

# USER'S MANUAL

# MODEL EV-120

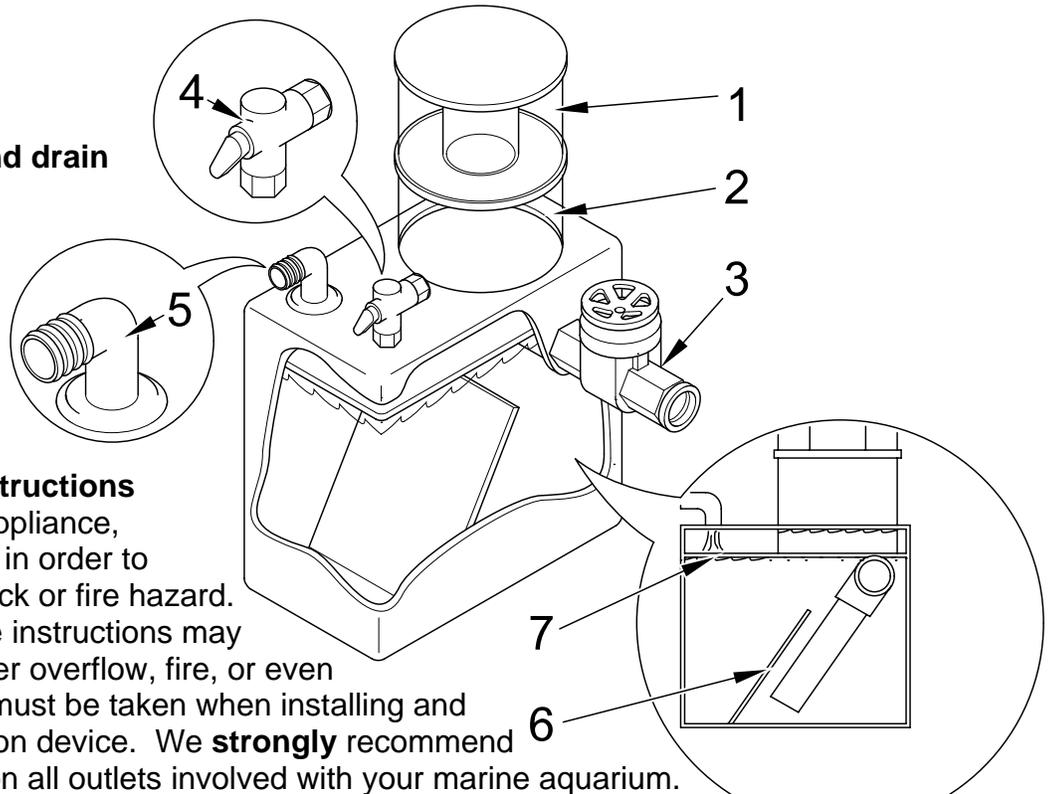
U.S. Patent # 6,156,209

**Thank you** for purchasing an AquaC protein skimmer! We appreciate your business very much. It is our goal to provide you with the best customer service possible, so if you have any questions at all do not hesitate to contact us!

Please take a minute to inspect the contents of the package. If any parts are missing or damaged, contact us immediately.

## Parts List:

1. Collection cup and drain
2. Foam tower
3. Gate valve
4. Air valve
5. Spray injector
6. Internal baffle
7. Internal plate



## Important Safety Instructions

As with any electric appliance, caution must be used in order to reduce the risk of shock or fire hazard. Failure to follow these instructions may result in flood, skimmer overflow, fire, or even electrocution. Care must be taken when installing and using your new filtration device. We **strongly** recommend that you use GFCI's on all outlets involved with your marine aquarium.

## How does our patented Spray Injector work?

The spray injector that drives your skimmer is unique. There is no needle-wheel or venturi adapter providing the air injection – it is simply the downward force of the spray that generates foam. Imagine a forceful spray from a garden hose that is shooting into a bucket of water – that is the best way to visualize the AquaC injector at work. Compared to all the other popular methods of skimming (Beckett, downdraft, venturi, or needlewheel), our patented Spray Injector generates the greatest air flow for a given pump size.

