.06	1	7.5
4-7-10	12.1	6	5.66	1	7.6
4-22-10	4.2	4	4.03	4	7.7
5-6-10	8.3	7	4.39	5	7.4
5-20-10	8.4	6	3.68	4	7.5
6-3-10	3.4	4	5.37	32	7.5
6-16-10	2.9	2	2.93	<1	7.4
7-8-10	<2	1	3.30	<1	7.3
7-22-10	<2	<1	3.48	3	7.4
8-4-10	<2	<1	1.2	<1	7.3
8-19-10	<2	<1	1.91	<1	7.2
9-1-10	<2	<1	1.93	<1	6.6
9-16-10	<2	<1	1.38	<1	7.1
10-6-10	4.6	1.75	2.57	<9	6.9
10-20-10	18.5	4	3.75	182	7.7
11-3-10	<4	1.86	6.84	<9	7.1
11-17-10	4.32	14.8	5.37	<9	7.6
12-1-10	12.5	21.7	3.18	<9	7.8
12-15-10	8.65	15.8	3.58	18	7.6

Attachment D: Design Manual & Guidelines



Delta Environmental™

Pentair Water

Dosing Guidelines for Delta's ECOPOD Series Wastewater Treatment Units

Engineered Dosing Reference
January 1, 2007

Delta Environmental recommends the following guidelines for dosing **into** the ECOPOD series Wastewater Treatment Units.

<u>Model</u>	<u>Max/Pump Dose Volume/Minute</u>	<u>Max Duration @ Minutes Intervals</u>
E50	10 Gallons	2 Minutes @ 15 minute intervals
E60	12 Gallons	2 Minutes @ 15 minute intervals
E75	15 Gallons	2 Minutes @ 15 minute intervals
E100	18 Gallons	2 Minutes @ 15 minute intervals
E150	25 Gallons	2 Minutes @ 15 minute intervals

NOTE: State and Local approved PVC pipe, valves & fittings suited for wastewater applications are recommended from the dose pump to the Wastewater Treatment Units.

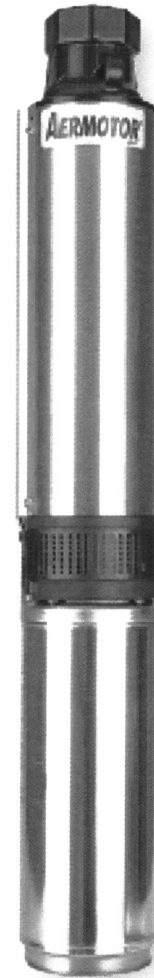
The above guidelines are maximum dosing volumes and times. Dosing volumes and duration can be reduced. Dosing interval times can be increased over the 15 minutes intervals.

4" SUBMERSIBLE PUMPS – 5, 8, 12, 16, 20, 22 AND 25 GPM **AERMOTOR**

T series – Thermax™ (thermoplastic)

Precision-engineered, corrosion resistant T Series – Thermax pumps in 5 to 25 GPM deliver efficient, dependable performance even in rough, aggressive water. Heads to over 900 feet and capacities to 35 GPM. Built to deliver long-term, trouble-free service.

- ▶ **Wide Range of GPM and HP Ratings Available** – Pump models to fill most all of your needs
- ▶ **Precision Molded Thermax™ Discharge Head** – Strong, corrosion resistant and lead-free
- ▶ **Built-in Flomatic® brand spring-loaded check valve poppet** – Positive sealing, field-proven, non-spin design
- ▶ **Lubricated and Sealed Top “A+” Bearing** – Seal keeps out sand. Lubrication prevents failure in dry run and gaseous well situations
- ▶ **Precision Molded, High-Impact Thermax™ Impellers “Float” in Diffuser Stages Fitted with Stainless Steel Wear Rings** – Superior sand handling and dry run capacities. No shims needed here!
- ▶ **Stainless Steel Cable Guard** – Protects motor leads
- ▶ **Cast Stainless Hardware and Precision Machined Pump Shell** – Strong and corrosion resistant
- ▶ **Precision Molded Thermax™ Motor Bracket with Wrap Around Suction Screen** – Strong and corrosion resistant with screen that prevents debris from entering pump
- ▶ **Aermotor Pump** – Driven by two- or three-wire water-lubricated motors with thermal overload and built-in lightning protection. Reliable, corrosion resistant, internationally recognized submersible motor built to NEMA standards and UL approved.



4" submersible pumps

specifications

Discharge Head – Minlon® (Nylon), 1-1/4" NPT

Pipe Stop – Minlon® (Nylon), 1-1/4" NPT

Internal Check Valve – Acetal poppet, 300 grade stainless steel spring, nitrile Buna-N seal

Pump Shell – 304 grade stainless steel

Motor Bracket – Minlon® (Nylon)

Intake Screen – Polyethylene

Cable Guard – 304 grade stainless steel

Cable Guard Screws – 300 grade stainless steel (18-8)

Pump Shaft – 300 grade stainless steel, 1-1/2 HP and larger*

Motor Coupling – 316 grade stainless steel

Spacer Sleeve Journal, Bottom – 316 grade stainless steel

*400 grade stainless steel – 1/2 and 1 HP

Bearing Sleeve Journal, Top – 316 grade stainless steel

Stage Diffuser – Glass-filled Noryl®

Diffuser Insert – 300 grade stainless steel

Impeller – 5-22 GPM: Lexan®; 25 GPM: Glass-filled Noryl®

A+ Top Bearing – Delrin® (Acetal)

Stage Disc Plate – 5-22 GPM: Delrin® (Acetal); 25 GPM: Glass-filled Noryl®

Disc Plate Wear Ring – 5-22 GPM: N/A; 25 GPM: 300 grade stainless steel

Uphrust Disc (5 GPM Models) – 5-22 GPM: Phenolic; 25 GPM: N/A

Bearing Seal Ring – NSF 61 Nitrile

Motor Lead Protector – Temflex®

Serrated Nuts (Motor Studs) – 300 grade stainless steel (18-8)

application

Water Systems...for residential, industrial, commercial, multiple housing and farm use

certification



This product is listed to UL and CSA Standards for Safety by CSA International.

Delrin® and Minlon® are registered trademarks of E.I. DuPont de Nemours and Co. Flomatic® is a registered trademark of Flomatic Corp. Noryl® and Temflex® are registered trademarks of General Electric Co. Thermax™ is a trademark of WICOR Industries.

4" SUBMERSIBLE PUMPS – 5, 8, 12, 16, 20, 22 AND 25 GPM **AERMOTOR**

T series – Thermax™ (thermoplastic)

ordering information – single phase

4" submersible pumps

2

HP	Series	GPM	Stages	Volt.	2 WIRE* Pump and Motor w/Motor Lead			3 WIRE* Pump and Motor w/Motor Lead Order Control Box Separately			Control Box All Three Wire Units	
					Order No.	Length	Weight	Order No.	Length	Weight	Order No.	Weight
1/2	T5	5	13	115	02638	26-5/8	26	02626	26-5/8	26	280 104 49	3
				230	02639			02627			280 105 49	
	T8	8	10	115	02668	24-1/2	25	02632	24-1/2	25	280 104 49	
				230	02643			02633			280 105 49	
	T12	12	8	115	02647	26-3/8	23	02655	26-3/8	24	280 104 49	
				230	02648			02656			280 105 49	
	T16	16	7	115	02375	24-1/2	23	02377	24-1/2	24	280 104 49	
				230	02374			02376			280 105 49	
	T20	20	6	115	02707	23	22	02709	23	21	280 104 49	
				230	02708			02710			280 105 49	
3/4	T5	5	19	230	02640	32-3/8	32	02628	32-3/8	31	280 107 49	3
	T8	8	13	230	02644	28	29	02634	28	29		
	T12	12	11	230	02649	26-3/8	28	02657	26-3/8	28		
	T16	16	10	230	02378	28-5/8	28	02379	28-5/8	28		
	T20	20	9	230	02651	27	28	02659	27	27		
1	T5	5	22	230	02641	36-1/2	35	02629	36-1/2	36	280 108 49	3
	T8	8	16	230	02661	31-1/8	33	02635	31-1/8	33		
	T12	12	14	230	02650	29-3/4	32	02658	29-3/4	32		
	T16	16	12	230	02380	31-3/4	32	02381	31-3/4	32		
	T20	20	11	230	02652	30-1/8	32	02660	30-1/8	31		
	T22	22	9	230	02662	31	31	02663	31	30		
	T25	25	8	230	02292	29-1/2	27	02293	29-1/2	26		
1-1/2	T5	5	29	230	02301	45-1/8	50	02302	43-5/8	42	282 300 81	7
	T8	8	22	230	02303	39-7/8	46	02304	38-3/8	39		
	T12	12	19	230	02664	36-3/4	49	02665	35-1/4	37		
	T16	16	17	230	02382	40	49	02383	38-1/2	37		
	T20	20	15	230	02666	37-1/2	46	02667	36	38		
T25	25	11	230	02294	36-3/8	46	02295	35-1/8	38			

* Pump end, motor and lead factory assembled and tested as a complete unit.

HP	Series	GPM	Stages	Volt.	Pump End Assembly*			3 WIRE ¹ Motor and Lead Assembly			Control Box	
					Order No.	Length	Weight	Order No.	Length	Weight	Order No.	Weight
2	T5	5	34	230	89039	33-3/4	17	224 301 92	15-1/8	32	282 301 81	7
	T8	8	28	230	89041	29-1/4	14					
	T12	12	21	230	89043	24	12					
	T16	16	22	230	89223	30	13					
	T20	20	19	230	89045	27-1/4	13					
T25	25	14	230	88025	25-1/2	1						

¹2 HP motor includes 48" lead.

* Pump end factory tested, but shipped separate from motor/lead assembly.

