

# PL 500 Aerobic Treatment Plant Troubleshooting Guide

## **Please Remember:**

With proper installation, the number of Proline Plant experiencing any trouble will be extremely small

## **When Homeowner Calls**

Ask homeowner to describe their problem fully –get as much detail as possible.

## **Determine plant age and service history from your records.**

If owner does not have an inspection/service policy, recommend they take one out. Let them know if they take one out that this call will be the first call on the new policy and they will not be charged. Also, let them know they will be charge if they do not take out an inspection/service policy.

## **Troubleshooting Sequence**

If home aeration plant has a problem, nature gives us an immediate safety warning — the smell! The smell is actually a benefit in disguise, because it not only notifies the owner that a problem exists, but also give him a strong incentive to have it corrected immediately. Before taking any corrective action with the plant, always positively identify the real source of the odor.

Check to see if odor comes from a neighbor's septic tank or absorption field. If it does, ask your customer to notify his neighbor of the problem. Also check if odor is coming from another outside source such as storm sewer or collection tile that has a septic tank discharging into it.

First perform a routine maintenance call. If the plant is not being routinely maintained, this will probably eliminate the problem.

If normal servicing does not solve the problem, go through "Installation" process covered in the next section. Then go through "Treatment," "Electrical," and "Mechanical" sections in order. Do not stop when you have corrected one problem. It may only be part of the overall problem. Check entire system for proper operation –this can save you from later service calls.

# INSTALLATION

## **Odor from Roof Vents**

All wastewater disposal systems vent gases back through soil pipe and out roof vents. Improperly installed roof vents can cause odor problems. In most cases vents are not extended high enough above roof for odors to dissipate properly. Sometimes vents stop under roof overhangs and trap odors. In these cases, recommend to the owner having vents carried through the overhang above the roof level. If this does not correct the problem, all roof vents should be extended higher.

## **Odors form Basement Drains**

Traps in drains prevent odors from entering the home. To function they must contain water. If taps are dry, run water into them. If odors still escape from traps with water in them, recommend to the owner installing new traps.

## **Water Softener Backwash/Discharge**

Water softener backwash must not be routed through the plant. Backwash can cause chemical and biological imbalance in the plant by upsetting the pH (acidity) and destroying bacteria vital to extended aerobic digestion. It can also create a hard crust on the surface of the first compartment causing wastewater to back up into the home. Lines carrying water softener backwash must always discharge into some other disposal area or after plant (may be discharged into pump tank).

## **Sludge Volume Testing**

All you need to test sludge volume is a one liter graduated cylinder. These are available from any lab supply store. You can also make your own from any tall, straight sided, clear glass container, 1 liter in capacity. Affix a piece of making tap vertically to the side of the container. Using water proof ink, mark 11 lines across the width of the tape ½" apart. The first line should be even with the inside bottom of the container. Label the first line "0," and second 10%, third 20%, etc. until the final mark is 100%. Test procedure is as follows:

1. Fill graduated cylinder to 100% mark with sample from aeration compartment (third compartment). Sample should be taken immediately after circulation pump has been operating so sludge is uniformly mixed. Do not take sludge sample from a still or inoperative plant.

2. Allow sample to stand for 30 minutes.
3. Measure sludge volume by locating top of settled sludge layer on graduations. Top of sludge layer should be between 20% and 50% from a well functioning plant.

## **Wastewater Backing into Home**

The unfortunate condition of having the home flooded with wastewater can occur with any wastewater treatment tank — septic tank or aeration plant. Fortunately, most cases of flooding can be permanently corrected by installation of “Wet-Weather Safety Valve” described below. Common causes of flooding are listed below. Check out the installation and correct where needed.

A subsurface effluent disposal system that clogs and blocks flow from plant.

Failure of pump to lift effluent to point of discharge

Tank settling or shifting which cracks inlet or outlet lines and blocks or restricts flow.

Flooding of storm sewer or stream that rises above final outlet or backs into discharge line.

Outlets clogged with ice.

Outlets clogged by grading of roadside ditches.

Cracked or crushed line. Frequently caused by heavy equipment running over it.

Dirt or debris blocking lines. Often happens during construction.

Water softener backwash should not be routed through the plant. If it is, it can create a hard crust on primary compartment causing wastewater to back into house.

Discharge line with insufficient fall.

One or more tiles in line set at upward angle.

Roof downspouts from home discharging into same line as plant. Downspouts should never be discharged into plant sewer line either before or after plant. They should be on a separate drainage line.

Plant set in low land that gets all surface drainage from surrounding area.

