

# LIFEREEF PROTEIN SKIMMER INSTALL AND OPERATION

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Includes In-Sump, External, Hang-On, and customs.

VS2-24, HVS2-24, SVS2-24, VS3-24, HVS3-24, SVS3-24, VS3-30, SVS3-30, VS3-36 and SVS3-36

Whether this skimmer was purchased as an in-sump or external it can be installed in either location. The pump of course has to be placed accordingly in or out of water depending on its requirement. You can even put the skimmer external and a submersible pump, or the skimmer in-sump with an external pump! As long as you have the skimmer and pump you can set either up in either location!



VS3 Flanged version shown in photo.

## **READ THIS PACKET COMPLETELY!**

**You will learn more about protein skimmers in this packet than any other manufacturer has told you, or not told you!**

I dislike reading instructions as much as you do, but a protein skimmer is one of the most misunderstood, misrepresented and misused components in a filter system. I've yet to have a question that was not covered here, but I will entertain anything you want to ask.

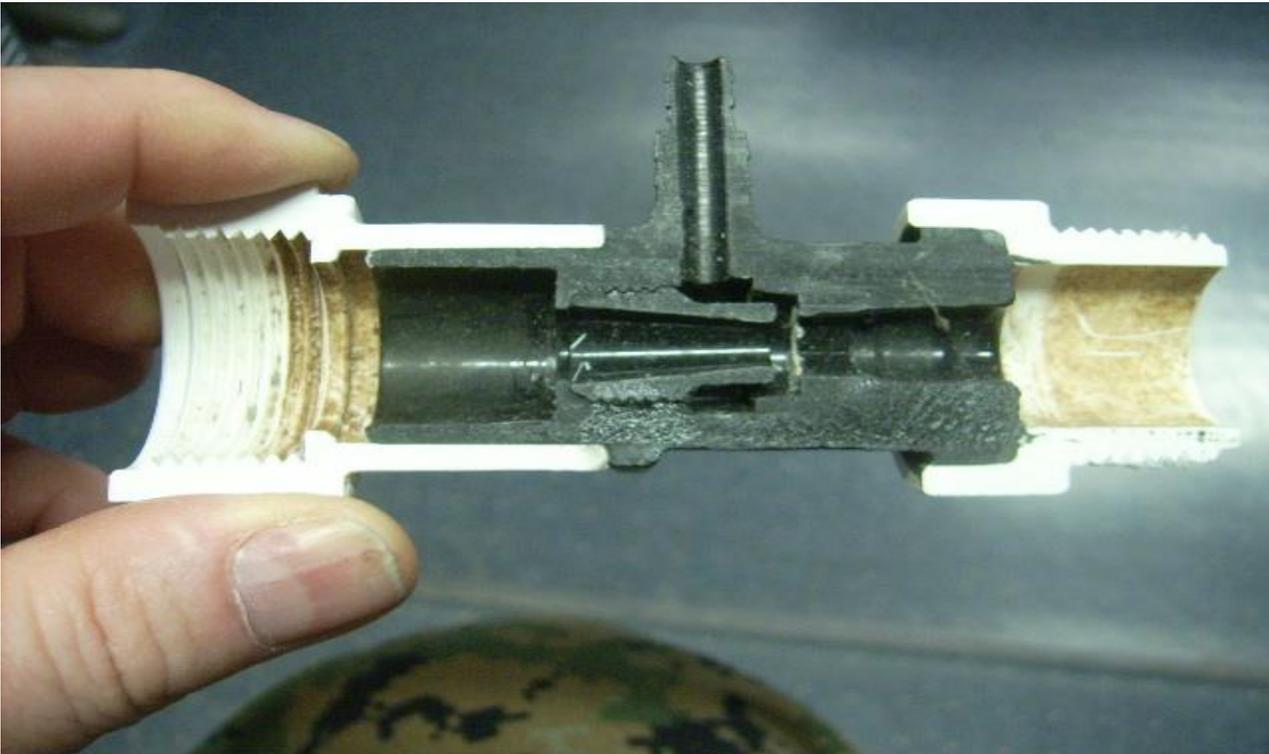
Educational as well as informative things are covered. An educated hobbyist is a wise hobbyist and can help educate others. There is a lot of information and if I put it here, it is important.

The included diagrams are a generalized layout of how water goes into your skimmer and how water exits your skimmer. There may be other parts in-between depending on your application and to what Lifereef sump it is being installed to. Your Lifereef Protein Skimmer plumbing parts may not look exactly like the diagrams, especially for those that requested or required specialized plumbing, but all skimmers will have a venturi assembly for the input and an adjustable valve for the output, those are the basics. The pump moves water through the venturi and the water exits via the skimmers output through the gate valve to adjust the skimmer water level.

