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MULTI-FLO

WASTEWATER TREATMENT SYSTEMS

MANUAL
FOR
OPERATION, MAINTENANCE
AND
TROUBLE-SHOOTING

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I. BASIC OPERATION AND MAINTENANCE REQUIREMENTS

The following is a description of the normal maintenance required to insure continuous satisfactory operation of the ***MULTI-FLO*** systems:

START UP:

Allow 6-to-8 weeks for sufficient bacteria to provide proper treatment in the ***MULTI-FLO***. During this period, there may be sudsing from to laundry wastes. *Sudsing can be reduced by limiting the volume of laundry washed daily and by using a low-sudsing detergent.* In situations where excessive laundry water is expected, "seed" the ***MULTI-FLO*** with "mixed liquor" from another unit. To prevent short-term hydraulic overloads, spread out laundry washing.

PUMPING EXCESS SOLIDS:

Periodic pumping is necessary to remove excess bacteria and other solids. For a typical single-family dwelling, the ***MULTI-FLO*** will require pumping at 2-to-4 year intervals. ***MULTI-FLO*** representatives can advise customers when their ***MULTI-FLO*** should be pumped.

FILTER CLEANING:

Filters should be cleaned whenever a ***MULTI-FLO*** is pumped. Filters may need to be laundered if the aerator is shut off for extended periods or they are plugged by grease, soap, residue or solids.

AERATOR REPLACEMENT:

The average life expectancy of the aerator is 3-4 years. New and replacement have a two-year warranty.

ALARM:

MULTI-FLO alarm systems indicate both aerator failure and filter plugging. Although the homeowner will not normally experience immediate filter plugging, the ***MULTI-FLO*** service representative should be notified as soon as the alarm is activated.

SERVICE CONTRACT:

MULTI-FLO units require periodic maintenance. With the purchase of each ***MULTI-FLO***, every owner receives a two-year service contract, which provides a warranty on all parts service, including a minimum of two inspections of the unit each year. After the initial two years of operation, owners are urged to maintain their service contracts to insure regular inspection and service of the ***MULTI-FLO*** system. **NOTE: The warranty does not include misuse or abuse of the system.**

REPLACEMENT PARTS/SERVICE:

Contact the factory for the name of the closest sales/service representative.

SUMMARY OF MAINTENANCE REQUIREMENTS (Residential)

Start up period.....6-to-8 weeks after sewage first enters unit

Pumping frequency.....every 2-to-4 years

Filter cleaning.....every 2-to-4 years

Aerator replacement.....3-to-4 years

Routine inspection frequency.....every 6 months (minimum)

NOTE: Due to differences in wastewater strength, increased user abuse, and hydraulic surges, additional treatment facilities and/or increased maintenance may be required. Please check with your ***MULTI-FLO*** representative.

II. EQUIPMENT AND MATERIAL ESSENTIAL FOR SERVICING MULTI-FLO UNITS

100' garden hose with spray nozzle

100' extension cord

1/3 hp submersible pump (little giant) with outlet made of flex pipe.

Small utility pump with 1/2 - 5/8" garden hose (6') on inlet and outlet (Teal model IP 579E, Simer Minivac Model M40 or equal.)

Pliers - standard with insulated handles

Pliers - channellock

Caulking gun

Caulking, silicone

Hammer

Electrical tape

Wire nuts

Knife

Screwdriver

Replacement parts:
- aerator
- filter bag expanders
- filter bags
- stainless steel spring clips
- pressure switches (for old style units)
- alarm
- latch assembly

Wiping rags

Gasket material

Adhesive for gasket

Volt ohm amp meter

Sample collection jars (1 quart capacity)

III. SERVICING PROCEDURES

Note: During all service procedures, be sure to observe good hygiene practices, including wearing gloves and proper hand washing.

Step 1 Layout garden hose, wiping cloths, tools, electrical tape, utility pumps, and extension cord.

Step 2 Turn off electrical power to ***MULTI-FLO***.

