

Premier Tech Aqua (PTA) congratulates you for your purchase of an **ECOPROCESS™ MBBR Wastewater Treatment System**. By making this choice you contribute to the protection of the environment and the water sources of your community.

*This guide contains the necessary information regarding the operation, usage and maintenance of the **ECOPROCESS™ MBBR Technology**. For more information, please do not hesitate to contact our Customer Service at **1 800 632-6356** or visit us at **PREMIERTECHAQUA.COM**.*

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1 Operation of the Treatment Chain

1.1 Introduction

The treatment chain of the **ECOPROCESS™ MBBR** is comprised minimally of an MBBR reactor and a secondary decanter. The MBBR reactor is an aerated reservoir which contains a moving bed biofilm that ensures the biological treatment. The purpose of the secondary decanter is to separate solids produced by the MBBR and discharge treated water at the effluent. Different treatment chain configurations are offered to meet the specific needs of clients.

The wastewater treatment process of the **ECOPROCESS™ MBBR** is entirely managed by one or more than one control panels. The purpose of the control panel(s) is to apply power or disconnect the equipment of the treatment chain. The control panel(s) can manage:

- The feed pumps of the MBBR reactor.
- The blowers ensuring the aeration inside the MBBR reactor.
- The sludge and scum pumps of the decanter.
- The phosphorus removal pumps (please consult the Phosphorus Removal Section of this document for more information on their operation and maintenance).
- The pumps of the pumping stations (please consult the Pumping Station Sections of this document for more information on their operation and maintenance).

1.2 Feeding of the MBBR with an Equalization Tank

In most cases, an equalization tank is integrated in the treatment chain to regularize the feed to the MBBR. The water contained in the equalization tank is directed to the **ECOPROCESS™ MBBR** using submersible feed pumps. Feeding of the bioreactor(s) is performed on an on-demand basis and depends on the activation of the floats in the equalization tank. In certain cases, feeding the MBBR can be done by gravity directly at the outlet of the septic tank. In that specific case, feed does not need to be managed, but the operation guidelines of the MBBR must be taken into consideration. For example, no aeration will be required in economy mode.

Figure 1 indicates schematically the position of the various floats in the equalization tank of the **ECOPROCESS™ MBBR** treatment chain.

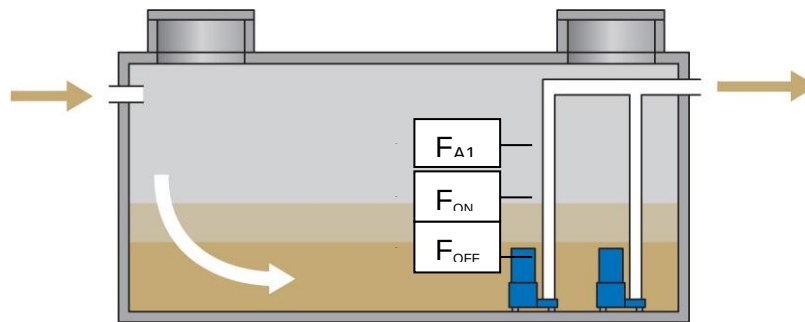


Figure 1: Schematic representation of the position of the floats in the Equalization Tank of the **ECOPROCESS™ MBBR** treatment chain.

Three (3) level floats are required to control the water level in the equalization tank. The lowest float (F_{OFF}) deactivates the control sequence and feed system. The middle float (F_{ON}) activates the automatic control sequence. The highest float (F_A) activates the continuous operation of the pumps as well as the alarm to notify the client of a high level of water in the equalization tank.

Please consult the « Technical Sheet » Section of this document for more information on the operation and components of the equalization tank.

The purpose of the PTA control panels is to operate the feed pumps of the MBBR in automatic, manual or stop mode depending on the position of the activation button of each pump.

1.2.1 Automatic Operation Mode

The automatic operation mode is the one prioritized under normal operations of the treatment chain. This operation mode allows the treatment chain to treat 100% of the design flow over a 20-hour period. During the start-up of the equipment, operation times of the pumps in automatic mode should be adjusted to make sure the treatment chain meets the needs of the client.