**ALL YOU GET TO DO WITH A PROTEIN SKIMMER AS FAR AS CONTROL ARE ADJUST THE WATER LEVEL UP, OR ADJUST THE WATER LEVEL DOWN. NOTHING ELSE IS ADJUSTABLE.**

Some parts may be loosely assembled without Teflon tape so as to show the way they go together. Take these assemblies apart, apply Teflon tape, and put back together and attach to the skimmer where they go.

CROSS-SECTION of venturi. Water flows left to right. Note the cone shape in the middle and the air inlet coming off the top. As water pushes through the venturi low pressure is on the outgoing side which allows atmospheric air pressure to push into the water flow. Venturis have air *pushed* into them and don't actually suck in air, though that is what we usually say, venturis suck air.



Your venturi assembly will be a "T" fitting where the water enters from the bottom and the end has a cleanout plug. This photo shows the same venturi and is shown so you can see the inside parts of the venturi. Input on left (your venturi inlet will be from the bottom), reduction nozzle, air suction from top hose barb and exit to protein skimmer on right. Sticking a wire into the air suction hole will NOT clean the venturi and will only DAMAGE the nozzle. The venturi is self-cleaning so rarely needs something stuck down the hole to clean it out. However, things can get stuck on the inlet to the reduction nozzle and this is cleaned out using the cleanout plug. If something gets stuck on the water input end it will get jammed or block water flow through the nozzle, reducing bubbles in the skimmer. After cleaning out the object put a few turns of Teflon tape on the cleanout plug and screw back into place.

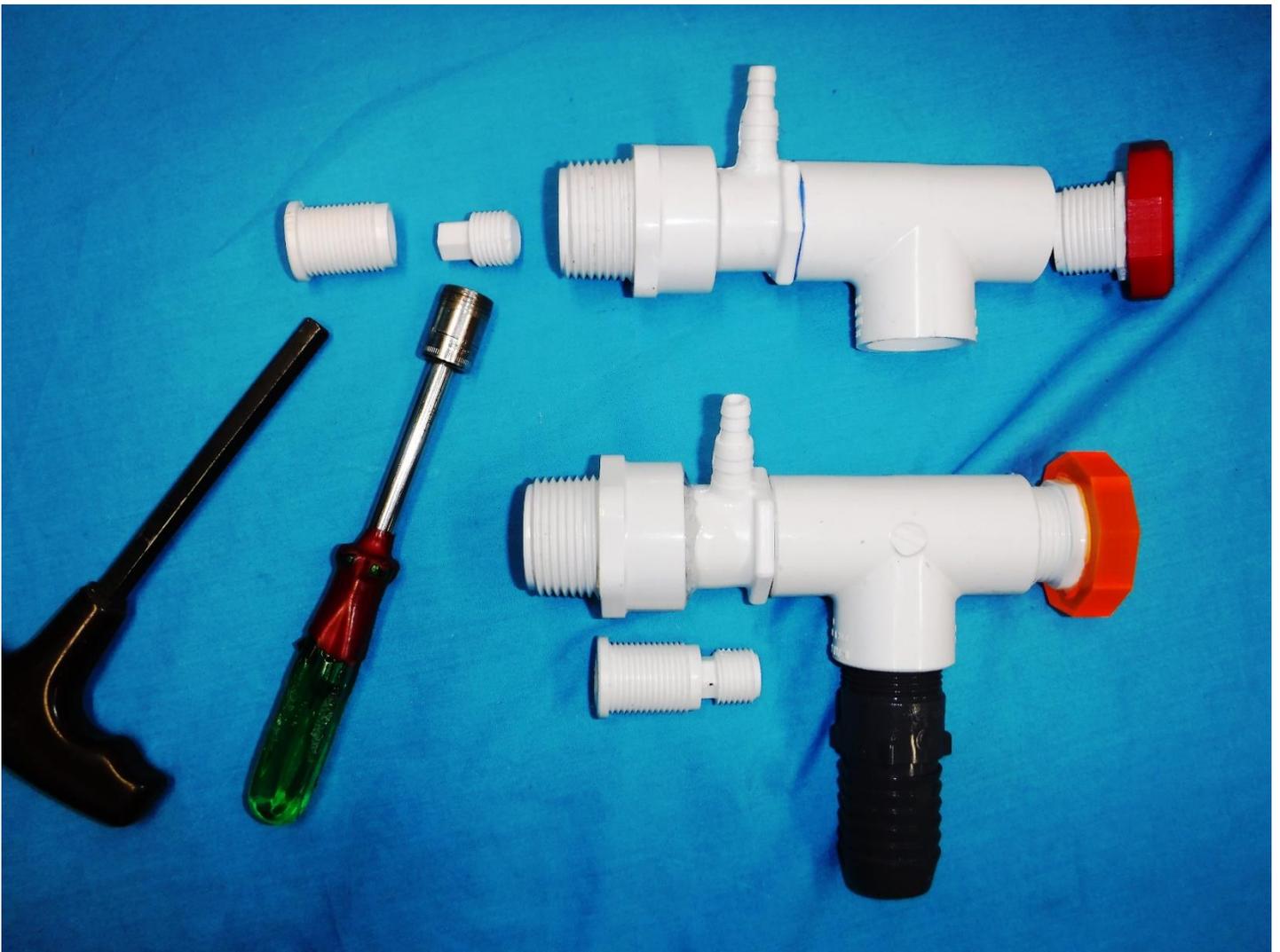
This is what your Lifereef Venturi looks like with the internal pieces removed. The piece on the left is the "Escutcheon Plate", next is the "Nozzle", "Venturi Body", and finally the "Cleanout Plug".