Step 3 Remove lid to ***MULTI-FLO***. Check surge bowl for signs of high water or foaming. Check the area around the ***MULTI~FLO*** for signs of previous overflow.

Step 4 Wash the inside of the lid and surge bowl of ***MULTI-FLO***.

Step 5 Remove the surge bowl and check the gasket on both the bottom and top. If it is loose, re-glue it; if it is damaged, replace it with *new gasket material.*

Step 6 Check the filters for possible plugging by running water into the center chamber and check for a quick, noticeable rise in the water level inside of the tower. If filters are plugged, follow procedures outlined under "Filter Cleaning."

Step 7 Collect a sample of the mixed liquor for a settleable solids test.

Step 8 Using the utility pump, vacuum the top of the weir to remove accumulated solids. Follow procedures outlined in this manual under "Cleaning the Hanger Plate and Weir: Procedure." Check for sludge build-up in the bottom of the filter bags. If the solid accumulation on top of the weir is excessive (greater than 1/2" thick) or appears to noticeably be more concentrated in one area, check for a torn filter(s), improper placement of clips, thin filter material, or a gap between the hanger plate and the ring on the top of the filter. Make appropriate corrections.

Step 9 Remove aerator and check for accumulation of foreign material wrapped around impeller.

Step 10 Replace aerator and check the intake tube to insure that it does not have any blockage. On newer units, check to ensure the clear plastic tube is not twisted or kinked. .Kinks in the hose will cut off aeration to the treatment tank and allow septic conditions to develop. The plastic line on pressure switch unit must not kink.

Step 11 Reinstall the surge bowl. **Make sure that the flat surface of the surge bowl is placed next to the electrical box or that the black marking stripes align properly.**

Step 12 Close lid to ***MULTI-FLO***. Make sure the lid is properly secured with a tamper-proof bolt, padlock or other approved locking device.

Step 13 Turn on the electrical power to the ***MULTI-FLO***.

Step 14 Check out alarm system.

Step 15 After appropriate settling time (possibly 24 hours) check setteable solids reading to determine if the ***MULTI-FLO*** should be pumped before the next routine service call. Advise homeowner accordingly.

Step 16 **Be sure to leave the owner notice of the inspection/service call, inspection results, service provided, and recommendations.**

IV. PUMPING

Bacteria and other microorganisms present in the wastewater use soluble organic material as a food source, converting it into more microorganisms (biomass), water, and carbon dioxide. As the colony matures, the numbers of microorganisms increase until they exceed the supply of organic material to maintain them. Due to the resulting starvation, organisms will begin to die and then be metabolized as new organisms are formed. Metabolized organisms reduce the overall solids (or "sludge") volume.

There will be a gradual increase in solids) due to the accumulation of inert remains of dead organisms and non-degradable material in the wastewater. As the solids increase, the mixed liquor becomes thicker, reducing the scouring effect on the filters. Periodically, the solids must be pumped from the ***MULTI-FLO*** to prevent filter plugging and maintain adequate aeration within the system.

PUMPING FREQUENCY:

The rate of solids accumulation—and resultant pumping—is dependent upon the quantity and strength of wastewater entering the plant, i.e.; the greater the waste load, the more frequently the ***MULTI-FLO*** should be pumped. Normally, residential systems should be pumped every 2-to-4 years. Units serving commercial occupancies may need to be pumped every 1-2 years, depending on the waste load.

DETERMINING PUMPING FREQUENCY:

Trained service personnel can help owners establish a pumping frequency by performing a 24-hour settleable solids test of the mixed liquor during semi-annual service:

Procedure

1. Mark a quart jar into 10 equal portions
2. While aerator is running, fill the jar with mixed liquor suspended solids by lowering the jar into the center aeration chamber.
3. Measure the percent of the original volume occupied by the sludge after it has settled for 24 hours.

The optimum level of settleable solids (24 hours) is normally between five and 50 percent. Whenever the percent of settled sludge exceeds 50%, the unit should be pumped.