## **Wet Weather Safety Valve**

This simple, inexpensive addition to the system is just an outlet to the surface between the normal discharge point (storm sewer, stream, etc.) and the plant. The “Wet Weather Safety Valve” protects the plant and the owners home from flooding during very heavy rains when the usual discharge point cannot accept unusually large amounts of water. If the “safety Valve” is ever needed, excess

water escapes out of the “Safety Valve” to the surface of the ground — rather than backing into the plant or home. Any water or treated effluent that passes through the “Safety Valve” is greatly diluted by rainwater and is carried away immediately by natural drainage. During dry weather the “Safety Valve” never comes into use. On most installations the “Wet Weather Safety Valve” will never be used, but it is a low-cost insurance against a possible emergency.

## **TREATMENT**

### **Volumetric Overloading**

#### **(Too much liquid going into the plant)**

Overloading may be caused by toilets or faucets that do not shut completely off. Check them all.

Run a garden hose into roof downspouts, floor drains and footer drains to see that they discharge into separate lines from the plant. After running hose through these fixtures, observe plant or discharge point for at least 15 minutes to see there is no flow from these fixtures into the plant. They must not discharge into the wastewater treatment system at any point before or after the plant. Make sure only sanitary wastes (toilets, sinks, showers, bathtubs, etc.) go into the system — nothing else.

### **Tank Needs Pumping**

Although Proline recommends pumping every 3 to 5 years, many tanks go indefinitely without it. There is no easy way of knowing how often a tank needs pumping. When the plant appears to be overloaded and increased aeration does not eliminate the problem, have the owner pump all the compartments. Be sure to turn off the power to the system before pumping. Running the Circulation pump dry can damage the pump. A high pressure hose can be used to clean the compartment walls and components. Pump any materials cleaned from the inside surfaces of the plant. Routine maintenance should be performed on the plant, and plant refilled with clean water before re-starting the power to the plant.

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## Excessive Plant Loading

The Proline PL-500 Plant is designed to serve only individual homes and facilities with similar loadings. If it is used for any other application, it may be subjected to volumetric and organic overloading beyond its capacity. Contact Proline for more information if full-time operation and other troubleshooting suggestions here do not solve problems you encounter.

## ELECTRICAL

### When homeowner calls

If the homeowner reports the aeration warning light is on, instruct them to reset the circuit breaker. This often solves the problem if it was caused by a temporary electrical overload. If the circuit breaker continues to interrupt the circuit or Circulation Pump operates intermittently, troubleshoot the electrical system.

### Control Panel and Wiring

Test for power to the panel with circuit tester. If no power is detected, reset the circuit breaker on the main house electrical panel.

Control panel must be on separate circuit. Have the owner correct if needed.

Check control panel and its wiring by referring to "Electrical Wiring Instructions" for the control panel installed.

Circuit breakers which will not reset (reset button will not "click" into set position) are usually damaged by direct short circuit. First correct the short circuit by using the following procedure and then replacing the circuit breaker. Circuit breakers can easily be replaced in the field without removing the control panel. Replacement circuit breakers are available from Proline.

Check for short circuit in underground cables and electrical connectors by:

- Turn off power to control panel at the main electrical panel for the home by turning the circuit breaker to the "OFF" position
- Turn control panel switch to "OFF."
- Disconnect the Circulation Pump's electrical cable leads from the control panel.
- Disconnect underground electrical cable from the Circulation Pump inside the pumps riser inside the waterproof connection box.

- Set your "Multimeter" to "resistance scale" and measure the resistance between the two leads for the underground cable. Also measure from leads to the ground. (All measures should equal infinity or  $\infty$ )
- If meter does not read infinity or  $\infty$  between all leads tested, underground electrical cable must be replaced. Reconnect leads in the control panel.

Test for power from the control panel to the Circulation pump, by testing the leads from the control panel to the pump, and at the pump (must be performed with power ON)

If there is no power detected from the control panel to the pump, the underground electrical cable may be broken.

If Circulation pump is operating properly for 2 hours or more between malfunctions, you can test to see if the cable is the cause of this intermittent failure by operating the unit for a day using a temporary cable.

Loose connections can also cause intermittent pump operation. Check circuit, tighten all connections in the control panel and both halves of the electrical connector.

### Circulation Pump Overloads

Once you know you have consistent power to the Circulation Pump, remove the pump and check for malfunction or low voltage by test running a different pump (same model only) in good condition on the system. If it operates properly, have the original pump repaired. If good pump does not start or trips the circuit breaker, check for low voltage.