The lower venturi shows where these pieces are located within the body.

The tools are an 8mm hex and an 11mm socket.

Rarely do these pieces need removed as nothing can get stuck in this exit side. But the input side is where stuff gets stuck and the Cleanout Plug is taken off to remove the object.

Sticking things down the AIR INLET to clean the venturi does nothing except scratch the top of the nozzle which over time can put a hole in the nozzle. This may get some sludge from the collection cup and a quick rinse by sticking the other end of the hose in water should rinse out this area.



The **Mazzei Venturi** (optional) is similar has no internal parts except the check valve components and the input and output are a longer taper. The air inlet is larger so allows more airbubbles to be pumped into the skimmer. The Mazzei venturi can be installed at any time to your skimmer.

The check valve washer, ball, and spring are not needed and can be removed but **ONLY** if your skimmer air inlet is connected to the collection cup via the hose. If you do not use this hose, and the venturi is below water level, you must use this check valve setup.



## Options for Lifereef Protein Skimmers:

1. Short-Cup for skimmers that are slightly too tall to fit cabinet space.
2. 8" diameter collection cup, almost doubles the collection volume.
3. Mazzei Venturi, achieve a bit more performance with more bubbles and a bit more water throughput. How much? You'll be the first to see based on your aquariums chemistry.
4. Ozone Kit, replaces the vinyl hose that goes from the collection cup to the venturi and an ozone safe collection cup elbow fitting. NOTE: the quick-disconnects may not be ozone safe and are not covered under any warranty.
5. Extensions for the skimmers to increase height on the 24 and 30 models only, and only the model numbers with a "3" in the model number.

**Tools Required:** Scissors or utility knife to cut tubing and pliers to squeeze hose-clamps. DO NOT use pliers to tighten any threaded fittings or the screws on the VS3 models.

**HAND TIGHT** is sufficient for fittings, finger-tight is sufficient for screws.

**Pumps:** The beauty of the Lifereef protein skimmers is that you can use any pump you like, as long as it is equal or greater output than the MagDrive pumps I recommend. The minimum pump size for the smallest protein skimmer (24 models) is the MagDrive9.5 which as a 950 gph output. Please note: A pumps rated gph does NOT flow through the venturi. Remember, all the water has to pass through that small hole in the venturi. Taller skimmers require stronger pumps because it has to work against head pressure. The more gph you push through a venturi the more bubbles are generated. **WHATEVER PUMP YOU GET TEST IT BEFORE INSTALLATION TO MAKE SURE IT IS WORKING AND NOTHING WAS BROKEN IN TRANSIT.**

**PARTS LIST** This list includes all skimmer models and if specific to one model will be noted. Some may include additional fittings depending on the application or what we discussed.

**From the top:**

Collection Cup Cap

Collection Cup

Collection Cup O-Ring (do not use silicone on this)

CVC Constant Venturi Cleansing assembly: Hose, right-angle hosebarb (black) and a Quick-Disconnect to allow cup removal and CVC disconnect. NOTE: Tubing may be longer than needed, cut to fit once you determine the location you want the cup drain valve. This CVC hose MUST NOT KINK or cup overflow is possible.

Ball Valve Drain with hosebarb and drain hose

Silicone Grease/Oil (VS3 models only), for rubber gasket top surface only, and a bit on the thumbscrews helps those screw in smoothly

Rubber Gasket (VS3 models only) Again, only use the silicone on the upper surface, the lower surface will bond to the acrylic over time and is a good thing.

9x Black Knurled Thumbscrews      VS3 Flanged skimmers only      One spare screw

Roll of Teflon Tape

Venturi Assembly (stock venturi) with either a threaded plug with a colored “flower” shaped handle, called the V.A.M.P. for Venturi Access Maintenance Port or union fitting. Both allow access to the input side of the venturi should some foreign object get stuck. Mazzei Venturis have a different cleaning arrangement.

Hosebarb Output Fitting for pump. Some may have a reducer bushing.