NOTE: ALL THERMAX PUMPS FEATURE BUILT-IN CHECK VALVE POPPET AND 1-1/4" NPT DISCHARGE.

4" SUBMERSIBLE PUMPS – 5, 8, 12, 16, 20, 22 AND 25 GPM **AERMOTOR**

T series – Thermax™ (thermoplastic)

ordering information – pump end assemblies (PEAs)

HP	Series	GPM	Stages	Pump End Assembly – Internal Poppet		
				Order No.	Length	Weight
1/2	T5	5	13	88823	17-1/8	13
	T8	8	10	88827	15	9
	T12	12	8	88831	13-1/2	7
	T16	16	7	89224	15	7
	T20	20	6	88816	13-1/2	6
3/4	T5	5	19	88824	21-5/8	12
	T8	8	13	88828	17-1/8	10
	T12	12	11	88832	15-5/8	11
	T16	16	10	89225	18	11
	T20	20	9	88834	16-1/2	9
	T25	25	6	88984	15	7
1	T5	5	22	88825	24-3/4	14
	T8	8	16	88829	19-1/2	12
	T12	12	14	88833	15-5/8	12
	T16	16	12	89226	20	12
	T20	20	11	88835	18-1/2	10
	T22	22	9	88800	19	9
	T25	25	8	88985	17-3/4	8
1-1/2	T5	5	29	89038	30	18
	T8	8	22	89040	24-3/4	14
	T12	12	19	88798	21-5/8	13
	T16	16	17	89227	25	13
	T20	20	15	88799	22-1/2	13
	T25	25	11	88986	21-1/2	11
2	T5	5	34	89039	33-3/4	20
	T8	8	28	89041	29-1/4	16
	T12	12	21	89043	24	15
	T16	16	22	89223	30	16
	T20	20	19	89045	27-1/4	15
	T25	25	14	89025	25-1/2	13

NOTE: Includes built-in Flomatic® poppet.

4" submersible pumps

4" SUBMERSIBLE PUMPS – 5, 8, 12, 16, 20, 22 AND 25 GPM **AERMOTOR**

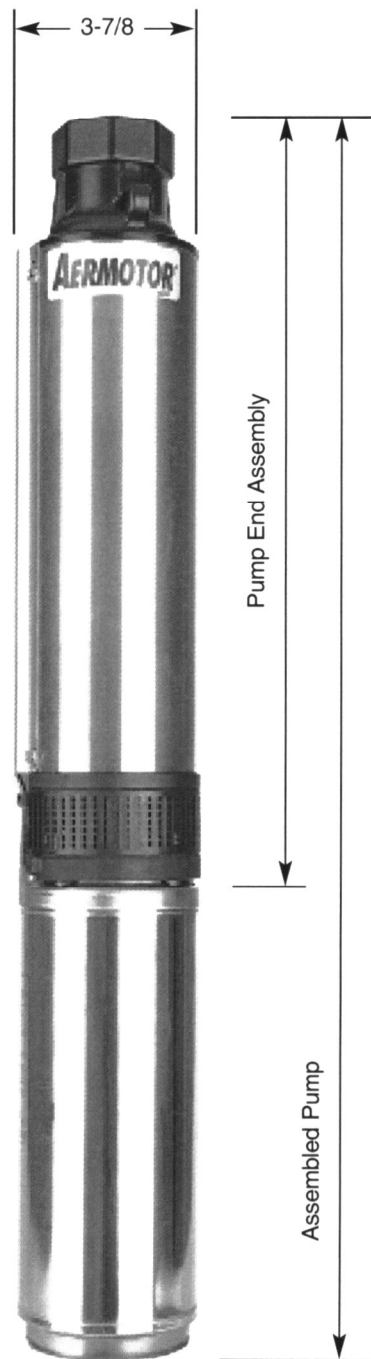
T series – Thermax™ (thermoplastic)

outline dimensions

Discharge

5 GPM	1-1/4" NPT
8 GPM	1-1/4" NPT
12 GPM	1-1/4" NPT
16 GPM	1-1/4" NPT
20 GPM	1-1/4" NPT
22 GPM	1-1/4" NPT
25 GPM	1-1/4" NPT

For lengths, refer to Ordering Information tables.

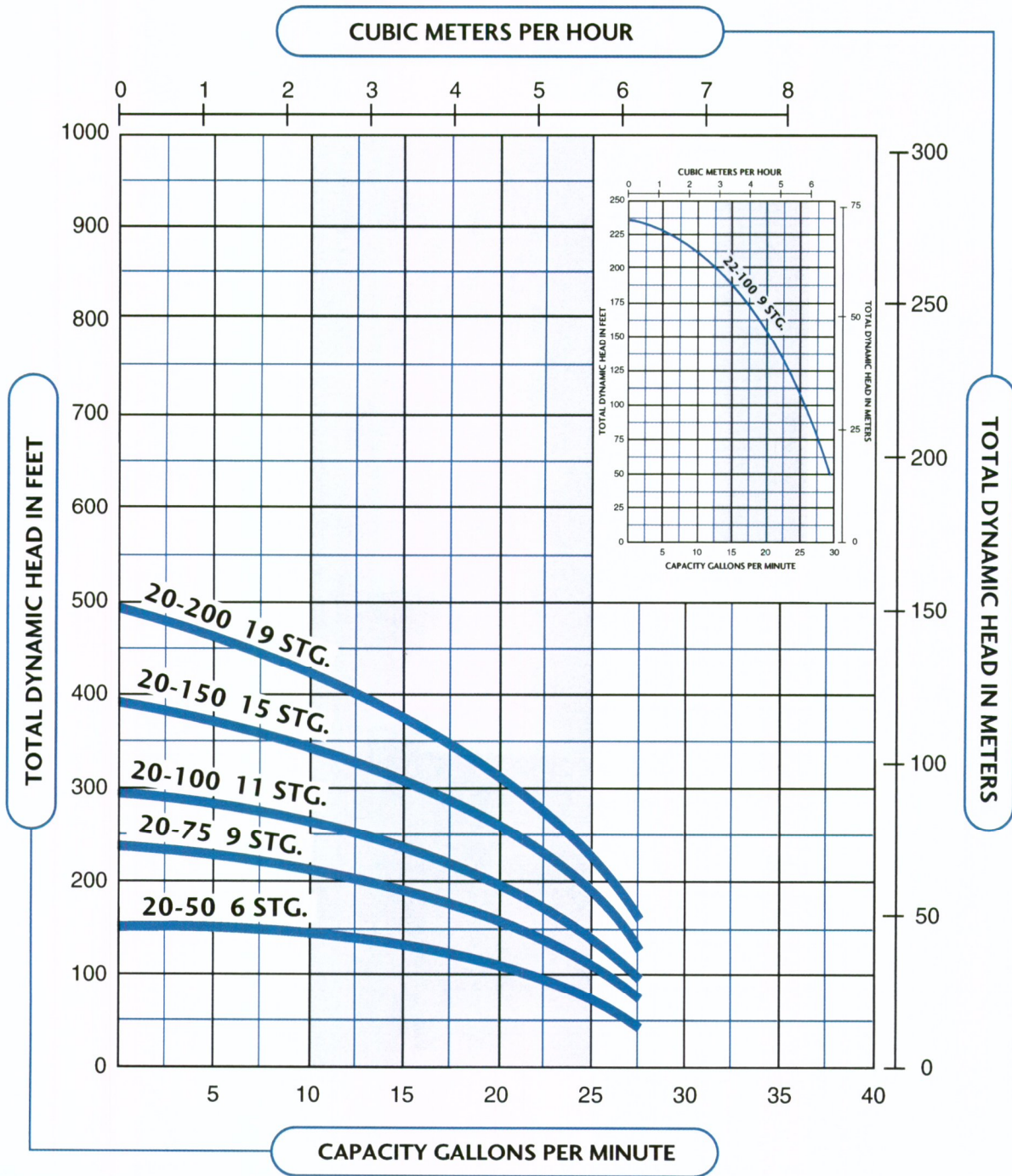


Dimensions (in inches) are for estimating purposes only.

4" SUBMERSIBLE PUMPS – 5, 8, 12, 16, 20, 22 AND 25 GPM **AERMOTOR**

T series – Thermax™ (thermoplastic)

20 and 22 GPM pump performance



SHADED AREAS INDICATE MOST ECONOMICAL RANGE

4" SUBMERSIBLE PUMPS – 5, 8, 12, 16, 20, 22 AND 25 GPM **AERMOTOR**

T series – Thermax™ (thermoplastic)

20 and 22 GPM pump performance

Pumping capacities in gallons per minute at indicated discharge pressures in pounds per square inch.