Please note that in all these cases, when a pump is operating:

- The power switch of the pump's motor is activated.
- If the pump is overloaded, a message will appear on the operator interface.
- It is possible to know the actual operating times of the pump via the control panel.

1.2.1.1 Case #1: The water level rises

This is the control sequence when the water level rises:

- Initially, the water lever is located under the first float (F_{OFF}). The MBBR is in economy mode (CE). The water lever rises and activates this float. No action is undertaken by the control system. The MBBR stays in economy mode (CE).
- The water level rises again and activates the second float (F_{ON}). The control system activates the pump of the equalization tank that operates as per a pre-established cycle. The MBBR is also activated in normal mode (1,2 and 3).
- In the event of a peak flow, the level of water will continue to rise and will activate the high float (F_A), which serves as an alarm float. The control system will activate the pumps of the equalization tank so that they operate continuously to deactivate the alarm float. The pumps will operate alternatively depending on a predetermined « ON » time in normal mode, without any pause. The MBBR continues to operate in normal mode (1,2 and 3). A visual alarm will appear on the control panel. **This situation is not normal.**

1.2.1.2 Case #2: The Water Level Goes Down

- Initially, the level of liquid in the reservoir will be under the alarm float (F_A). This means that all three (3) floats are activated (high position) and that the pumps operate continuously. The level goes down and deactivates the alarm float (F_A), the pump's operation mode returns to the normal, pre-established cycle. The MBBR continues to operate in normal mode (1,2 and 3).
- The water level goes down and deactivates the second float (F_{ON}). No action is undertaken by the control panel and the pumps continue to operate as per normal sequences. The MBBR continues to operate in normal mode (1,2 and 3).
- The water level goes down and deactivates the first float (F_{OFF}). The control system will stop the pumps, the MBBR is no longer fed. The MBBR activates its economy mode (CE).
- Under normal operating conditions, the water level should not reach the alarm float (F_A). When normal activities are taking place in the serviced building, the water level should be between the F_{OFF} float and F_A float.

1.2.2 Manual Operation Mode

The feed pumps are operating without stoppage regardless of the level of the liquid. The operation and stop sequences are short-circuited.

Note: Avoid operating the pumps when dry.

1.2.3 Operation Mode: Stop

In this position, no power is sent to the motors of the different pumps.

1.3 Operation Mode of the Aeration of the ECOPROCESS™ MBBR System

Two operation modes are possible for the blowers of the MBBR reactor, namely the economy mode (CE) and the normal mode (1,2 and 3).

1.3.1 Normal Operation Mode (1,2 and 3)

- Activates itself when the F_{OFF} and F_{ON} floats are activated (high position).
- **ECOPROCESS™ MBBR** reactor receives a constant level of influent doses at a set frequency.
- The aeration inside the reactor is frequent because of the regular arrival of water to be treated (pre-established sequence).
- Deactivates itself when the F_{OFF} is deactivated (low position).

This operation mode varies depending on the age of the system. In fact, during the first weeks of operation, the biological load inside the reactor must construct itself. That is why the aeration time must be modified to prevent the accumulation of foam inside the reactor.

1.3.1.1 Start-Up Mode

At the time of the start-up, the aeration must be kept to a minimum to begin the biological activity and avoid the accumulation of foam on the surface of the reactor. The operation time of the blowers must be set to 2 minutes and the stop time at 6 minutes.

1.3.1.2 Intermediary Mode

A few weeks after the start-up, it is possible to increase the aeration to optimize the consumption of the organic load in the reactor and the mixing of the media. The operation time of the blowers must be set at 5 minutes and the stop time at 5 minutes.

1.3.1.3 Full Operation Mode

When the system has reached an equilibrium and if the reactor is deprived of oxygen, the aeration must be adjusted for the reactor to reach its maximum performance in terms of organic and nitrogen load removal, if applicable. The operation time of the blowers must be set at 30 minutes and the stop time at 5 minutes.