Hoseclamps, 3/4" and/or 1" depending on venturi and related fittings

Hose to connect pump to venturi, 3/4" or 1" depending on setup

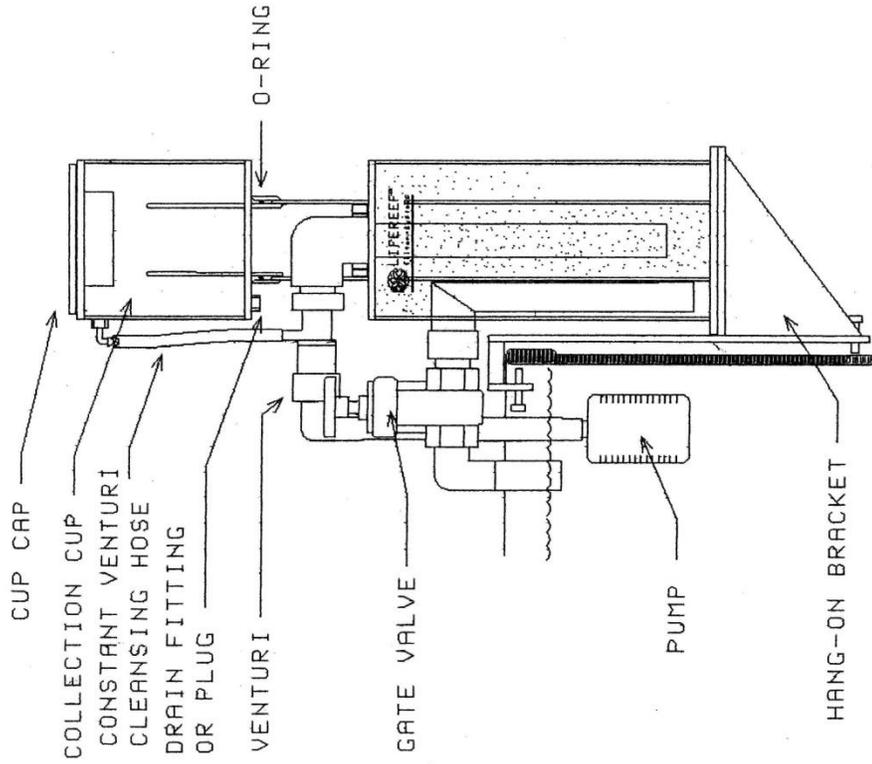
1" Gate Valve with nipple fitting

Protein Skimmer Body

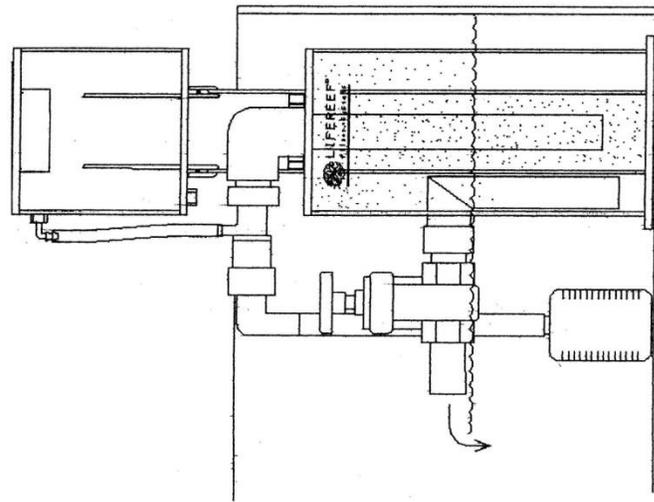
Water Pump, if ordered with skimmer