1-1/4" NPT DISCHARGE

Model Number	HP	PSI	Depth to Water in Feet																Shutoff Head						
			20	40	60	80	100	125	150	175	200	225	250	275	300	350	400	450	500	FEET	PSI				
20-50 (6-STG)	1/2	20	25.0	22.5	19.7	15.7															156	67			
		30	20.2	16.5	13.5	8.5																			
		40	18.8	13.2																					
		50	10.8																						
		60																							
20-75 (9-STG)	3/4	20	-	-	-	23.3	21.3	17.0	11.7												234	101			
		30	-	25.0	23.2	21.0	19.7	12.3																	
		40	24.8	22.8	20.3	17.3	12.7																		
		50	22.5	20.2	16.8	11.8																			
		60	19.7	16.2	11.3																				
20-100 (11-STG)	1	20	-	-	-	-	24.2	22.1	19.7	15.8	10.4										285	123			
		30	-	-	-	23.9	22.2	19.8	16.2	11.0															
		40	-	23.5	21.9	20.0	16.5	11.3																	
		50	21.5	20.5	19.5	17.0	15.2	11.0																	
		60	23.2	21.5	19.3	16.3	12.2																		
22-100 (9-STG)	1	20	-	-	-	25.8	24.1	22.8	18.8	14.2											231	101			
		30	-	25.7	23.7	21.5	19.5	14.7																	
		40	25.4	23.5	21.2	18.5	16.5																		
		50	23.3	21.0	18.0	14.3																			
		60	20.5	17.7	13.5																				
20-150 (15-STG)	1-1/2	20	-	-	-	-	-	24.1	22.5	20.8	18.5	15.7									386	167			
		30	-	-	-	-	-	24.3	22.7	20.9	18.7	16.0	12.3												
		40	-	-	-	-	24.3	22.3	21.0	18.8	16.2	12.5													
		50	-	-	-	24.2	22.8	21.2	19.0	16.3	12.8														
		60	-	-	24.0	22.7	21.3	19.2	16.7	13.2															
20-200 (19-STG)	2	20	-	-	-	-	-	-	24.8	23.5	22.0	20.5	18.9								483	209			
		30	-	-	-	-	-	-	24.9	23.6	22.2	20.7	19.0	17.2											
		40	-	-	-	-	-	25.0	23.7	22.3	20.8	19.1	17.3												
		50	-	-	-	-	25.0	23.8	22.3	20.9	19.2	17.5													
		60	-	-	-	25.0	23.8	22.5	21.2	19.4	17.7	15.7	13.0												

4" submersible pumps



Delta Environmental
Products™

ECOPOD-N™ Series

FIXED FILM WASTEWATER
TREATMENT SYSTEM

P.O. BOX 969, DENHAM SPRINGS, LA 70727

(225) 665-6162 – Telephone

(225) 664-9467 – Fax

K4508 09/09

**Fixed Film Wastewater
Treatment System Design Manual**

TABLE OF CONTENTS

Notice	3
Introduction	4
ECOPOD-N™ Description	4
Specifications	
General Specifications	5
Operating Conditions	5
Construction	5
Sizing Examples	6
Operation and Maintenance	
Homeowner Care and Operation Instructions	7
Items Not Permitted In System	7
Warnings	8
Solids Removal	8
Seasonal Use Guidelines	9
Sample Requirements	9
Installation Instructions	
Delivery Inspection	10
Installation Instructions	11
Installation Procedure Drawings	12-14
Troubleshooting Guide	15-16
Specifications and Materials of Construction	17
Electrical Requirements	17
Dimensions	17
System Layout Drawings	18-19
Control Panel and Float Switch Drawings	20-26
Nameplate	27
Service Policy	28
Warranty	32



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 I.D.*	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™.



**Delta Environmental
Products™**

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 not 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/l (or ppm);
- Suspended Solids (SS of less than 30 mg/l (or ppm);
- Volatile suspended solids of less than 30 mg/l (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/l (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.



**Delta Environmental
Products™**

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.

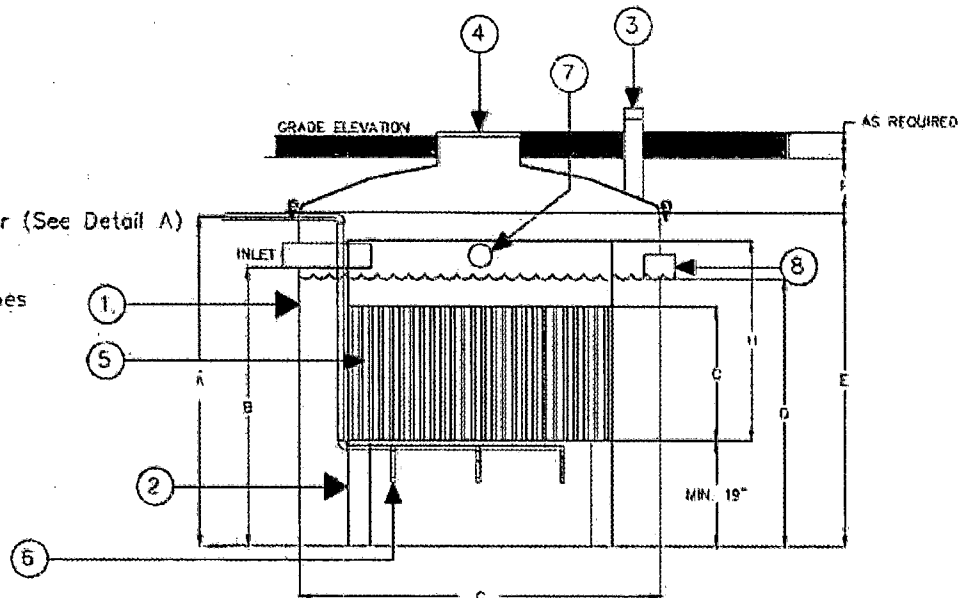
1. Before unpacking, check the packaging for signs of damage. If there is evidence of damage or abuse, notify Delta Environmental Products at 1-800-219-9234

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

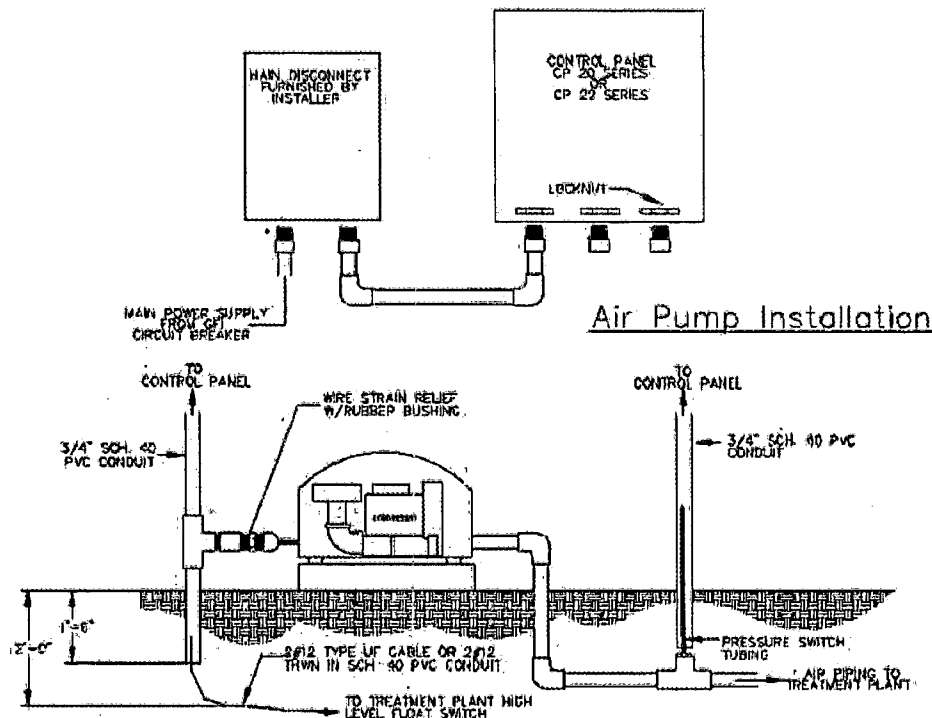
If the unit is free of damage, unpack completely and proceed with the installation.

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

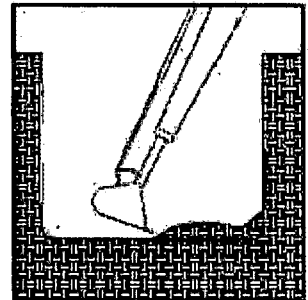
1. Prepare an excavation, having a diameter approximately one foot larger than the tank and a depth that will allow approximately three inches of the inspection port to extend above normal ground level. Backfill with a six inch layer of sand or gravel if otherwise unable to provide a smooth, level, compact 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. 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:

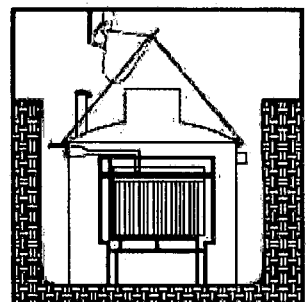
Dig hole from the side for accurate sizing. This reduces the bridging distance between the tank and undisturbed soil and provides good support for inlet and outlet pipes. The bottom of the hole should be undisturbed and level. If leveling is necessary due to over excavation, use sand for fill.



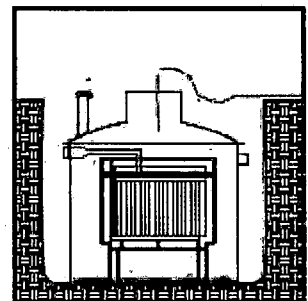
NOTE: Never place tank directly on rock. place at least six inches of sand bedding between the tank and rock surface.

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.



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.:
DEP034B



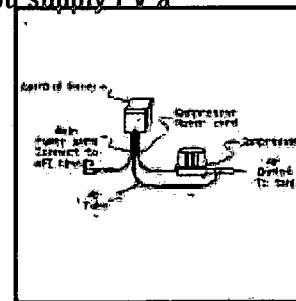
Delta Environmental
Products™

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 :

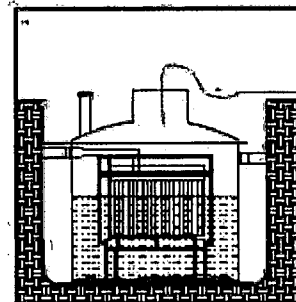
Install duplex or quadruple GFI or GFI protected receptacles at the selected location of the air pump. Mount control panel and install fittings, tubing and piping to tank location.

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.



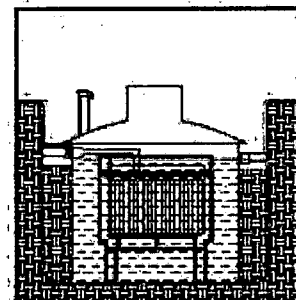
6. FILLING THE TANK :

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.