## General Do's and Don'ts:

**DO NOT** clean your skimmer with any chemicals or soap. Use warm water and a non abrasive sponge. Cleaners that contain alcohol, ammonia or other chemicals can damage the acrylic and lead to stress cracks on the plastic's surface.

**DO** wash your new skimmer and pump with warm water prior to installation. This will help remove any oils and manufacturing residues, which can prolong the break-in period.

**DO NOT** attempt to modify or retrofit your skimmer.

**DO** secure all connections between the skimmer and pump with hose clamps to ensure a tight, leak-proof fit.

**DO NOT** run the skimmer on a timer with a rapid on/off cycle. It is OK to turn the skimmer off during feeding, trace element additions, etc. but be aware that repeated starting/stopping of the pump can wear the impeller and motor out prematurely.

**DO** use caution when hooking your skimmer up to a waste collection vessel. The waste reservoir can overflow with foam when you are away, leading to a flood.

**DO** clean your skimmer's collection cup as often as possible. A dirty cup inhibits the collection of foam and will lead to poor performance.

## Skimmer Features

Our new EV Series skimmers are a significant advancement over the original design we released in 1998. We've listened to customer suggestions and comments and the new EV's incorporate many of the features you have been asking for. The new features include:

- Flanged and locking collection cup and cap - twist and release for easy cleaning.
- Raised gate valve – the skimmer no longer needs to be raised in most sump installations!
- Redesigned exit plumbing keeps microbubble return to a minimum.
- Larger mixing chamber (40% more volume) means greater contact time and waste removal.
- Side-mounted gate valve saves critical sump space.
- Precision control air flow valve – easy tuning for wet or dry foam.
- John Guest “*Super Speed Fit*” fitting for ozone or calcium reactor connection\*
- Sealed foam tower means no more salt creep build-up.
- Auto-waste container compatible. Two and three liter containers are available.
- Redesigned interior baffling system reduces turbulence and increases contact time; the end result is a **two-fold increase** in foam production and skimming efficiency.

\* JG fitting is optional on EV-120/180 and standard on larger EV models

## Choosing a water pump

One of the advantages of buying an AquaC EV Series skimmer is that you have several different pump options to choose from. You can use an external or submersible pump,

depending on your application. In our tests, the EV-120 performs best when powered by a pressure-rated pump capable of producing **500-550 GPH** unrestricted. Due to the pressure that the spray injector places on the pump, the true flow through the skimmer will be quite a bit less than the unrestricted rating.

As of our last printing, the **Danner Supreme Mag Drive 5** is our favorite pump on the EV-120 skimmer. Other submersible pumps with a similar flow curve should produce comparable results to the Mag 5. The **Iwaki 20 RLT** is our favorite external pump on the EV-120 skimmer. If you use an external pump, we recommend that you add a gate valve to the pump's output. This will help you fine-tune the flow to the skimmer.

Some of our customers report increased performance when running a water pump that is rated higher than what we recommend. For example, a Mag 7 can "overdrive" the EV-120 and produce even better results. If you choose to use a larger water pump, please be aware that it is very easy to overdrive the skimmer in such a way that the performance will actually suffer! The EV-120 is designed to handle a certain amount of water flow, and it is possible to choke off the spray injector, which will result in a decrease in performance. **If you use a larger water pump, be sure and add a gate valve to the pump's output so that you can fine-tune the flow to the skimmer.** At no time should the water level inside the skimmer be any higher than the top of the dark gray box.

### **Skimmer Installation**

There are several ways to install and run your new skimmer. If you have the space, we recommend that you place the skimmer directly in the sump since this requires the least amount of plumbing and minimizes the risks of a flood. If the skimmer won't fit in the sump, however, it is OK to place it outside of the sump. Performance will be the same in either case.

It is important that the sump water level is not too high. If the sump level is above the output of the gate valve, the skimmer will perform inconsistently when the level rises and falls due to evaporation, water changes, etc. As long as the maximum sump level is below the output of the gate valve, the skimmer's performance will remain unaffected and you won't need to raise the skimmer.