1.3.2 Economy Mode

- Activates itself when the F_{OFF} float is deactivated (low position).
- The MBBR reactor has not received any influent for a certain time.
- The aeration is less frequent because there is no new flow of wastewater (pre-established sequence)
- Deactivates itself when the F_{ON} float activates itself (high position).

1.3.3 Summary of the Operation Modes of the Blowers

Table 1: Summary of the operation and stop times of blowers depending on the operation mode

OPERATION MODE	OPERATION TIME (MIN)	STOP TIME (MIN)
ECONOMY (CE)	5	55
START-UP (1)	2	6
INTERMEDIARY (2)	5	5
FULL OPERATION (3)	30	5

1.4 High Level Alarm in the MBBR Biological Reactor

A high-level float is installed inside the reactor. It is activated if the water level is higher than the height of the outlet. The control panel will indicate an alarm to inform the client of the situation. The likely cause of a high level in the reactor is:

- The holding grid of the media is clogged and the water cannot flow freely to the subsequent treatment step.

1.5 Operation Mode of the Secondary Decanter

The secondary decanter is, in most cases, gravity fed. It is located downstream of the MBBR biological reactor. When the water level in the reactor has reached the invert of the outlet of the MBBR reservoir, the water flows toward the decanter. A scum pump and, at the minimum, a sludge pump is integrated in each decanter. The purpose of the scum pump is to remove the sludge floating on the surface of the decanter. The purpose of the sludge pump or pumps is to remove the sludge which has settled at the bottom of the tank.

Under normal condition, the pumps both activate themselves two times a day in alternation (depending on pre-established sequences). The pumps operate independently of the operation mode of the MBBR (economy or normal mode). The operation and stop times of each type of pumps can be adjusted in the control panel. The operation and stop times should be adjusted at the start-up of the treatment chain. Depending on the actual operation (real loads), it will be possible to increase the frequency of sludge removal based on the speed at which the sludge and scum accumulate in the decanter. However, it is important to consider the volume of the supernatant recirculated at the beginning of the treatment chain by the sludge removal. Please consult the technical sheet of the decanter in the « Technical Sheet of the Internal Components » Section of this document for more information about the capacity of the sludge removal pumps.

If required, please contact **Premier Tech Aqua** to determine the optimal operation and stop times of the scum and sludge pumps.

1.6 Low Level Control of the Secondary Decanter

A low-level float is integrated in the secondary decanter. When it is deactivated (low position), the sludge and scum pumps will not start to avoid operating dry and then emptying the reservoir without any reason until the float is activated again. This condition indicates there has not been any inflow of water for a certain time.

Table 2: Summary of the operation and stop times of the sludge and scum removal pumps

NUMBER OF REMOVAL PER DAY PER PUMP	OPERATION TIME (MIN)	STOP TIME (H)
1	1	12
2	1	6
3	1	4
4	1	3

Depending on the specific configuration of the installation, please note that the operation time of the pumps could be greater than what is indicated in the above table. These times are nonetheless generally sufficient.

1.7 Operator Interface and Alarm Management

The operator interface located in the control panels allows you to consult and modify the operation parameters of the electro-technical components of the treatment system, namely of the pumps and blowers for the MBBR reactor and scum and sludge pumps of the decanter. The screen of the interface also indicates all the alarms that occurred. When the panel indicates an alarm on the screen of the interface, make sure you note it in the monthly log book and see that the situation which generated the alarm is corrected. Please consult the Troubleshooting Section at the end of this document to identify the issue. If the problem persists, please contact **Premier Tech Aqua**. To cancel an alarm, press the Reset button. A persisting alarm indicates that the problem is still occurring. If the alarm disappears by pressing the Reset button, the problematic condition is no longer in effect. However, it is good practice to investigate further to identify and understand what caused the alarm.

The operation guide of the control panel(s) in this document provides more details on how to navigate into the user interface.