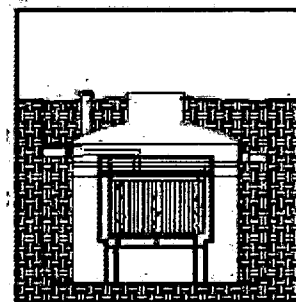
WARNING: Possible Fire Hazard

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.

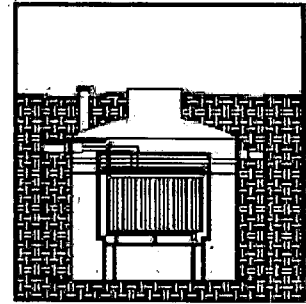
DWG. NO.: DEP034A



Delta Environmental Products™

9. TRIM INSPECTION RISERS:

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

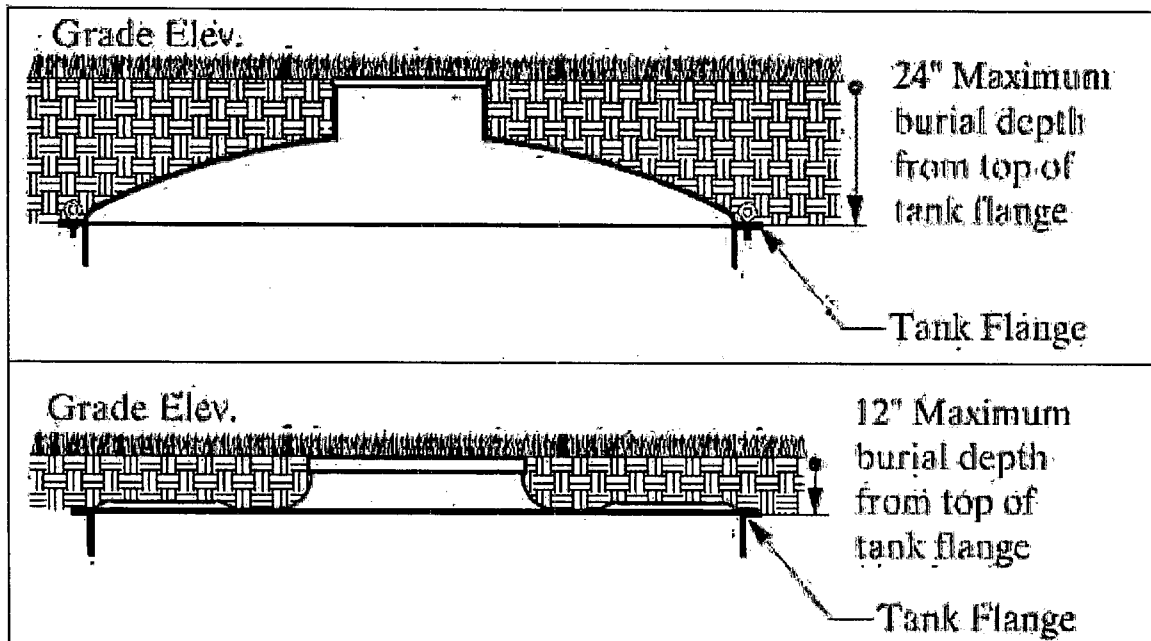


Caution: The bottom of the 4" aeration riser must be above the water level for both visual inspection and ventilation. Both of the optional 6" and 4" top caps must be above ground level to prevent ground water from entering the risers.

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
----------------------	------------------	------------------	---------------------



Delta Environmental
Products™

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.



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. 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 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

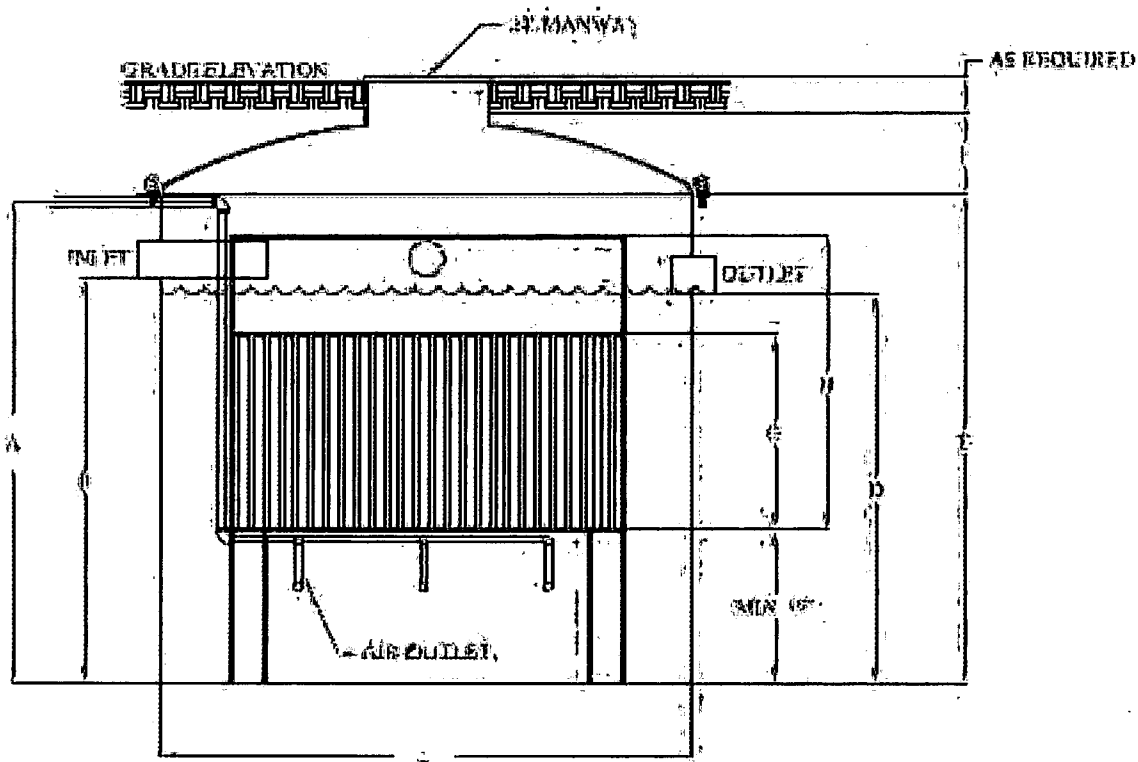
Model	Compressor	Motor full load Amps	Measured Operating Watts	Electrical Requirements
E50-N	Delta Model E50	3.5	185	115 volt - single phase
E60-N	Delta Model E60	4.7	280	115 volt - single phase
E75-N	Delta Model E75	4.7	280	115 volt - single phase
E100-N	Delta Model E100	7.1	475	115 volt - single phase
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 $\frac{3}{16}$ "	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.

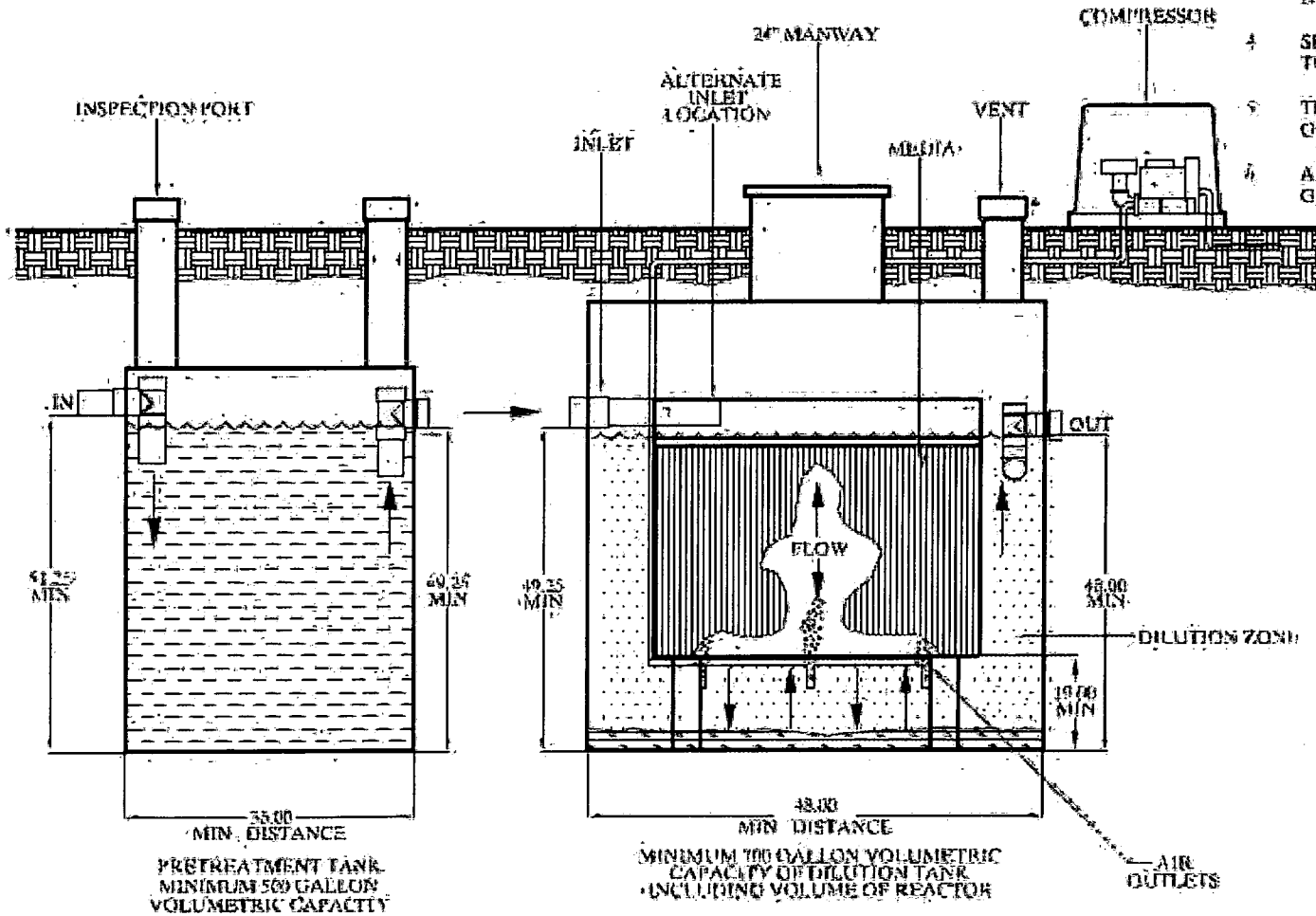
NOTE: For special cargo or container shipments 12 inches must be added to the diameters of all fiberglass units (due to the fiberglass flange and lifting lugs).