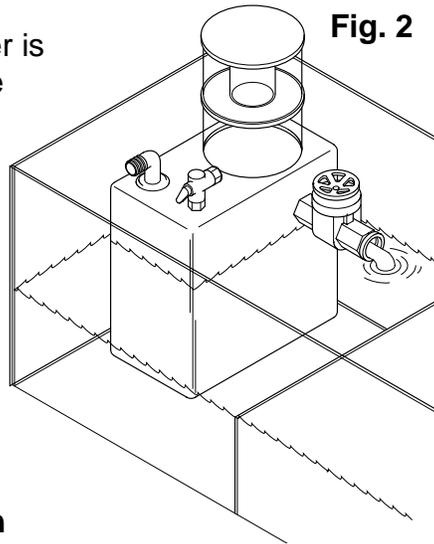
**TIP:** The EV-120 will run best if it is fed by fresh, unfiltered water that has come directly from the tank. If possible, position your skimmer and pump so that unfiltered tank water will get processed, as opposed to letting the skimmer re-skim its own water over and over again. Watch out for air bubbles, since these will decrease the water flow if they are getting sucked into the pump.

**TIP:** Keep in mind that the skimmer will produce some microbubbles during operation (especially after feeding). Orient the skimmer so that it discharges processed water away from your return pump. This way, microbubbles will be less apt to make it back to the tank.

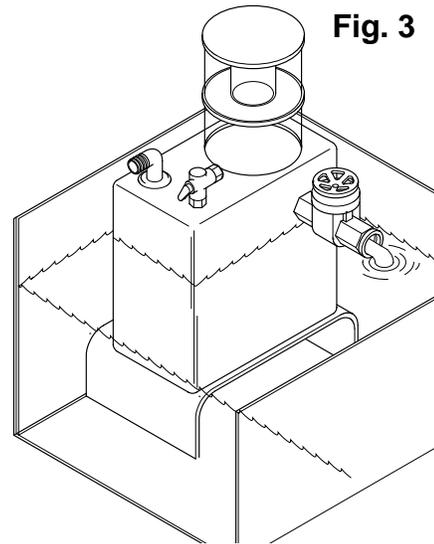
**In-Sump Installation:** This is the most common and easiest method of installation.

There are a variety of materials you can use if you need to raise the skimmer so that the gate valve is higher than your sump level. A simple platform can be constructed out of PVC pipe and elbows. Plastic light diffuser “eggcrate” can also be used. Any inert material that won’t rot or leach chemicals into the aquarium will work fine. Wood, cinder blocks, etc. should be avoided.

In **Fig. 2**, the skimmer is placed directly on the bottom of the sump. The gate valve is above the sump level.



In **Fig. 3**, the sump level is too high, so the skimmer is raised a few inches on a platform.

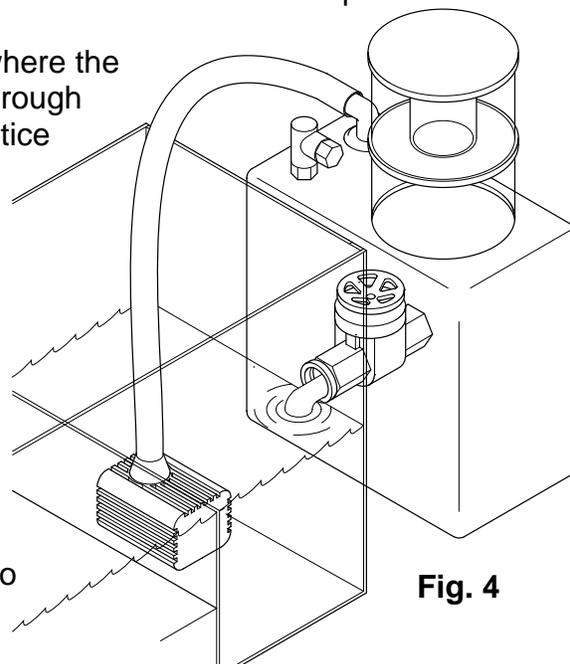


### External Installation

If your system does not allow for an in-sump installation, it is easy to install your skimmer outside of the sump. If vertical clearance isn’t an issue, the best solution is to raise the entire skimmer on a platform so that the gate valve will clear the sump wall. If you don’t have the clearance to raise the skimmer, you can install a 1” bulkhead through the side of the sump wall and directly connect the skimmer to the sump.