PROCEDURE FOR PUMPING THE MULTI-FLO:

1. Shut off the ***MULTI-FLO*** and allow solids to settle for 30-60 minutes.
2. Remove access cover and the surge bowl.
3. Lower the hose into the center aeration chamber. *Care should be taken to avoid knocking or damaging the aerator, air intake tubing or power cord. Be careful with the older model FTB 0.75 because the aerator sits on a platform.*
4. Pump solids from the bottom. If the filters are not to be removed, be sure to hose down the filters and the bottom of the hanger plate.

5. Pump down the tank, until the liquid level is at the top of the aerator. This will leave sufficient seed material to allow start-up conditions to develop.
6. *In areas with a high water table, immediately refill the **MULTI-FLO** with clear water to prevent shifting or flotation.*

V. FILTER CLEANING

Under normal operating conditions, the filters in the ***MULTI-FLO*** do not require manual cleaning or backwashing. The extent of the bacterial buildup on filter surfaces is limited by the constant scouring from the aeration and sloughing of the solids.

The biomat that develops on the surface of the filter enhances filtration. Therefore, *cleaning of the filters is not recommended unless actual plugging is occurring.* The following conditions may cause plugging of the filters to occur:

1. Excess buildup of solids in the ***MULTI-FLO*** (see Pumping Procedures).
2. Extended septic conditions (see Aerator Replacement). Normally, the filters will not plug unless septic conditions exist for a period more than 7-to-10 days.
3. Excessive grease entering the ***MULTI-FLO***. This may become a problem at a food service facility or in a home with a garbage disposal.
4. Hydraulic overload. (See Troubleshooting Guide for remedies.)
5. Organic overload. (See Troubleshooting Guide.)

CLEANING PROCEDURE (Standard Procedure):

1. Remove spring ring retainer from filter.
2. Without removing the filters, grasp the filter by the ring at the top and move it up and down in the weir to scrape off the accumulated solids and biomat.
3. Check the interior of the filter. If there is an accumulation of sludge in the bottom, remove the filter and pour the sludge into the aeration chamber.
4. Replace the filter in weir and push back in place. Replace the spring ring retainer.
5. If the water fills up the filter as fast as it is being pushed down through the weir, no further cleaning is required. Follow the same procedure with the remaining filters. **NOTE: This procedure is only recommended when done during routine pumping. *If the above procedure does not adequately cleanse the filters, or if the plugging resulted from other causes perform the following procedures:***
   a. Replace the existing filters with a clean set.
   b. Launder the old filters on gentle cycle and allow them to air dry (do not use a heated dryer as this will damage filters). Add bleach with the detergent (or during the rinse cycle) to enhance the cleaning of the filters and provide personal health protection.

Do not attempt to clean the filters by washing them with a garden hose or pressure washer. This can damage the filters or leave a residue within the fabric which will cause the filters to plug prematurely.

Hydraulic or organic overloads should be considered if filters plug frequently (i.e., less than 12 month intervals), or shortly after the unit goes into operation. Contact the ***MULTI-FLO*** distributor or factory representative for assistance.

VI. CLEANING THE HANGER FILTER PLATE AND WEIR

Often, "pin floc" (less than 0.03 inches in diameter) forms as a result of over-oxidation of the sludge. Pin floc is observed in units with low hydraulic loads and long retention times, which allow digestion of the bacterial cells to occur. These fine, mostly inert, solids may pass through the filter fabric, especially if an inadequate biomat has formed on the filter surface. Pin floc may occur in new units though hydraulic surges (laundry, showers, etc.) may also force some of the small particles through the filters.

Pin floc usually settles to the bottom of the filters. However, some of the particles may be carried upward through the filters and settle on the upper surface of the hanger filter plate. It will be necessary periodically to remove the settled solids from both the hanger plate and inside of the filters to prevent solids from being carried over the weir.