2 Process Control – Biology

2.1 Biological Operation Parameters

2.1.1 Dissolved Oxygen in the MBBR

To ensure an adequate treatment by the microorganisms and prevent an excessive proliferation of filamentous bacteria, a minimal dissolved oxygen concentration of 4 mg/L should be maintained in the bioreactors.

The lack of oxygenation can lead to a dark coloration of the contents of the MBBR, an unpleasant odour characteristic of a « septic condition » an accumulation of biomass on the media and diminished treatment performances. Various potential solutions can be considered:

- Increase the aeration time while in normal operating mode (1,2 and 3) to increase the quantity of oxygen supplied to the bioreactor. However, special attention must be paid not to aerate excessively to limit the destruction of the biofilm flocs suspended by the movement of the media pieces.
- Reduce the duration of the non-aerated periods while in normal operation mode (1,2 and 3) to increase the number of aeration sequences.
- Reduce the volume of each feed dose applied to the bioreactor.
- Reduce the frequency of the feed periods (be careful with these last two adjustments. You must make sure that you will be able to respect the daily flow of wastewater to be treated).

2.1.2 Nutriment

The organic matter, the nitrogen and the phosphorus constitute a source of food and are essential nutrients for the microorganisms responsible for the treatment. Their activity will be maximal when all their needs are met. Nitrogen and/or phosphorus deficiency can favour the growth of filamentous

organisms and impair treatment performances. A balanced mass ratio ($BOD_5/N/P$) of 100/5/1 must be present for the biological activity. In the event of a deficiency, the situation can be corrected by adding nitrogen and/or phosphorus to obtain a more balanced mass ratio.

2.1.3 pH and Alkalinity Variations

pH will vary if acid or basic wastewater is discharged into the system or if the alkalinity of the water is insufficient in the raw sewage. A drop in the pH can impair treatment performances. Usually, the occasional addition of small quantities of acid or alkaline products in the wastewater will not impair the treatment due to the dilution rate inside the reactor. However, an important spillage of acid or alkaline products could impair or even inhibit the treatment.

A lack of alkalinity ($CaCO_3$) in the wastewater (buffering capacity) can lead to a decrease in pH. Typically, the alkalinity is consumed by the nitrification process during the biological treatment under aerated conditions. While mostly used by the nitrifiers, the chemical removal of the phosphorus can also consume a fraction. A residual alkalinity at the effluent of 50 mg/L is generally recommended to ensure the stability of the pH during the treatment.

Significant pH variations in the system on a regular basis may make it necessary to add an automatic pH control equipment or some alkalinity.

2.1.4 Biofilm Control

The efficiency of the biological treatment is based on the activity of the microorganisms stuck on the media pieces. A sufficient quantity of such microorganisms must thus be found in the biofilm covering the media surface. However, an excessive quantity of biofilm can impair the process treatment. Under normal conditions, the thickness of the biofilm should be barely visible up to 1 mm.

To reduce the clogging of the media pieces and optimize the thickness of the biofilm, the operator must make sure aeration is sufficient. The purpose of the aeration is twofold: it cleans the media by stirring and abrasion, and ensures sufficient input of dissolved oxygen for the biological treatment. The operation of the blowers, if it respects minimal mixing criteria, will usually allow for the adequately recurring of the surface of the media. An optimal thickness of biofilm will thus be maintained.



Figure 2: Media with little colonization

Figure 3: Very colonized media

In certain cases, where the applied load is much lower than the design loads, it may be necessary to reduce the duration of the aeration times to limit the excessive abrasion of the suspended pieces of biofilm. In fact, a very elevated retention time can lead to suspended biomass flocs breakage and impair the separation of solids by the decanter. To limit the flocs from breaking, the agitation must be controlled. Be careful not to lower the aeration too much to maintain a sufficient biological activity for the treatment.

2.2 Environmental Follow-Ups

The operation of an **ECOPROCESS™ MBBR** is done automatically. However, it is necessary to perform periodical follow-ups of its performances to ensure that the control parameters are always properly adjusted. To do so, it is generally appropriate to perform a sampling of the effluent of the treatment chain. Certain precautions must be taken during the sampling procedures to avoid contaminating the samples collected and skew the obtained results. As such, it is essential that the instruments and materials used for the sampling (sampler, sampling points, bottles, etc.) be carefully cleaned and disinfected. Moreover, it is strongly recommended, when more than one sampling points are concerned, to begin with the least contaminated point and move back up the treatment chain. This will limit the risks of cross contamination.