**Fig. 4** demonstrates an external installation where the skimmer is sitting on the floor and plumbed through the side of the sump using a 1” bulkhead. Notice how the gate valve is still above the sump level. If vertical clearance isn’t an issue, you can simply raise the skimmer so that the gate valve is above the sump wall. This is easiest since you won’t have to retrofit your sump with a bulkhead.

It is best to install the skimmer as close to the sump as possible. Adding a piece of flexible hose or PVC pipe between the gate valve and the sump is ok, as long as it runs horizontally and it is no longer than 18” with no sharp bends. If there is any backpressure on the gate valve, the skimmer won’t drain



properly and it will be difficult to get it adjust correctly. If, due to space restrictions, you need to install your skimmer in a manner other than described above, please contact us so that we can help. There are many different plumbing configurations that will work, but the addition of 90 degree bends, longer pipe lengths, etc. might require some “tweaks” to ensure that the skimmer will run correctly.

Water enters the skimmer under high pressure, but exits the skimmer by gravity. Any changes or additions to the gate valve and exit plumbing **WILL** have a noticeable effect on the skimmer’s performance, and it is important that you contact us for tips if you want to install any extra or modified drain plumbing!

**Important!** If you decide to add pipe/fittings to the gate valve to prevent splashing and/or cut back on the noise of the water returning to the sump, be aware that you must install a “siphon break” in order to ensure proper function. A siphon break will let some air into the drain line, which prevents it from sucking water out of the skimmer faster than it would normally fall due to gravity. If you plumb your skimmer so that the returning water exits a pipe below the sump level, a siphon break is critical to achieve good performance. You can add a siphon break to the exit plumbing by drilling a ¼” hole in the PVC, or by using a “tee” fitting in place of a 90 degree elbow. Leave one end of the tee facing upwards and open to air flow.

**Important!** If your skimmer is installed externally to the sump, be sure that the blue air valve and JG fitting are above the highest possible water level in your sump. If your main return pump were to fail, water would rise in the sump and it could spill out of the air valve/JG fitting, if the skimmer isn’t raised high enough.

**Pump Connection:** Depending on the pump you choose, there are a variety of different methods of connection to the skimmer. We recommend using ¾” inside diameter flexible hose, which can be purchased at your local fish store, hardware store, etc. Flexible tubing is easier to plumb and connect than hard PVC pipe. You cannot replace the skimmer’s ¾” hose barb input with hard PVC, since this fitting houses the spray injector. Most submersible pumps accept ¾” ID tubing without any modification.

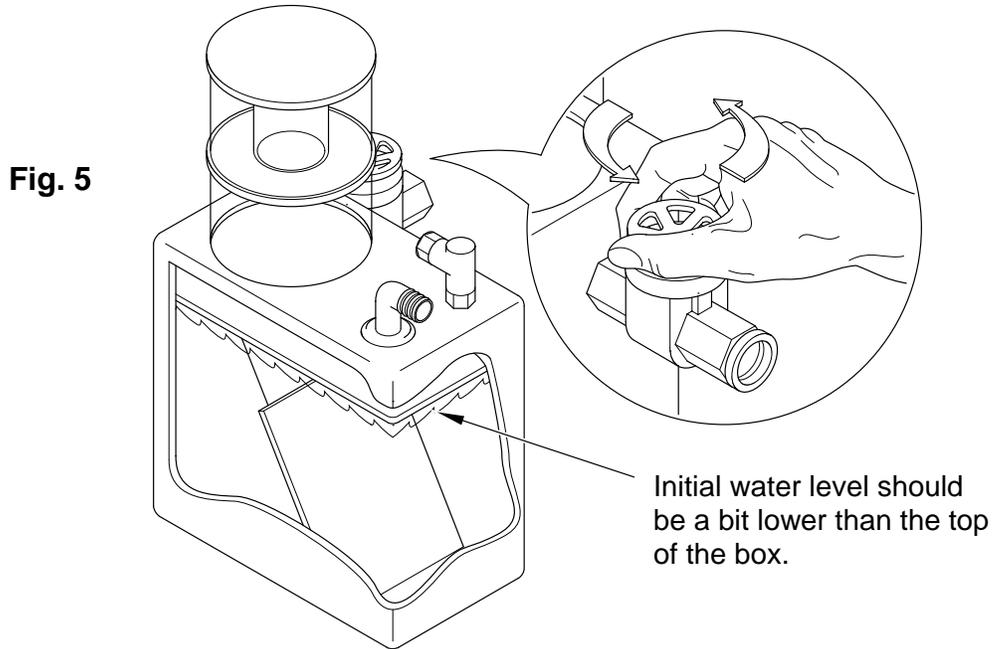
**Important!** Secure all connections with hose clamps! You can use the metal screw-type clamps or plastic snap-on clamps (which won’t rust). An unsecured hose connection *will* pop off when you least expect it, leading to a flood.