PROCEDURE:

1. pump the settled solids off the top of the hanger plate using a 1/2 to 5/8 inch garden hose for an intake and discharge,. Place the discharge end into the center chamber.
2. If there is a significant amount of settled sludge in the bottom of the filters, pump the sludge out using a 4 foot section of 3/4 inch PVC pipe attached to the end of the intake hose. If there is no access to a pump, remove the filter and pour the sludge into the center aeration chamber. If surface discharge of the effluent is used it is good policy to plug the 4 inch discharge line until cleaning is completed.

CLEANING FREQUENCY:

Under ordinary conditions, the top of the hanger and weir should be cleaned during each routine inspection (every 6 months). Sludge should be removed from the interior of the filters whenever it exceeds 6 inches in depth or if clumps of floc float at the top of the filter (approximately once every 12 months).

It is not advisable to remove or clean the filters more than is necessary. Unnecessary cleaning will wear or damage filters and expanders.

VII. AERATOR REPLACEMENT

PROCEDURE:

1. Turn off the electricity before working on aerator.
2. Remove the three wire nuts and disconnect the aerator electrical cord from the main power cable.
3. Loosen the pressure fitting in the center tower and gently pull the power cord through so that the aerator is free.
4. Grasp the air intake tube and raise the aerator until the upper union (located in the middle of the air intake tube) is visible.
5. Disconnect the sensor (upper) portion of the intake and lay it back on the hanger plate. The aerator is now free and can be moved from the ***MULTI-FLO***.

6. Change aerators and replace in the ***MULTI-FLO*** by following the above procedure in reverse.

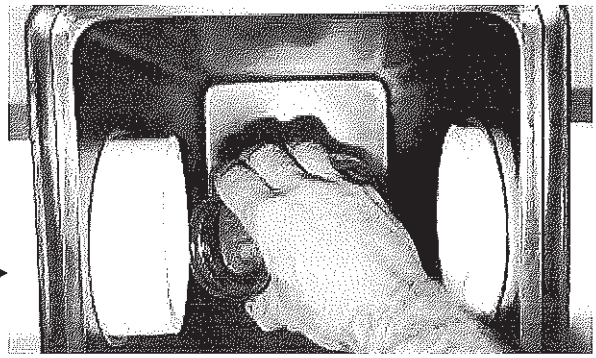
VIII. ALARM REPLACEMENT

PROCEDURE:

1. Turn off the electricity before working on the alarm.
2. Unplug the alarm or disconnect the power cord.
3. Unscrew the face plate of the alarm.
4. Remove the two wire nuts and disconnect the green and white sensor wires.
5. Remove the alarm box from the wall or mounting bracket and replace with a new alarm.
6. Reconnect the sensor wires (white to white; black to black).
7. Replace the face plate; plug in the alarm and restore power.
8. Check alarm by pressing test button.

IX. SAMPLE COLLECTION

MULTI~FLO units produce an effluent exceeding the performance requirements of NSF Standard 40 (Class I) for aerobic treatment plants: 30 day average of <25 mg/l CBOD and <30 mg/l TSS. Local health agencies may require periodic sampling to confirm this performance. If this is necessary, the following procedure should be followed.

To collect samples from the ***MULTI~FLO***, care must be taken to get a reliable and uncontaminated samples as **effluent is discharged from the unit.**

1. Provide a suitable port on the outlet of the ***MULTI~FLO*** (see Fig. 1). The port should be at least 6" in diameter, with a minimum depth of 8" below the effluent line.
2. Using a clean cloth, wipe the interior of the effluent line, where it enters the sampling port, to remove any debris that may have accumulated.
3. Drain water into the cleanout before the ***MULTI~FLO***, to generate a flow through the unit. Allow the flow to continue for approximately one (1) minute to flush the line.
4. Shut off the water and dip the water out of the sampling port. Discard this water.
5. Turn on the water and collect a sample as effluent flows into the sampling port. Do not collect water that has accumulated in the sampling port. Take care to avoid catching dirt or other debris while collecting the sample.