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

OWN BY:
CHACTAI,

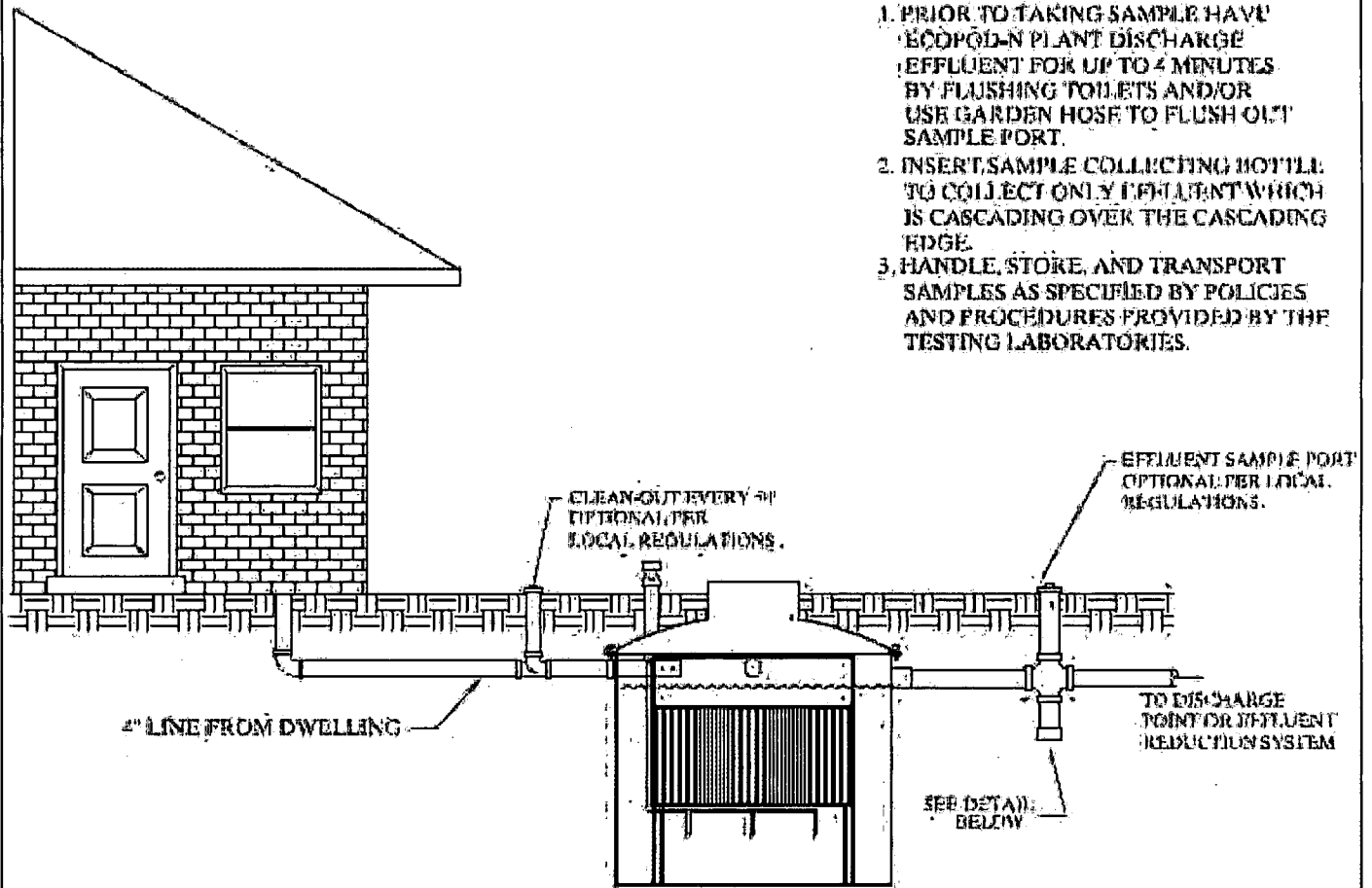
DATE:
5/15/09

SCALE:
N.T.S.

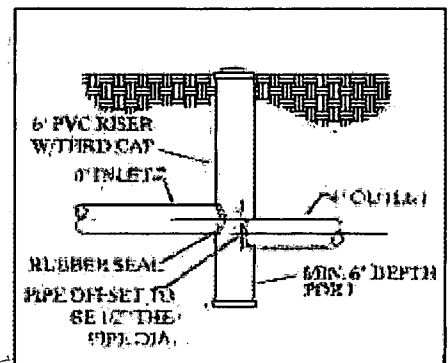
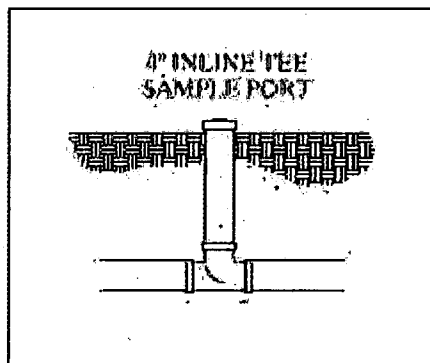
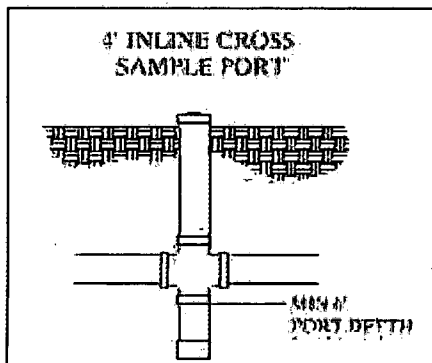
DWG. NO.:
ECOPOD-N FLOW PATTERN

SAMPLE PROCEDURES:

1. PRIOR TO TAKING SAMPLE HAVE ECOPOND PLANT DISCHARGE EFFLUENT FOR UP TO 4 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.1:
EP-N Sample Ports

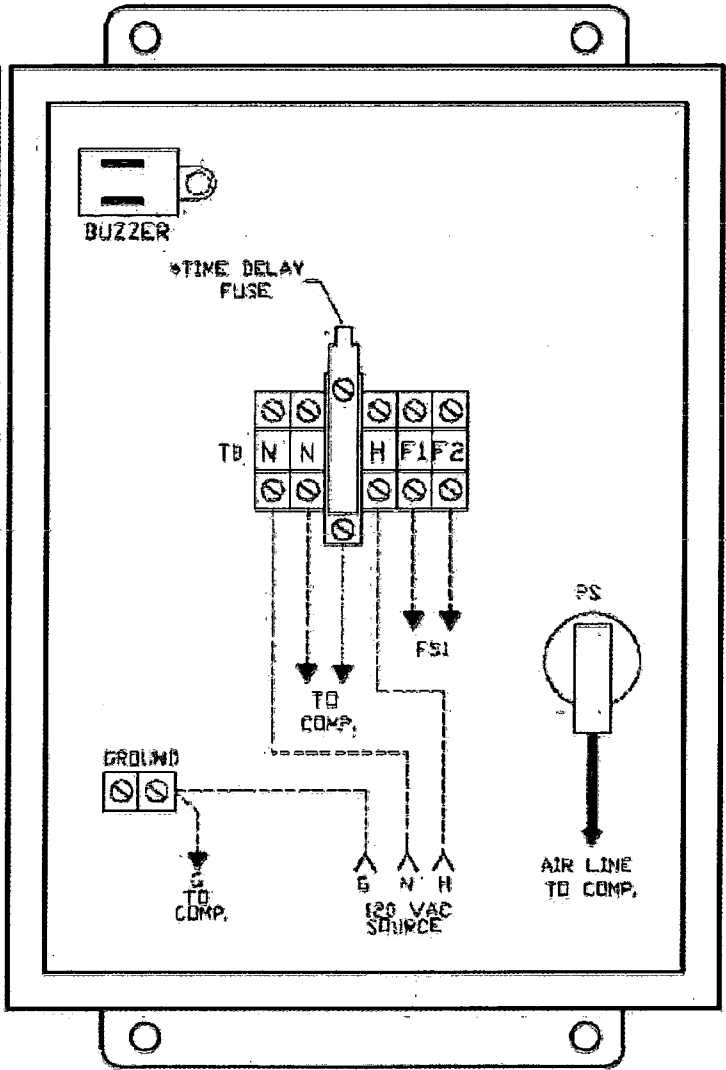
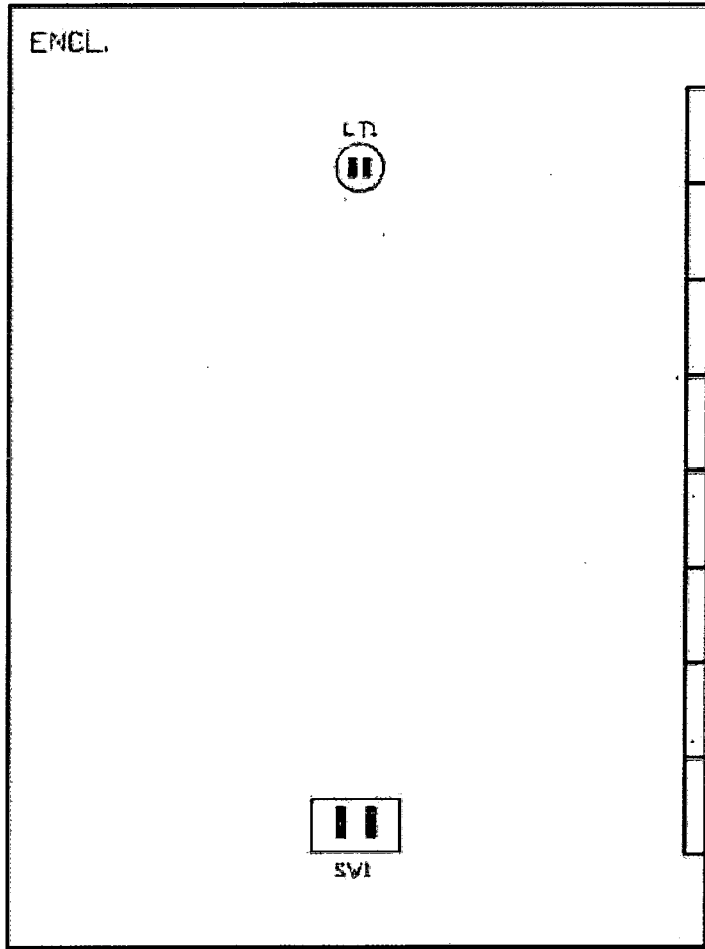