May have additional fittings and/or hose-clamps

Hang-Bracket and alignment thumbscrew for Hang-On Models HVS2 and HVS3 models



**HANG-ON VIEW**

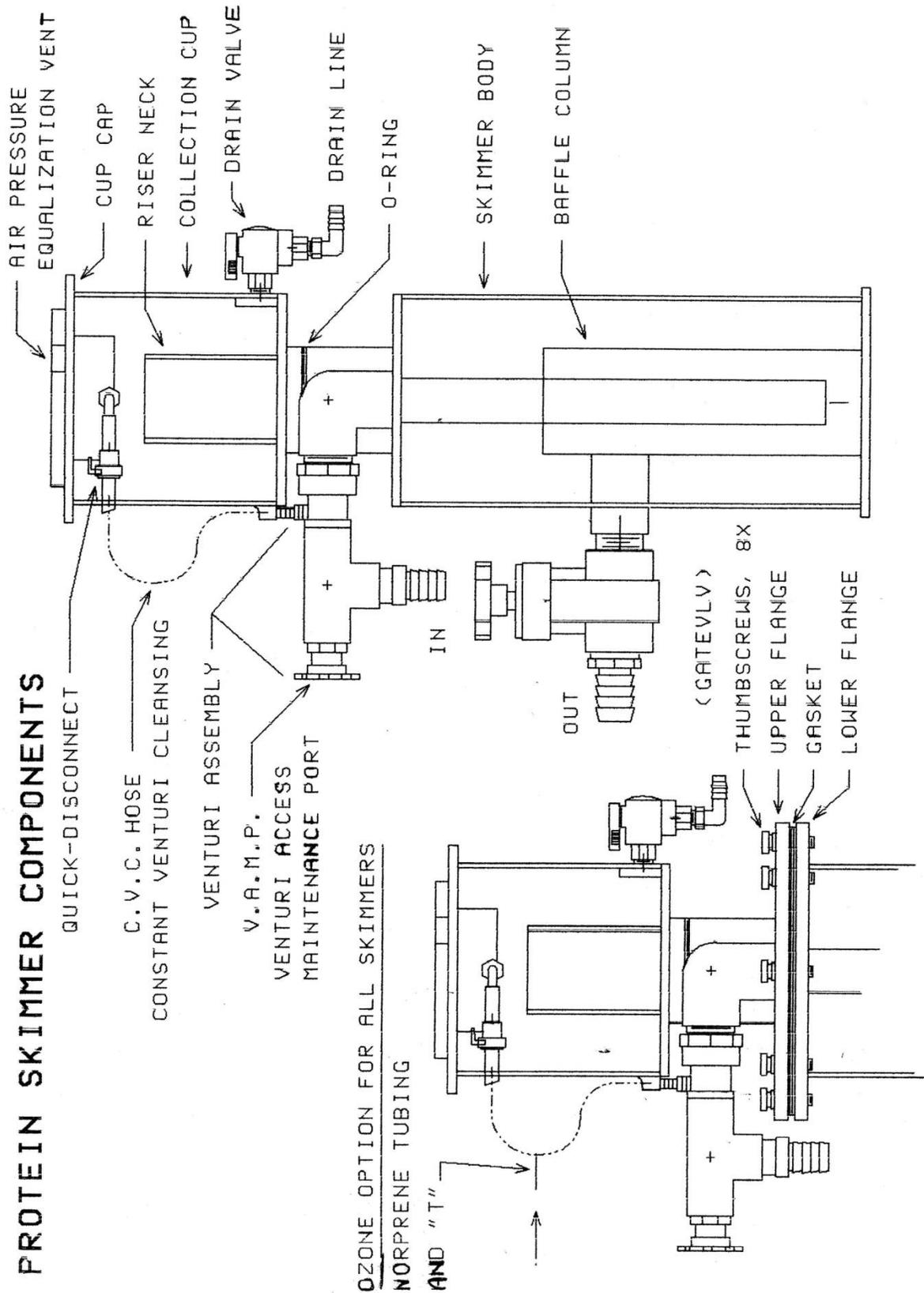


**IN SUMP VIEW**

Use this page for skimmer and pump positioning only. The skimmer details are not current and do not show the V.A.M.P. venturi features.

(vs\_ref)