### Low Voltage Conditions

Circulation pump motors are designed to operate at  $\pm 10\%$  of their rated voltage. Whenever voltage drops below this point, the motor draws excessive current which overheats the windings and trips the circuit breaker. Intermittent low voltage conditions can be detected by incandescent lights dimming in the house. Ask the homeowner if they have observed this occurrence, and do the following.

- Check voltage with volt meter or "multimeter at connection points (waterproof connection box and main house circuit box)

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- If voltage is OK at house box but low at wire terminals, check for loose connections, wire splices or runs of more than 400' of wire between the control panel and the Circulation pump. Cable with splices must be replaced with unspliced cable. Runs of more than 400' must have cables with larger conductors to reduce voltage drop.
- If voltage is low at the main house circuit panel or you suspect intermittent low voltage, have the power company check their system and correct problems.

Carefully read and follow all safety instruction in this manual and on pump.

Keep safety labels in good condition.  
Replace missing or damaged safety labels.

To avoid serious injury and/or property damage, read and follow these rules and instructions carefully.

1. Do not lift pump by power cord at any time. Attempting to lift or support pump by power cord can damage cord and cord connections, and will void warranty. Always lift pump by pumping handle.
2. Meet National Electrical Code, Canadian Electrical Code, and local codes for all wiring. The National Electrical Code requires installation of a ground fault circuit interrupter (GFCI) in the branch circuit supplying this type of pump. Purchase a GFI at your local electrical supply.
3. Disconnect power before servicing.
4. Periodically inspect pump and system components. Keep free of debris and foreign objects. Perform routine maintenance as required.
5. Personal Safety
  - a. Wear safety glasses at all times when working with pumps
  - b. Keep work area clean, uncluttered and properly lighted. Replace all unused tools and equipment.
  - c. Keep visitors at a safe distance from work area.
6. This equipment is only for use on a 115 volt (single phase) and is equipped with an approved 3 conductor-cord.

## MECHANICAL

**⚠NOTICE⚠:** This pump has no serviceable parts inside case. Opening the case will ruin the pump. If obstructions or blockages of impeller cannot be clean from the outside (for instance, by washing out with a garden hose), replace the pump.

**⚠⚠⚠WARNING⚠⚠⚠** Hazardous voltage; can shock, burn or kill. Disconnect power to pump before attempting to clean or work on the pump.

Read and Follow Safety Instructions!

**⚠** This is the safety alert symbol. When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

**⚠⚠⚠DANGER⚠⚠⚠** warns about hazards that will cause serious personal injury, death, or major property damage if ignored

**⚠⚠⚠WARNING⚠⚠⚠** warns about hazards that can cause serious personal injury, death, or major property damage if ignored.

**⚠⚠⚠CAUTION⚠⚠⚠** warns about hazards that will or can cause minor personal injury or property damage if ignored.

This label **⚠NOTICE⚠** indicates special instructions which are important but not related to hazards.