Keep the hose between the pump and skimmer free of any sharp bends, and the length should be limited to under 3 feet, if possible. Longer hose or increased head pressure might require that you use a larger water pump.

## **The Break-In Process**

Once your skimmer is situated and the plumbing is in place, you can turn the pump on and begin the break-in process. At this point, keep the gate valve and air valve open 100%, and watch all the fittings closely to make sure that there aren’t any leaks.

Allow the skimmer several minutes to settle at a stable water height. With the gate valve completely open, the skimmer water level should rise very close to the internal platform shown in Figure 5.



**The skimmer's best performance is usually obtained when the water level is EQUAL to the top of the dark gray box.**

The easiest way to set this level is to slowly **CLOSE** the gate valve until you start to see some water rise in the foam tower, above the box. There will be a lot of turbulence and bubbles, but once you raise the water level into the tower, you should be able to clearly discern the line between water and foam. **STOP** making adjustments to the gate valve at this point, and give the skimmer a chance to settle at this new level. Next, slowly **OPEN** the gate valve in tiny increments and you should observe the water level in the foam tower fall. **STOP** making adjustments once the water level appears to be equal to the top of the box. Leave the skimmer at this setting for the next 48-72 hours, or until the foam starts to rise up the tower and into the cup.

**Important!** Our original EV Series skimmers worked best when the water level was set equal to or lower than the internal platform. This is not the case with your new EV-120!

Since your skimmer is made of translucent gray acrylic, you should be able to observe the interior dynamics (you might need to use a flashlight). It is normal for some water to collect above the internal platform during operation. This is a result of splashing inside the skimmer. You might notice that the water level remains relatively constant directly under the spray injector. Don't mistake this for the *real* water level – it is the pressure of the spray that holds the water there. Following the above directions is the

easiest way to set your skimmer correctly. If you have any questions, don't hesitate to contact us.

The break-in period usually lasts for 48-72 hours. During this period, oils get washed away and a thin "slime coat" forms on the surface of the skimmer and pump. It is best to avoid making any adjustments or changes to the tank or skimmer during this period. New tanks, in particular, will often require a longer break-in period since there aren't a lot of organic wastes for the skimmer to remove.

During the break-in period your skimmer will run louder than normal and it will release a lot of microbubbles. This is normal, and you should see a significant reduction in noise and bubble return after a week or so.

### **Collection Cup Drain**

The collection cup drain is a convenience feature that some people choose to use, while others do not. All of the air that flows through the skimmer must exit through the collection cup drain! If the drain fitting is subjected to any backpressure, the skimmer will not work. Therefore, it is important that you do not plug this fitting, even if you choose not to hook the skimmer up to a waste vessel. The drain fitting accepts 5/8" ID flexible hose, and it is important to keep the drain line clean and free of any obstructions. Do not submerge the end of the drain line in skimmer gunk, as this added backpressure will prevent the skimmer from working normally.

**Important!** During the first week or two, we recommend that you run the drain line back to your sump. When your skimmer "kicks in" it could remove several gallons of liquid in a short amount of time. Your EV-120 is capable of producing a lot of foam, and if it suddenly goes haywire when you aren't expecting it, disaster could result.