DELTA ENVIRONMENTAL PRODUCTS
P. O. BOX 969 DENHAM SPRINGS, LA 70727



CP20 PANEL

DWN BY: C. RACHAL	DATE: 5/18/09	SCALE: N.T.S.	DWG. NO.:
			CP20



FRONT VIEW
DOOR OPEN
CP20

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

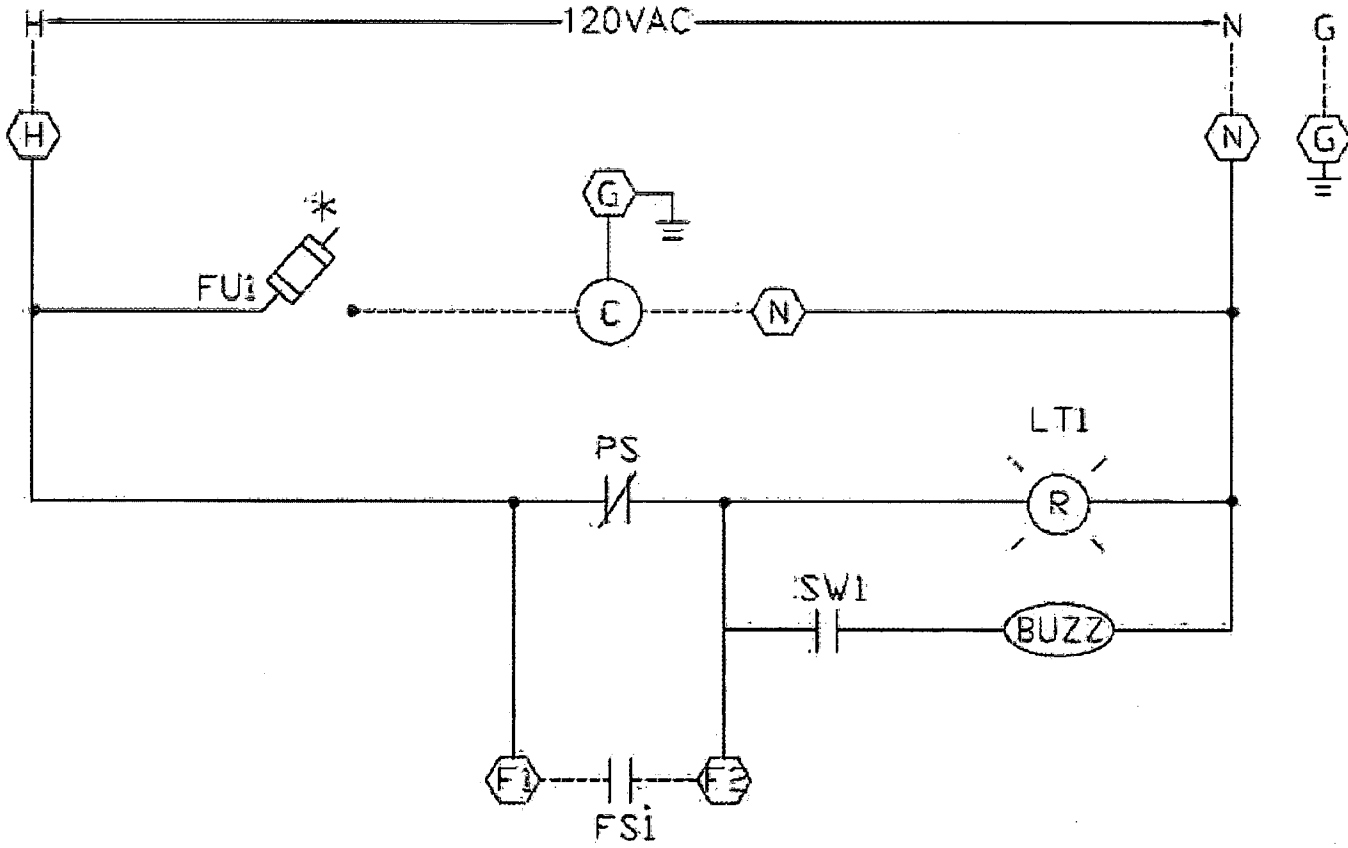
CP20 WIRING DIAGRAM

DWN BY:
C.RACHAL

DATE:
5/18/09

SCALE:
N.T.S.

DWG. NO.:
CP20



SCHEMATIC DIAGRAM
CP20 SERIES

* FUSE SIZE VARIES WITH COMPRESSOR SIZE
PER NATIONAL ELECTRICAL CODE





Delta Environmental
Products™

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



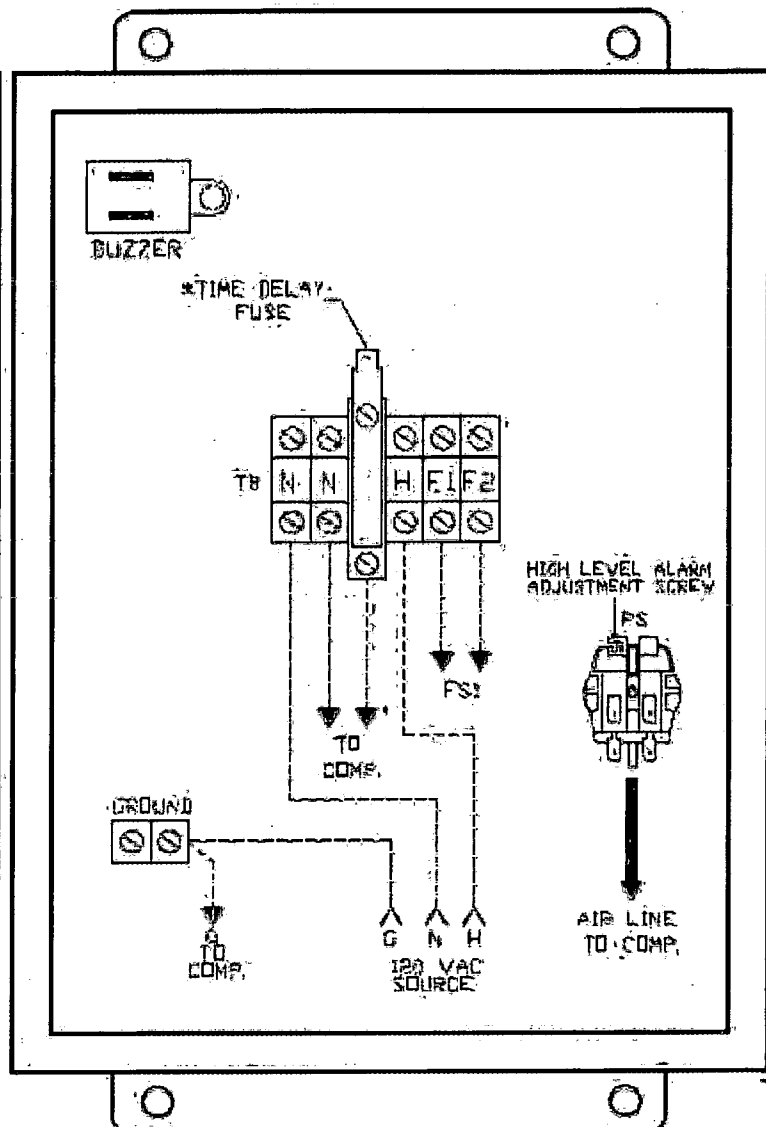
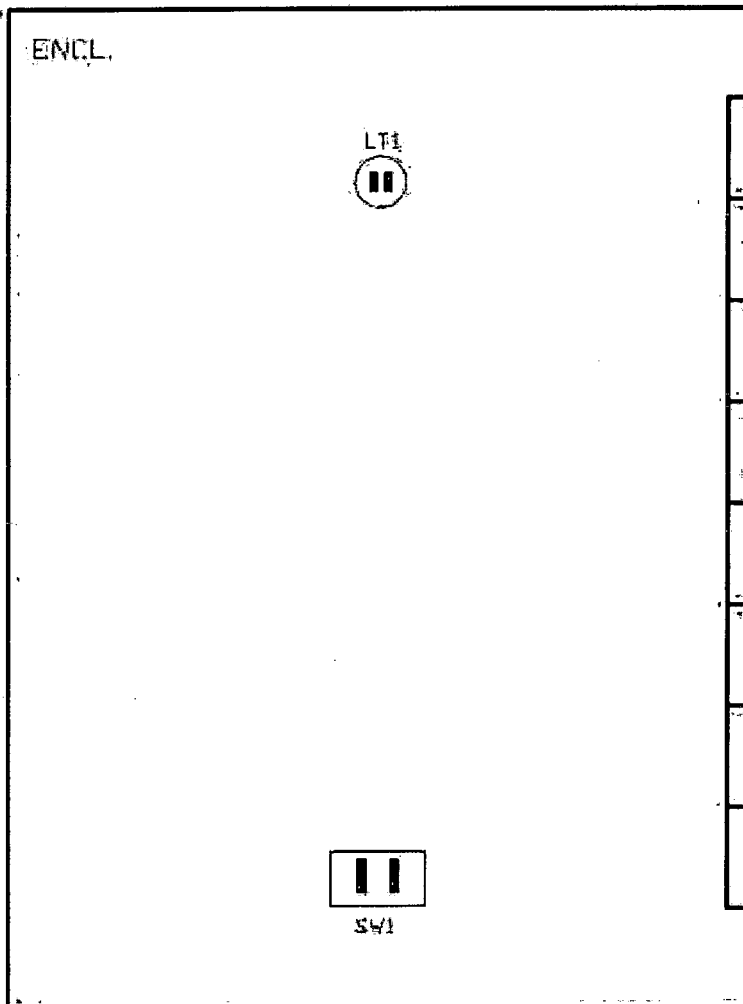
DELTA
QUALITY