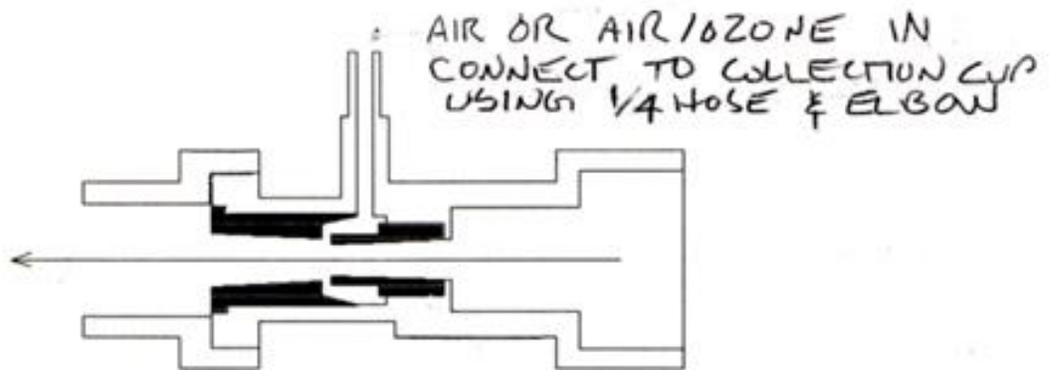
# PROTEIN SKIMMER COMPONENTS



VS3 FLANGED SKIMMERS

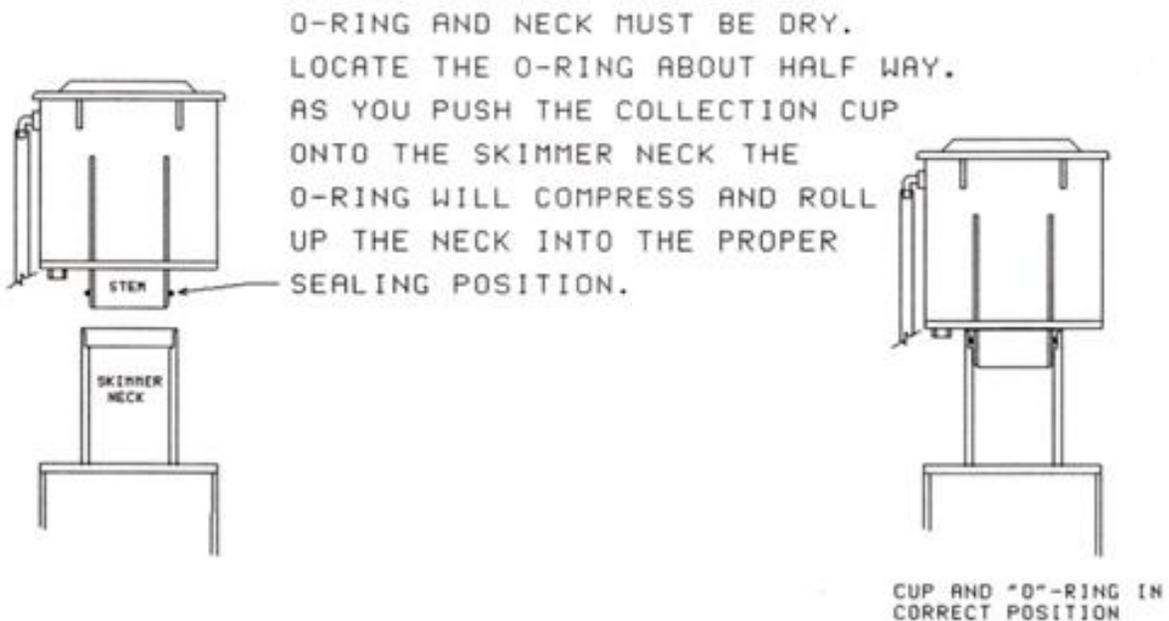
VS2 SKIMMERS

( VS224 )



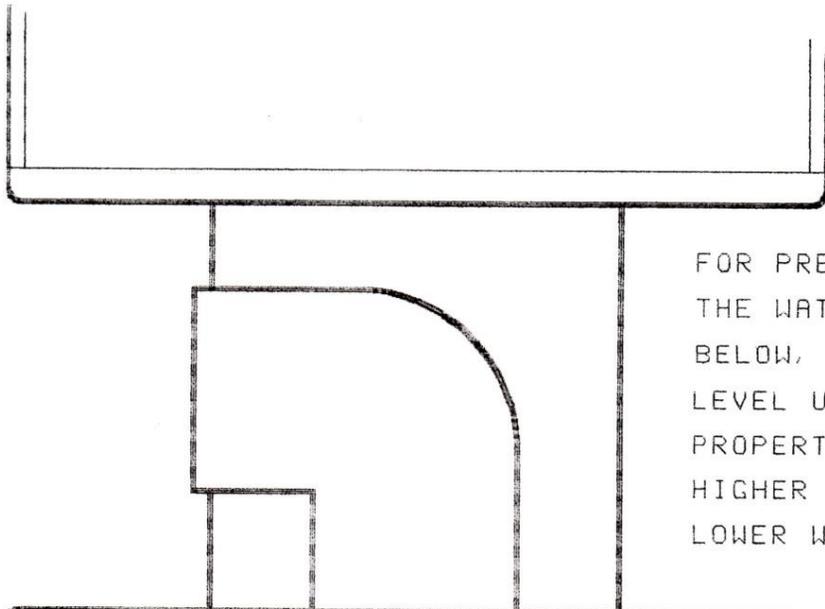
## VENTURI CROSS-SECTION

NOTE: THIS CROSS-SECTION IS FOR REFERENCE ONLY.  
DO NOT REMOVE ANY PARTS FROM THE VENTURI OR  
THE VENTURI WILL NOT OPERATE.



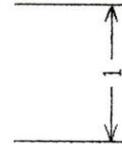
(VENTURING)

# STARTING WATER LEVEL



FOR PRELIMINARY SETUP HAVE THE WATER LEVEL SET AS SHOWN BELOW, THEN, ADJUST THE WATER LEVEL UP/DOWN ACCORDING TO FOAM PROPERTIES.

HIGHER WATER LEVEL = WET FOAM  
LOWER WATER LEVEL = DRIER FOAM



STARTING LEVEL

**IMPORTANT!**  
FORMING IS ENTIRELY A  
FACTOR OF WATER CONDITION  
AND QUALITY. IF YOUR  
SKIMMER IS MAKING LOTS OF  
FINE BUBBLES.....

**IT IS WORKING!!**

IT WILL FORM WHEN AND IF  
WATER CONDITIONS ARE  
CONDUCTIVE TO PRODUCING A  
FOAM.

( FOAMLVL )

**Maximum sump water depths:** 24 models, 10"      30 models, 17"      36 models, 23"

These sump water depths apply to both in-sump as well as external skimmer installations.

**Minimum sump water depths:** No minimum, as long as the pump can suck water.

**CUP OVERFLOWS:** All protein skimmers have the tendency to overflow, it is the nature of the beast, or, the nature of having an open container (skimmer) and pumping water and air into this container, and if conditions are right (your water surface tension which is detailed later in this packet) cups can fill and spill. There are float switches and sensors that can be used to turn off your protein skimmer pump should it detect water.

Though the Lifereef protein skimmers have a lower tendency to do this it still can happen.