The following parameters are generally analyzed:

- Total carbonaceous biochemical oxygen demand after 5 days (BOD_5C_{tot}).
- Chemical Oxygen Demand (COD).
- Total Suspended Solids (TSS).
- Total Phosphorus (when required by the regulation or for a system diagnostic).
- All forms of Nitrogen (when required by the regulation or for a system diagnostic).
- Fecal Coliforms (when required by the regulation or for a system diagnostic).
- Soluble Carbonaceous Biochemical Oxygen Demand after 5 days ($CBOD_{5sol}$) (system diagnostic).
- Other parameters can be required as per the local regulation as well as discharge requirements specific to your installation.

3 Maintenance and Servicing of the System

3.1 Weekly Inspection and Maintenance

The operation principle of the **ECOPROCESS™ MBBR** treatment process is simple, but the system does require regular, preventive inspection and maintenance. A minimal weekly follow-up is recommended as a preventive measure to be able to react swiftly in the event of an electro-technical operation failure. It is not required that this follow-up be performed by a person trained by Premier Tech Aqua. Here are the actions to be undertaken during these visits:

3.1.1 Weekly Inspections

- Visual inspection of the proper operation of the electromechanical components, pumps and blowers.
- Visual and olfactive inspection around the **ECOPROCESS™ MBBR** treatment chain (equalization tank, bioreactor, decanter, pumping stations, etc.).

- Note down any failure or other particularities related to the operation of the system.
- If possible, note the operation time of every equipment.

3.2 Periodical Operation and Maintenance Follow-ups

The maintenance of the **ECOPROCESS™ MBBR** system should be performed by a person trained by Premier Tech Aqua. Premier Tech Aqua service partners inspect and maintain the mechanical components and perform the follow-up required for the proper functioning of the treatment process.

Table 3: Principal operation points of the **ECOPROCESS™ MBBR** System

Activities
Operation of the treatment chain
Inspection of the primary treatment and sludge measurement
Reading of key operational parameters
Inspection and maintenance of the MBBR system
Inspection and maintenance of the secondary decanter

3.2.1 Operation of the Treatment Chain

- Verification of the general operation condition of the treatment chain.
- Verification of the operation of the pumps.
- Verification of the operation of the control panel(s) and alarm system.
- Perform the maintenance of the pumps and blowers as per the recommendations of the manufacturer (please consult the « Technical Data Sheet of the Internal Components » Section of this document.

3.2.2 Reading of Key Operation Parameters

- Note the operation times of the various pumps and blowers.
- Note the total number of operation hours of the electrotechnical components.
- Note any failure or particularities related to the operation of the system.
- Make the required adjustments based on the observations made.

3.2.3 Inspection and Maintenance of the ECOPROCESS™ MBBR System

- Evaluate the correct feed rate of the **ECOPROCESS™ MBBR** system.
- Verify the proper operation of the blowers and the homogeneity of the mixture in the tank.
- Note the pressure indicated on the manometer while the blowers are operating.
- Note the adjustment of the relief valve. It should open when the pressure is 25% greater than the operational pressure.
- Verify if the clogging indicator of the blower's filter has indicated any clogging. Clean the filter, if required. Following the maintenance of the filter reinitialize the clogging indicator by pressing the yellow button on top.



3.2.4 Inspection and Maintenance of the Decanter

- Verify the operation of the pumps and make sure the sludge is properly directed to the storage tank (septic or sludge management tank).
- Note the accumulation of scum on the surface of the decanter (inlet, middle and outlet section).
 - If there is scum, increase the frequency of the scum removal.
 - If there is scum in the inlet and outlet sections, it will need to be removed manually with a Shop-Vac®.
- Measure the sludge accumulation at the bottom of the decanter (inlet and outlet section). There should not be any sludge there.
 - If there is an accumulation of sludge at the bottom of the decanter, increase the frequency of the sludge removal.