### **Adjusting your EV-120 for Longterm Performance**

Your skimmer will have completed the break-in process once the bubbles start rising up the foam tower, rather than immediately popping at its base. In the lower section of the tower, the bubbles should be turbulent and resemble rapidly boiling water. These bubbles will rise up the tower and as they approach the bottom of the collection cup, they should start to form a more stable, but still wet, foam. The foam will rise into the collection cup and eventually spill over. Depending on your tank size, bioload, foods and additives used, etc. your skimmer might start collecting a very watery liquid, or it could collect a darker, pasty waste product. Small adjustments can now be made to the gate valve and air valve to fine tune the foam quality.

### **Wet vs. Dry Foam**

The decision to collect a watery, diluted waste product or a darker, pasty foam is a matter of personal preference. **Simply put, one is not better than the other!** Wet foam contains the same amount of waste products as dry foam, but is diluted with tank

water. In other words, the skimmer is removing the same amount of waste whether it collects a cupful of yellowish liquid or a ¼” of dark gunk. Depending on how often you clean and service your system, one might be better than the other. We recommend frequent cleaning of your skimmer (2-3 times per week) and keeping it adjusted to collect a reasonably wet, light green-brown foam product.

If the foam you are collecting is less concentrated than you prefer (too wet), open the gate valve in small increments. This will lower the water level inside the skimmer, which gives the foam more time to stabilize before it spills into the collection cup. If the gate valve is open 100%, then you can start closing off the blue air valve in small increments.

If the foam you are collecting is more concentrated than you prefer (too dry), first make sure that the water level is adjusted to be equal to the top of the box. Next, verify that the pump is supplying enough flow and that the spray injector and air valves are clean and unclogged. You can try opening or closing the gate valve a small amount in either direction to see how this impacts the performance.

Congratulations! Your new AquaC High Performance Protein Skimmer is completely installed and is already beginning to improve your water quality!

### **JG Fitting – Ozone or Calcium Reactor Hook-Up**

The John Guest Super Speedfit fitting on your skimmer is designed to accept ¼” OD tubing and allows a hassle-free connection without any tools. If you choose to run ozone through your skimmer, be aware that you will need to use an air pump with the ozonizer. We recommend dosing no more than 50-100 mg/hr. Also, be sure and filter the air with activated carbon after it leaves the collection cup. Ozone is a toxic gas and you don't want it to escape back to your home.

**Important!** In general, skimmers do not remove as much waste when hooked up to an ozonizer. The ozone breaks down a lot of the organic waste products that the skimmer would otherwise remove, and you will notice a decrease in foam production. The skimmate will also be lighter colored, in most cases. For this reason, we recommend dosing ozone periodically to help keep the water clear, for example 3-4 days each month.

If you would like to connect your calcium reactor to your skimmer, you can run the effluent line directly into the JG fitting. Carbon dioxide in the effluent drip will be blown off to the atmosphere, and this might help prevent pH depression as a result of running a calcium reactor on your system.

### **Cleaning and Maintenance**

Like any other aquarium filter, normal maintenance is critical to ensuring good longterm performance. We recommend that you clean the foam tower and collection cup at least twice a week for best results. This is easily accomplished by wiping the foam tower with

a rag or paper towel and rinsing the cup thoroughly under warm water. The collection cup can be quickly disassembled for hassle-free cleaning. Never use cleaners or soap to wash any part of the unit. The thick brown scum that accumulates along the sides of the foam tower can impede the performance of the skimmer.

**Important!** The spray injector and air valve should both be unscrewed and inspected every 3-6 months, or more frequently if you suspect that they might be clogged. Decreased skimmer performance is frequently due to debris that has become trapped in one or both of these parts.

We recommend that you install a mesh prefilter over the intake of the water pump. This will prevent debris from damaging the pump, and will also keep the spray injector clean! If you are running your skimmer in a refugium-style sump with lots of critters, algae, etc. it is very important that you protect the pump from sucking up debris.