If the skimmer is in your sump this doesn't pose much of a problem but if the skimmer is a hang-on or external to the sump things can get wet.

Therefore, it is highly recommended to get a water alarm that will make a loud chirp when its sensor gets wet. These can be had for around \$20.00. Or, many of the automated aquarium electronics have water alarms so it would be a good idea to incorporate one of these into your gadgets.

## **THE USE OF TEFLON TAPE, CLAMPS ON HOSEBARBS, AND TIGHTENING PVC FITTINGS**

Teflon tape goes on male threaded fittings before you screw them into the receiving female part. PVC threaded fittings vary so some may require more Teflon tape than others. As an average 10 turns of Teflon tape are usually sufficient.

**DO NOT SCREW ANY PVC PARTS/FITTINGS TOGETHER WITHOUT TEFLON TAPE!** You will friction-weld the parts together and they will not be able to be taken apart. You can loosely assemble threaded parts to check for fit and clearance and that you have put the parts together correctly. Then disassemble each part individually so you can tape and replace rather than have all the parts lying all over the place. All Lifereef systems have been engineered to fit and all the parts have been provided, sometimes more parts than required.

Wrap about 10 turns of Teflon tape on male threaded fittings. **HAND-TIGHTEN** taped fittings only. **DO NOT TIGHTEN TO THE POINT THE FITTINGS FREEZE OR SO TIGHT THAT YOU CANNOT MOVE IT.** Pipe fittings are tapered and the more you screw them tight the greater the risk that the receiving fitting will split or you will crack the acrylic. This way if the joint leaks you can

tighten it slightly, if you tighten it too tight and it leaks, you will need to remove the part and tape again. Note: 10 turns is an average and due to different parts manufacturers there are some discrepancies and more tape might be required. The fitting should have a smooth feel as it is being screwed in. If you feel any rough or sticking remove the fitting and wrap a few more turns around the piece. Split fittings are not covered under any warranty and are considered user installed parts and if broken it is your fault. Good news, I have never had a customer split a fitting, but it is possible.

**HOSE CLAMPS** Install hose clamps on a barb section, not on the smooth neck area behind all the barbs.

**This paragraph for VS3, SVS3, HVS3 FLANGED SKIMMERS (skimmers with 8 screws and a gasket top)**

The rubber gasket will stick to acrylic flanges making the top cover removal difficult. This is good for the gasket to stick to the lower black flange, but the upper clear flange needs to be easily removed. This is accomplished by using the silicone grease included with your skimmer. The skimmer may have been shipped with the gasket in place with a protective paper on top. Discard the paper, remove the screws (the gasket will naturally be stuck to the lower flange), and apply a thin film of the silicone grease, **ON THE UPPER SURFACE OF THE GASKET ONLY!** Use the silicone grease sparingly, too much will interfere with foaming and prevent foaming. Next, wrap about 10 turns of Teflon tape on the inner downpipe threaded fitting that was loose in the skimmer body and screw into the female threaded connection on the underside of the clear flange, it does not need to be tight, just snug. This down-tube then inserts into the baffle tube inside the protein skimmer. Place the upper flange back onto the skimmer body flange and rotate to lock into the keyholes, and **FINGER TIGHTEN** the screws. Overtightening the screws will only warp the flange and not make a better seal.

**Note for Hang-On Skimmer** DO NOT hang the pump off the venturi parts, you risk breaking something. Support the heavy pump on some live rock or put it on the bottom of the aquarium. It is best to have the pump near the surface because that is where your proteins accumulate.

### **V.A.M.P, or VENTURI ACCESS MAINTENANCE PORT**

Occasionally a foreign object will make it past the pump and into the back end of the venturi and get stuck which will reduce water flow and this will cause a reduction in bubbles. In order

to remove this object the venturi access maintenance port allows easy access to the water inlet of the venturi. Some skimmers will have a union instead of this VAMP venturi setup but both offer the same access.

The small colored plug/handle on the venturi requires Teflon tape, do not forget this or you will have water squirting everywhere. The plug will be loosely screwed into the V.A.M.P. assembly, or it may have been taken out and just put in the parts box. Don't forget to Teflon tape this plug and install it into the venturi assembly. Though previously stated to put 10 turns of tape on the threads some fittings may require more, I sometimes put up to 24 turns of tape depending on the fit as some parts are not uniform and may require more tape to make a finger-tight seal.

Protein skimmers using the Mazzei venturi in a vertical position will not have the V.A.M.P. setup, may have a union depending on space, and will require more effort to get an object removed from the venturi. The Mazzei has a larger orifice so are less prone to have blockage.

Regardless of the venturi you are using check it out, look into the water input end to see how small the orifice is that the water must pass through.

### **C.V.C. or CONSTANT VENTURI CLEANSING FEATURE**

No other protein skimmer has this feature, or if they do they "borrowed" it from Lifereef since I've been doing this for close to 20 years. The C.V.C. feature of your Lifereef protein skimmer is the small hose that runs from the top side of the collection cup to the venturi air suction port.