3.3 Environmental Follow-Ups

To validate the treatment performance of the treatment system, a sample and analysis of the physical and physicochemical parameters may be required.

Moreover, for all types of treatment chains designed for community, commercial and institutional establishments, local authorities may require environmental follow-ups of the treatment performances of the treatment chain while in operation.

Premier Tech Aqua can provide technical services for such follow-up programs. Premier Tech Aqua offers different service packages depending on the specific needs of clients and maintenance contracts are renewable on an annual basis. Depending on the type of service selected by the client, the frequency of the visits of the sampling site may vary.

4 Intermittent Operation and Seasonal Fluctuations

A prolong no flow period (one week) could lead to the death of a fraction of the microorganisms present on the media. The restart of the alimentation of the MBBR is performed automatically, without the need for any human intervention. Depending on the duration of the no flow period, a few days to a few weeks could be required for the complete reestablishment of the treatment performances. Moreover, it is possible that such a situation generates foam. This foam will be controllable by the addition of an anti-foam agent available from any speciality supplier and by reducing the duration of the aeration (please consult Section 1.2).

In certain applications, it is possible that loads vary depending on the period of the year the system is in operation. For example, a restaurant may only operate in the summer.

In terms of the flow variation, the treatment system will adjust itself automatically. During periods when flow will be less. When the flow is less, the MBBR technology will be in economy mode for longer periods of time.

A significant variation in the BODC₅ concentration at the influent could have a negative impact on the treatment. As such, and in certain cases, it may be necessary to adjust the aeration. Premier Tech Aqua recommends adjusting the duration of the aeration proportionally to the difference of the mass loading to be treated. For example, based on the following table:

Table 4: Design criteria of the treatment system (occasional loads)

Parameters	Pressing waters	Maple waters	Average of the water generated yearly
Type of operation	3 months/year	2 months/year	Year
CBOD₅ soluble concentration (mg/L)	2,000	1,500	665
Daily flow (L/day)	7,000	500	11,735
Daily charge to treat (g/d)	14,000	750	7,809

- The variation in the mass load brought about by the maple waters is lower than 10%, which represent a typical variation the MBBR can absorb. No modification in the aeration times is required.

- The variation mass loading brought about by the pressing waters is, on the other hand, significant and requires an adjustment. Considering the aeration will be operating for 60 minutes (« ON ») and 5 minutes of stop time (« OFF ») under normal operation conditions, this means that the blowers are operating 92% of the time and aerate the reactor, which corresponds to a full capacity operation (yearly waters and pressing waters). The aeration will need to be adjusted when pressing waters are no longer directed to the treatment chain.

$$\% \text{ of the aeration time} = \frac{\text{real charge}}{\text{total design load}} \times \text{design operation time}$$

$$\% \text{ of the aeration time} = \frac{7\,809 \text{ g/day}}{21\,809 \text{ g/day}} \times 92\%$$

$$\% \text{ of aeratino time} = 33\%$$

- Under these conditions, the blower should be adjusted to aerate for 5 minutes and pause for 10 minutes to aerate the reactor 33% of the time.

5 Start-Up and Seasonal Shutdown

When the treatment chain is not operating in the winter, certain actions must be undertaken to prevent any equipment breakage:

- Drain the feed pipes of the reactor by completely opening the drain valves on the 2" (50 mm) outlet pipe of the equalization tank.
- Drain any other pipes that may freeze in the winter.
- Make sure that pumps are not located at a level where the water could freeze and lead to breaks. For the decanter, it is preferable to lower the pumps to the bottom of the reservoir for the winter period. At start-up, the pumps should be placed back in their original position.

During start-up, following a temporary CBOD₅ shutdown of the treatment chain, it is important to open the lids of the reactor and secondary decanter to verify if any component may have broken during the stoppage period.

For more information about the shutdown of a treatment chain in the winter, please consult the « Seasonal Shutdown » Section of this document.