DATE
3/8/89

SCALE
N.P.S.

2100-00
CP22 Enclosure

CP 22 PANEL



FRONT VIEW
DOOR OPEN
CP22

FSL=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

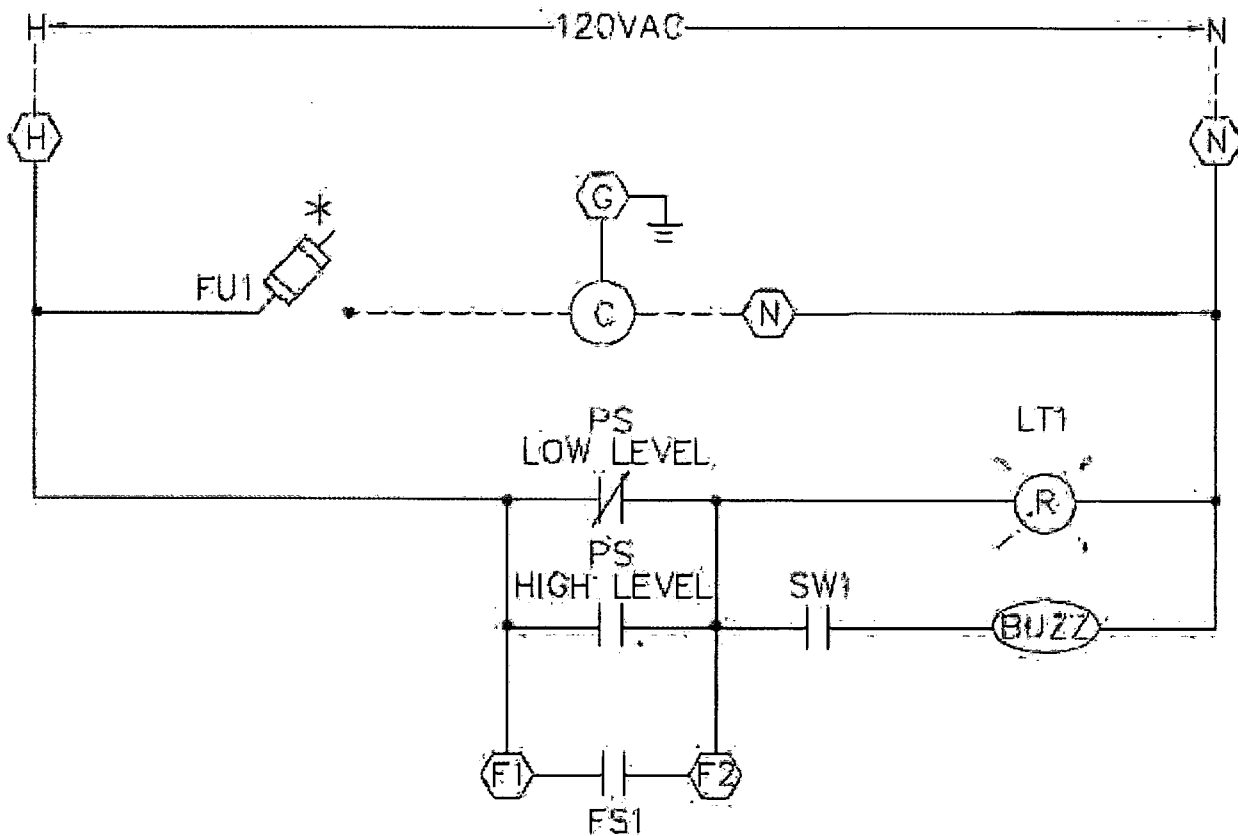
CP22 WIRING DIAGRAM

DRW. BY:
LKA/CJL

DATE:
5/18/89

SCALE:
N.T.S.

DWG. NO.:
CP22 Schematic

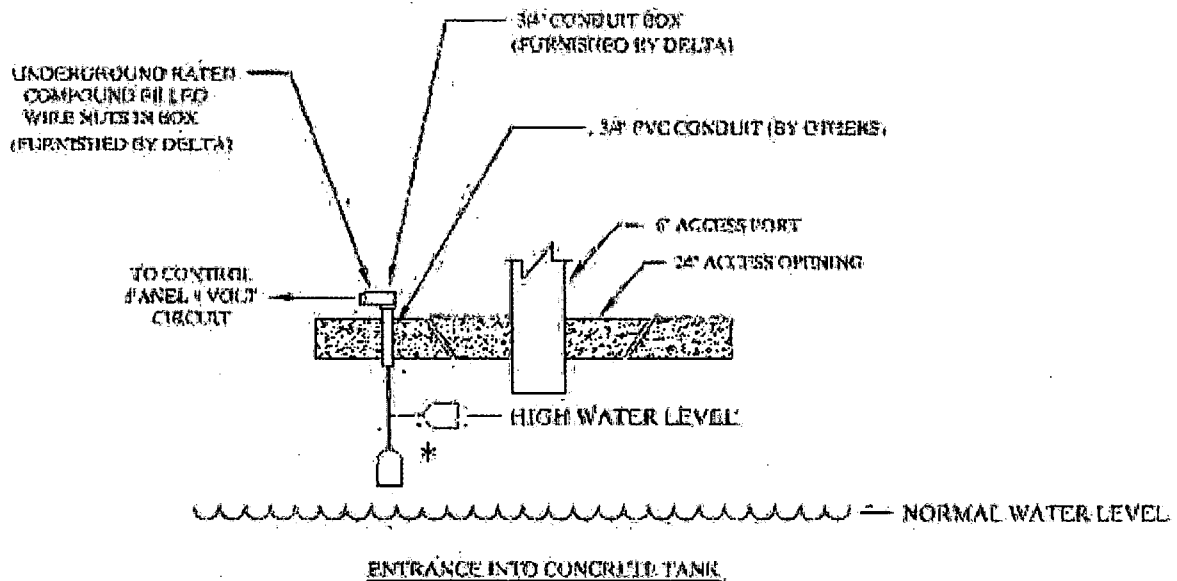
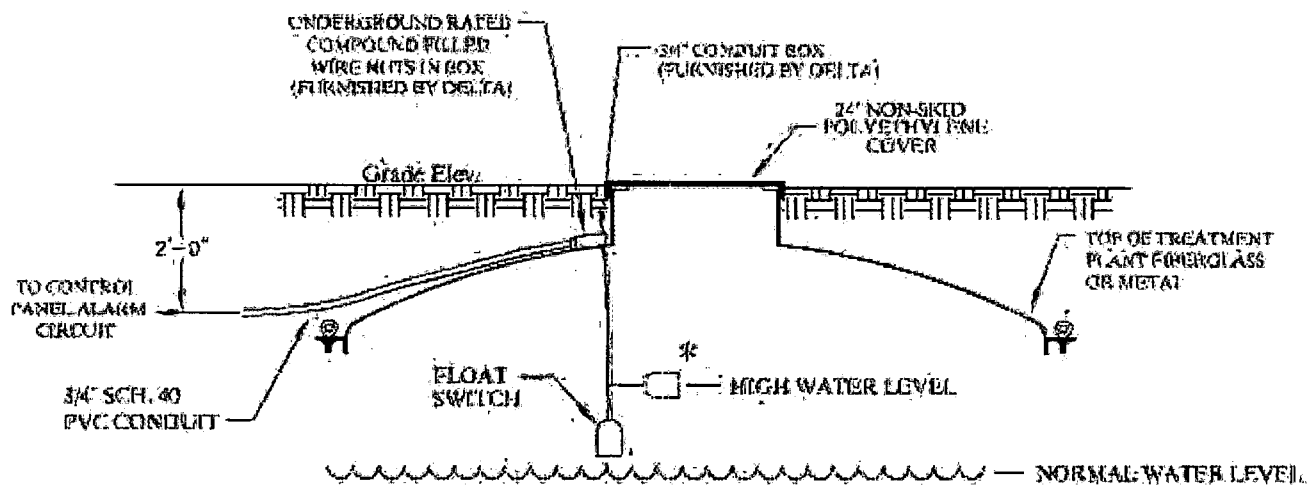


SCHEMATIC DIAGRAM
CP22 SERIES

FS1- H.L. FLOAT SWITCH (OPTIONAL)

* FUSE SIZE VARIES WITH COMPRESSOR SIZE
PER NATIONAL ELECTRICAL CODE

-A SEPERATE DISCONNECT IS REQUIRED.