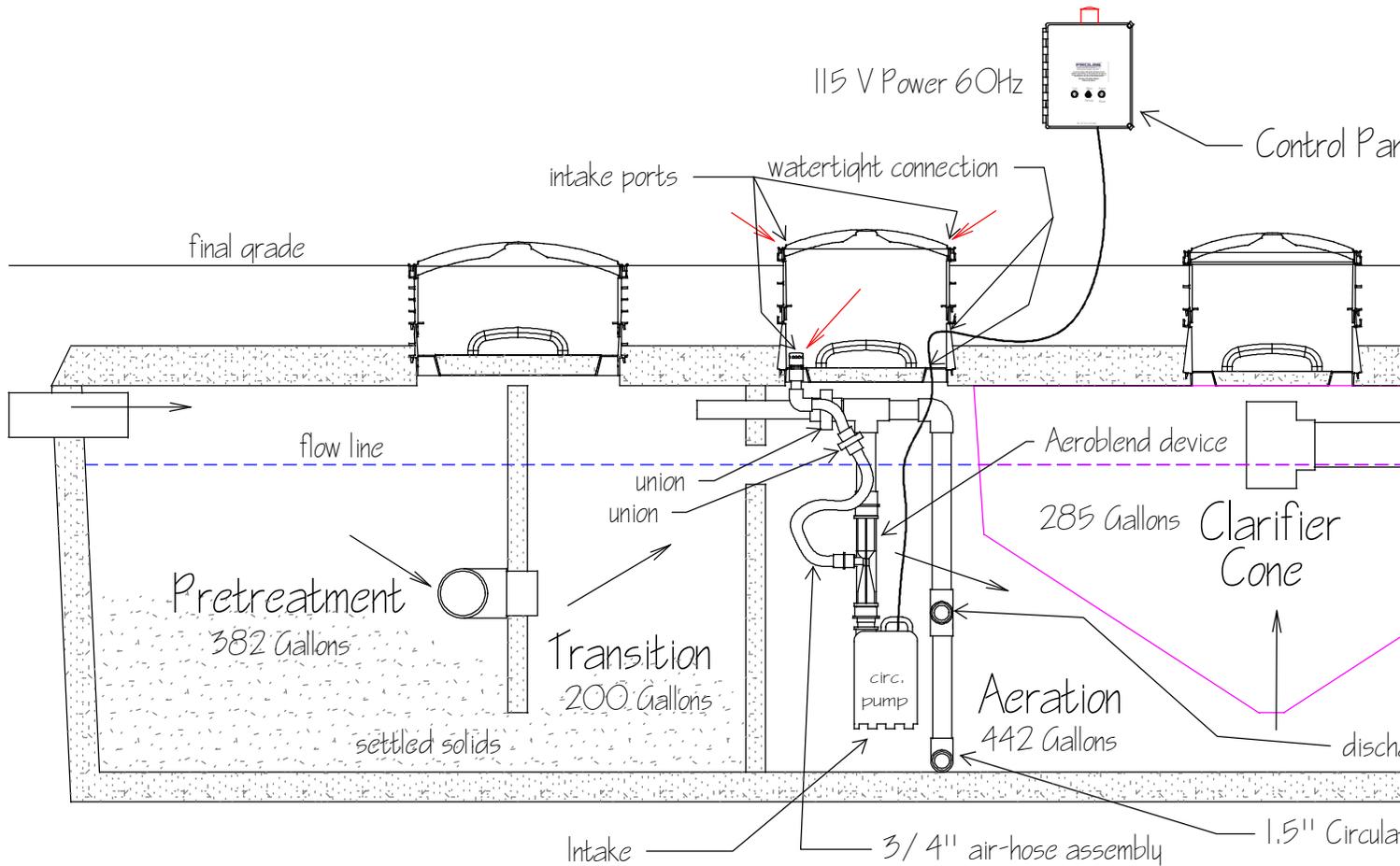
General Safety

**⚠⚠⚠WARNING⚠⚠⚠** To reduce risk of electric shock, disconnect power before servicing.

7. Make certain power source conforms to requirements of system.
8. Protect electrical cord from sharp objects, hot surfaces, oil, and chemicals. Avoid kinking cord. Replace or repair damaged or worn cords immediately.
9. Do not touch an operating motor. Modern motors are designed to operate at high temperatures.
10. Do not handle pump or pump motor with wet hands or when standing on wet or damp surface or in water.

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Symptom	Possible Causes	Corrective Action
Pump won't start or run	Blown fuse  Low line voltage  Defective Pump Defective Impeller  Tripped Breaker	If blown, replace with fuse of proper size  If voltage under recommended minimum, check size of wiring from main switch on property. If OK, contact power company  Replace pump If impeller won't turn locate source of binding and clean out with hose or remove  Reset Breaker
Pump operates but delivers little or no water	Low line voltage  Something caught in impellers  Worn or defective parts or plugged impellers	If voltage under recommended minimum, check size of wiring from main switch on property. If OK, contact power company  Clean out impeller or replace pump.  Clean impeller if plugged, otherwise replace pump.
Intermittent running or pump stopped automatically	Thermal overload tripped	Protect installation from sun. Check for clogged impeller; clean if necessary. Pump has run dry; add water.
Pump operates, but does not draw air	Plugged air hose or intake holes	Flush air hose with fresh water by connecting cleaning hose to the air hose (with pump off), and flush with water until freely flowing. If necessary use hose bib with anti-siphon device for this procedure Intake holes should be sprayed with clean water and cleaned of debris as needed.
Effluent has septic odor	Chemical kill of bacteria  No air intake  Hydraulic/Organic Overloading	If symptom has persisted for 48 hrs or more, evacuate liquid, and refill with clean water.  Clean air hose/intake holes; make sure pump circulating.  Reduce flow and/or organic load



PL-500			
System Proline PL-500	O&M / Troubleshooting		
Designed by Brandon Couch, R.S.	Illustration		
For Proline Wastewater Equip., L.L.C.	Side View		
APPROVED NSF Review	Type 2D	Part Number PL-500	
SCALE 1" = 18"	REV 5.2	SHEET 1 OF 1	

 = air flow  
 = system flow