6 Troubleshooting

IMPORTANT: certain operations can only be executed by a qualified electrician or technician.

6.1 Mechanical Features

6.1.1 High-float alarm – Equalization Tank

Turn off the fee pumps. Keep the water consumption to a minimum until the issue is resolved.

Possible Causes	Explanations and Repairs
Mechanical problem leading to a high level	• Reset the circuit breaker of the pumps, if required. • Reset the overload relay of the pumps, if required. • Verify the operation of the pumps manually. • Verify if a high-level float is stuck in the equalization tank. • Verify the operation of the level floats in the equalization tank. • Proceeded with the necessary verification, repairs or part replacements if the problem continues.
Air lock in the pump's conduit	• Activate the pump and wait a few minutes for movement in the conduit to begin. • Activate the pump and, if possible, move the pump and its conduit vertically to let the air out. • With the pump deactivated, disassemble the pipes (cam coupler) to purge the air and reconnect the pipe.
Calibration of the pumps	• Verify if anything is obstructing the pumps or feed conduits. • Validate the flow of the feed pumps. • Based on the flow of the feed pumps and their pre-established operation sequences, evaluate their daily treatment capacity. • Evaluate the daily flow to be treated based on the flow of the feed pumps and the daily operation time totalizers. • Adjust the flow or the operating times if the treatment capacity is lower than the daily flow to be treated.
Obstruction of the holding grid of the MBBR media	• Clean the holding grids inside the MBBR.
Runoff water flowing to the treatment chain	• Inspect all the elements of the treatment chain and verify if any runoff water is flowing to the installation. • Correct what may be required to address the issue.
Real flow is greater than the design flow	• Revise the design of the ECOPROCESS™ MBBR treatment chain.

6.1.2 Problem with the feed pump of the ECOPROCESS™ MBBR System

Turn off the feed pumps. Keep water consumption to a minimum until the issue is resolved.

Possible Causes	Explications et Repairs
Defective pump(s)	- Identify the defective pump with the error message on the operator interface. - Reset the circuit breaker of the defective pump, if required. - Reset the overload relay of the defective pump, if required. - Test the operation of the pumps manually. - Proceed with the necessary verification, repairs or part replacements if the problem continues.
Obstructed Valve adjustments	- Verify that water flows freely in the valve when it is in the open position. - If the valve seemed obstructed, use a push rod to unblock it.

6.1.3 Presence of an important amount of foam in the MBBR

The presence of controlled foam inside the reservoir is not necessarily problematic. Foam becomes an issue when it is so abundant that it begins to seep out of the tank.

Possible Causes	Explanations and Repairs
At Start-Up - Initial Start-up - Seasonal Start-up - Start-up after a long period of no flow	- At the initial start-up, reduce the aeration times as per the times listed in Section 1.2.3. Set the operational times to normal when the foam is well controlled. - If the adjustment of the aeration is insufficient, add an anti-foam product during the start-up period as per the recommendations of the manufacturer.
Under normal operations	- Investigate how the system is used by the occupants of the serviced building. Verify if certain products rejected into the wastewater may cause an accumulation of foam. - Measure the concentration of the dissolved oxygen of the water inside the MBBR while in normal operation mode. If the water is saturated, the mixing could be excessive and produce foam. Reduce the aeration rate all the while making sure to maintain a minimum of 4 mg/L in dissolved oxygen. - If the adjustment of the aeration is insufficient, add an anti-foam product as per the recommendations of the manufacturer.

6.1.4 Problem: the treatment chain does not function, even if the main switch is in the « ON » position

Possible Causes	Explanations and Repairs
Defective electrical and phase connections	• Verify the various phases with a voltmeter. • Reset the main circuit breaker or replace any burnt fuse.
Defective electrical connections	• Verify if all electrical connections were performed concord with the electrical plans.
Defective control unit	• Verify if the voltage before and after the main switch concord with the electrical plans.
System in manual mode	• Verify if every equipment is in « AUTO » mode.
Problem with the floats inside the equalization tank	• Verify if you can visually confirm that the low float of the equalization tank is activated (on the control panel and inside the tank). Verify the electrical connections, if necessary.