## Troubleshooting

### 1. Skimmer isn't collecting any foam

- A. Give the skimmer enough time to complete the break-in process, which can take as long as a week.
- B. Check the water level. An incorrect water level will prevent proper foam production. Adjust the gate valve so that the skimmer's water level is equal to the top of the dark gray box.
- C. Verify that the water pump, spray injector, and air valve are all clean and clear of any obstructions.
- D. AquaC protein skimmers feature an intense air flow-thru rate, which means that they are highly influenced by oils, fats, and chemicals dissolved in the aquarium water or air source. You will notice a drastic but temporary reduction in foam production after fish feedings or other events that introduce chemicals into the water. Foam production should resume within several minutes to a few hours, depending on the nature of the chemical disturbance. This should not be any cause for concern since your high performance skimmer will rapidly make up for any time lost due to the disturbance.
- E. Cigarette smoke will prevent the skimmer from working! Smoke gets sucked into the skimmer and hurts the foaming process.
- F. Make sure there is no backpressure on the collection cup drain. You can try running the skimmer without the lid for a few days to see if backpressure on the drain fitting is the problem.
- G. Certain "Aqua Gloves" will leach chemicals into the water that prevent the skimmer from working normally.

### 2. Skimmer water level is too high

- A. Make sure that the water pump is not too powerful for the unit. Add a valve, if necessary.
- B. Raise the skimmer higher by placing it on an elevated platform so that water can drain the skimmer properly.
- C. Open the gate valve until the water level is at the proper height.

### **3. Skimmer is overflowing with watery foam**

- A. Lower the water level inside the skimmer by opening the gate valve in small increments (1<sup>st</sup> option).
- B. Close the air valve in small increments to slow the air flow through the skimmer (2<sup>nd</sup> option).
- C. If you are using “stress coat” additives, water conditioners, or other trace element/feeding solutions the skimmer may react by overflowing with foam. We recommend against the use of any additives that cause your skimmer to foam excessively.
- D. Underwater epoxy will cause your skimmer to foam like crazy for a few hours.

### **4. Skimmer releases microbubbles back to the sump**

- A. The skimmer should release very few microbubbles once it is broken in. During the first two weeks of operation it will release a larger number of bubbles since it is still in the break-in process.
- B. If you are running the skimmer with too powerful a pump, microbubbles will escape back to the sump. Use the correct size pump with the skimmer.
- C. After fish feedings, water changes, or trace element additions it is normal for the skimmer to release microbubbles for a short period of time. These will normally subside within several minutes to an hour or two.
- D. Don't mistake bubbles created from drain splash for microbubbles – These bubbles are usually larger and present less of a problem to return pumps.

**If you have any other problems that are not listed above, do not hesitate to call or email our technical staff for help! Customer service is one of our top priorities and we will do our best to find a solution to your problem.**

Please include the following information in your technical support emails or phone messages:

- Tank size, age, and type (fish-only, SPS reef, mixed reef, etc.)
- Bioload

- Any supplemental filtration used (i.e. ozone, w/d filter, other skimmers, etc.)
- Foods and additives used as well as dosing schedule/amounts.
- Skimmer model, pump model, and method of installation.

## **AquaC Limited Warranty**

### *Limited Warranty*

AquaC, Inc. ("AquaC") warrants to the original consumer purchaser that, except for limitations and exclusions set forth below, this product shall be free from defects in materials and workmanship for a period of one year from the date of original retail purchase ("Warranty Period"). The obligation of AquaC under this warranty shall be limited to repair or replacement, at AquaC's option, without charge, of any part or unit that proves to be defective in material or workmanship during the warranty period.

### *Exclusions From Warranty*

This Warranty applies only to defect in factory materials and workmanship. Any condition caused by accident, abuse, misuse, or improper operation, violation of instructions furnished by AquaC, destruction or alteration, improper electrical voltages or currents, or repair or maintenance attempted by anyone other than AquaC, is not a defect covered by this Warranty. In such cases, AquaC may charge you for materials and labor, even during the Warranty Period. Parts subject to wear and tear in normal usage are not covered by the Warranty.

### *Implied Warranties*

Under state law, you may be entitled to the benefit of certain implied warranties. These implied warranties will continue in force only during the Warranty Period. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

### *Incidental or Consequential Damages*

Neither AquaC nor your retail dealer or selling distributors has any responsibility for any incidental or consequential damages including without limitation, commercial loss or profit, or for any incidental expenses, expenses, loss of time, or inconvenience.

### *Other Legal Rights*

This Limited Warranty gives you specific legal rights. You may also have other rights which vary from state to state.

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