NOTES:

1. GROMMET TO BE SELECTED FOR TIGHT FIT AROUND CABLE AND IN LID.
2. WIRE TO CONTROL PANEL TO BE 1/2 GAUGE AND RATED FOR DIRECT BURIAL SERVICE. WOODS WIRE-886 OR EQUAL.
3. WIRE NUTS TO BE RATED FOR UNDERGROUND SERVICE IDEAL-DR PLUS MODEL #0 OR EQUAL.
4. FLOAT SWITCH TO BE NORMALLY OPEN MDI-AS30Y0500 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 OF 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

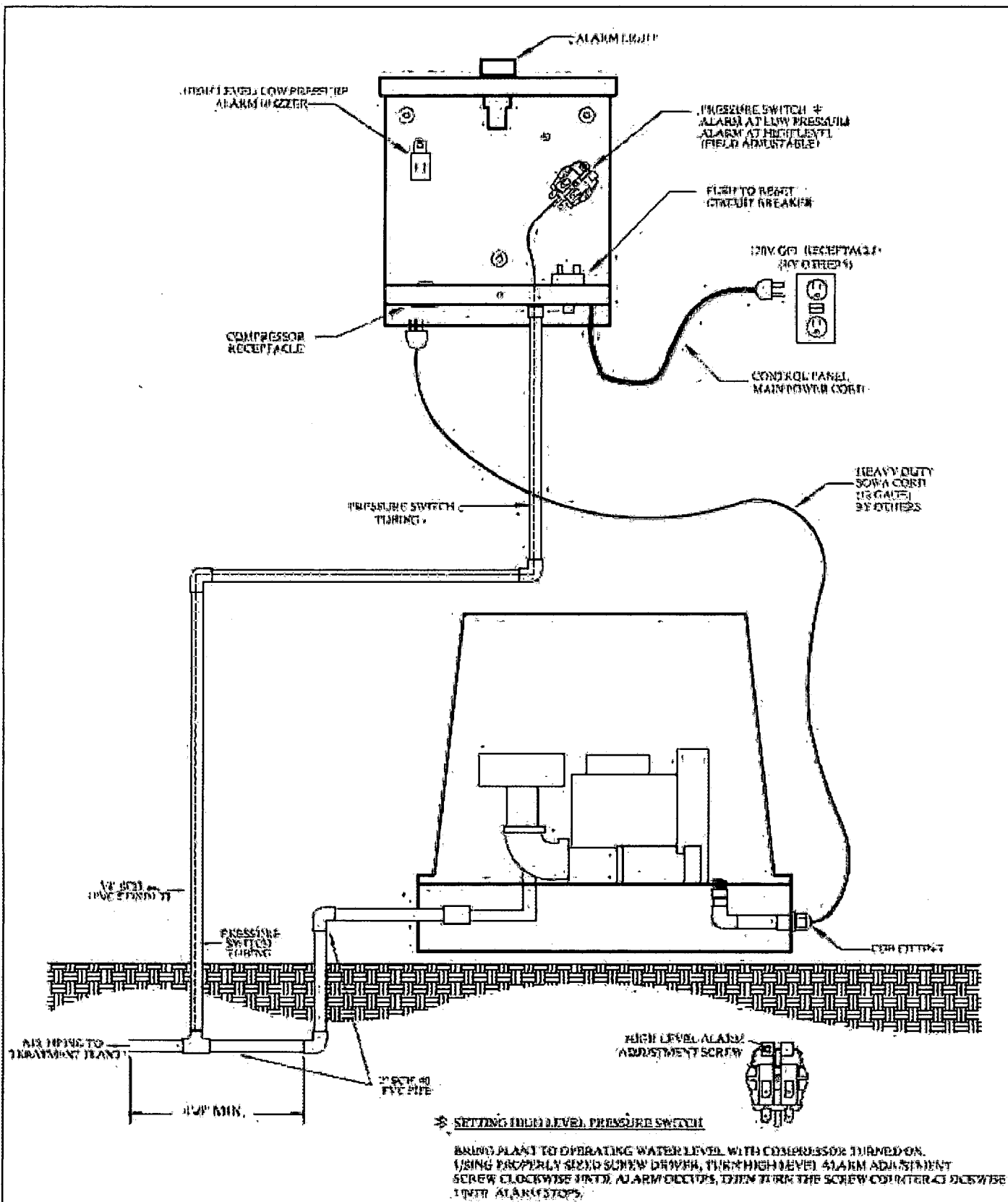
DATE:
5/18/09

SCALE:
N.T.S.

DWG. NO.:
FH'Sw Mtg



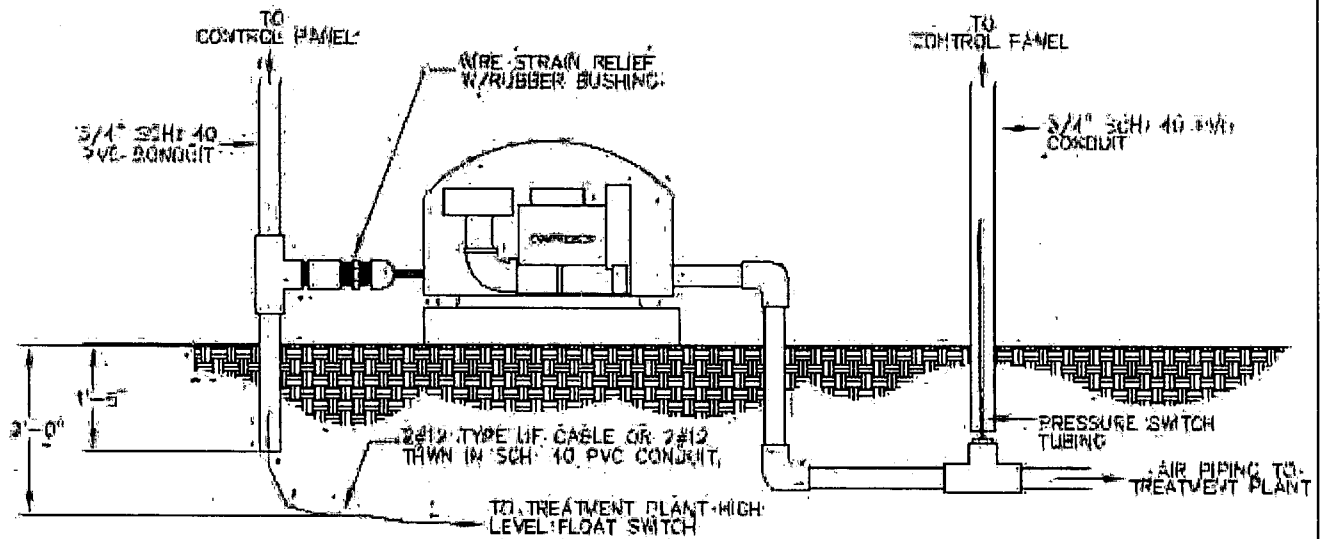
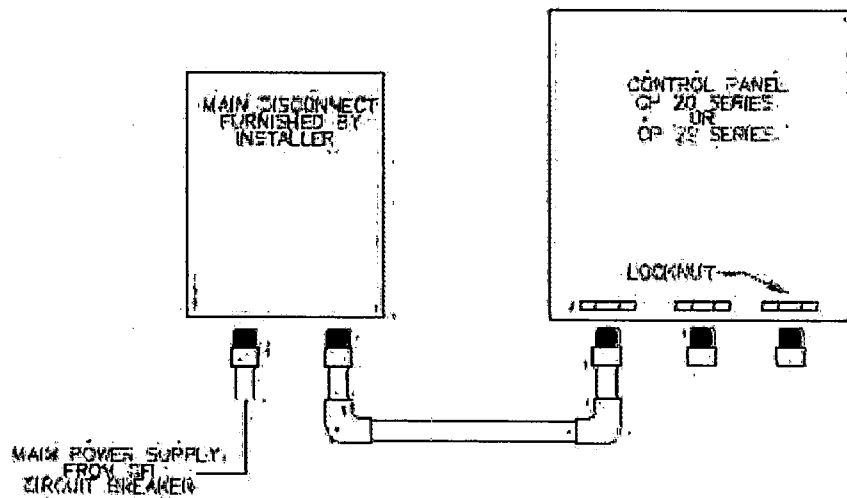
Delta Environmental
Products™



**CONTROL PANEL CONNECTIONS
USING REGENERATIVE SERIES COMPRESSORS**


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

DWN BY: C. RACHAL	DATE: 5/18/09	SCALE: N.T.S.	DWG. NO.: CP Con Regen
-----------------------------	-------------------------	-------------------------	----------------------------------



**CONTROL PANEL CONNECTIONS
USING LINEAR COMPRESSOR**



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

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-N
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-N
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"



**MAP(S)/PLAN(S) SCANNED IN
SEPARATE FILE**

From: /Expéditeur:

Strider Consulting
1029 Hwy. 201 North
Mountain Home, AR 72653

Mrs. Loretta Reiber, P.E.
Arkansas Dept. of Environmental Quality
NPDES Permits Section, Water Division
5301 Northshore Drive
North Little Rock, AR 72118

Country of Destination: /Pays de destination:



1005

72118

U.S. POSTAGE
PAID
MOUNTAIN HOME, AR
72653
FEB 17, 11
AMOUNT

\$5.95
00067770-09

TY MAIL
GE REQUIRED