6.1.5 Problem: Defective blower

The blower refuses to start or stop.

Possible Causes	Explanations and Repairs
Temporary loss of communication	• If the equipment is operational, ignore this error.
Burnt out feed fuse	• Verify the feed fuses. • Replace any fuses, if required.

Blower surcharge

Possible Causes	Explanations and Repairs
Closed valve or obstructed conduit	• Verify if the valves before and after the blower are open. • Verify that the conduits before and after the blower are not obstructed.
Defective motor	• Use an ammeter to verify the current used by the motor. • Verify the condition of the winding of the motor. An electrical resistance should be present at each phase of the grounding. • Replace the motor, if required.
Defective blower	• Verify the general condition of the blower (leaks, temperature and colour). • Reassemble or replace the blower, if required.

Incorrect adjustment of the maximum current in the frequency inverter	Verify that the adjustment maximal current of the frequency inverter corresponds to the motor (FLA).
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6.1.6 High-level alarm – MBBR

Possible Causes	Explanations and Repairs
Clogging of the holding grid of the media	Clean the holding grid inside the MBBR.

6.1.7 Problem: Decanter

Possible Causes	Explanations and Repairs
Scum accumulation on the surface	- The frequency of scum removal is insufficient. Increase the frequency of scum removals depending on the site's needs as specified in Section 1.5. - The loading time of the conduits is elevated and not enough water is directed to the sludge holding tank. Increase the « ON » time of the scum removals to make sure the sludge is directed to the scum storage tank adequately. - Clean the surface at the inlet and outlet of the decanter with a « Shop-Vac® ».
Sludge accumulation at the bottom of the tank	- The frequency of the scum removal is insufficient. Increase the frequency of the scum removals depending on the site's needs as specified in Section 1.5. - The loading time of the conduits is elevated and not enough water is directed to the sludge holding tank. Increase the « ON » time of the scum removals to make sure the sludge is directed to the holding tank properly.

6.1.8 Problem: Odours

Identify the source of the odour carefully. Air can circulate between reservoirs and on the site. Sometimes, an odour detected near an equipment may be triggered by another equipment.

Possible Causes	Explanations and Repairs
Not enough aeration	Septic type of odour from the MBBR. Measure the level of aeration and increase the aeration frequency while in normal operation mode if the dissolved oxygen is below 4 mg/L.
Location of the treatment chain near human activity	- Perform a smoke test inside the reservoirs to validate the presence of leaks and the source of the odour. - Install an air vent further away from where human activities takes place. - Waterproof the reservoirs' access point, if they are leaking.

	• Install a carbon filter to treat odours.
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6.1.9 Problem: The treatment performances overage

Possible Causes	Explanation and Repairs
Total CBOD ₅	• Verify if the real loads are higher than the design loads. If so, revise the design of the treatment chain. • Measure the soluble CBOD₅. • If the soluble CBOD₅ is 50% lower than the discharge objective in total CBOD₅, refer to the section below about TSS. • If the soluble CBOD₅ is greater than the discharge objective in total CBOD₅, increase the aeration inside the MBBR while in normal operation mode. • Then, if the soluble CBOD₅ is greater than the discharge objective in total CBOD₅ total, lower the volume of water dosed to the MBBR by dose.
TSS	• Refer to Section 6.1.7 of this document if there is an accumulation of sludge and scum. • Verify that the design of the surface loading rate is respected. • Reduce the volume of water dosed at each dose. • Reduce the aeration inside the MBBR, if the oxygenation is excessive.

6.1.10 Power Outages

In the event of a power outage, the program will restart by itself and will store any previously entered data. If you have any questions about the functioning of the **ECOPROCESS™ MBBR** treatment system, please do not hesitate to contact Premier Tech Aqua Customer Service at 1 800 632-6356.

**For any issue, question or comment, please do not hesitate to
contact Premier Tech Aqua at 1 800 632-6356.**



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