All protein skimmers in existence (except air-stone skimmers) whether it be needle-wheel, venturi, Becketts, downdraft, nozzle-injection, mesh-wheel, pin-wheel, whatever-wheel, have a problem of the venturi clogging. Yes, these skimmers all have a venturi device or operate on a venturi principle. What happens is that the intruding air/water mix will cause dehydration at the mixing point and cause a salt buildup. This salt residue will change the air and/or water going into the skimmer and thus will affect the skimmers water level that you have previously set. This is the number one cause of protein skimmer fluctuations, this and the fact that some skimmers exit under water and the sump water level changes. But more often it is this salt clog that causes erratic skimmer operation. Your Lifereef skimmer will never clog with salt, ever. Not only will it not clog with salt, the C.V.C. provides all these fantastic features:

1. Prevents venturi clogging, your Lifereef skimmer water level will remain set where you put it.

2. Muffles the venturis sucking noise. Basically the collection cup becomes a large muffler
3. Air recirculation. Room air quality does affect a protein skimmers ability to foam.
4. Prevents cup overflowing except in extreme cases where some product has been added that causes profuse foaming. So far no one has contacted me that has had a cup overflow, so the CVC seems to be working fine for this application.
5. When using ozone the unused ozone will be recirculated back into the skimmer thus utilizing all the ozone until depleted. Sometimes the right-angle fitting may get clogged with gunk so make sure you blow through the hose during your cup cleanings and rinse out the fitting and the hose. The in-line white or clear connector is a quick-disconnect fitting, push the tab and pull the fitting apart, makes cup removal easy when you can also disconnect the hose from the venturi.

**OZONE?** Certainly! Your Lifereef protein skimmer is ozone safe, but the venturi suction hose, quick-disconnect, and black elbow fitting are not. An **OZONE KIT** is available to replace these parts as well as a “T” fitting needed to pump your ozone into. You must use an air pump to pump the ozone into this “T” fitting because the venturi will not suck air through both the CVC hose and the “T” fitting. Connect your air pump and ozonizer together into your ORP controller so that the air pump comes on when your ozonizer does.



It is also possible to remove the venturi hose from the cup and connect your ozonizer directly to the venturi but you venturi will now get that salt buildup that the Lifereef protein skimmers are so famous for eliminating. So in order to keep the venturi free from salt buildup you can install a “T” fitting in the ozone/venturi hose and connect your automatic top-off water pump. Now when your ATO pump comes on to replenish water your venturi will be rinsed clean.

Ozone will not make your skimmer more efficient. On the contrary, when your ozonizer comes on your foam column will collapse. This is why it is a good idea to select an ozonizer rating that is double your aquarium volume, or close to it. For example if you have a 150 gallon aquarium get a 300mg ozonizer. You do not want an ozonizer to be on all the time because your protein skimmer won't foam. The protein skimmer has nothing to do with ozone, it is just a "vehicle" or "tool" to get the ozone into the water and what better place to get lots of air/ozone into the water than a skimmer. Ozone reactors work too but are more complicated and confusing.

When using ozone it is recommended you pass the water leaving the protein skimmer through carbon. This can be done in Lifereef sumps using a nylon filter bag with carbon in it and placed in the sump chamber. Other sumps may or may not contain a chamber where you can place a bag of carbon.

The quick-disconnect fitting may or may not be ozone resistant and is not covered under any warranty nor will it be replaced if it does fall apart. This is the only quick-disconnect fitting available so if it goes it goes, remove it and connect the hose to the elbow on the cup.

A nice benefit using the CVC feature is that your unused ozone will be recirculated back through the skimmer so it will utilize all the ozone coming from your ozonizer.

Though ozone can be used with the Hang-On protein skimmers you may need to hang a bag of carbon on the skimmers exit in order to filter the skimmer water through carbon.

You may notice an ozone odor near the skimmer and this is normal but in such a small concentration is nothing to worry about and is not harmful.

**Low pH** Some aquariums may exhibit low pH and getting outside air into the system can help raise the pH, and a protein skimmer is a convenient way to do this.

A low pH can occur in aquariums located in basements or where air circulation is not very good and with new homes that are so "airtight" that outside air entering the home is pretty much nil. Inside air sometimes causes the aquarium water to have a low pH. In order to raise the pH you can run outside air into the CVC/venturi setup.

To do this you will need to install a "T" fitting in the venturi hose and then pump air to this fitting. Your air pump will need to be outside or if your air pump has an air inlet fitting you can

run this hose to the outside air and keep the pump inside. The venturi will not suck air from this additional hose, it must be pumped.

Another option is to bypass your CVC hose and just remove it and connect your outside air line direct to the venturi. However, doing this will cause the venturi to cake up with salt residue and require a freshwater flushing from time to time to rinse out the salt. A good way to accomplish this is to plumb in your auto-top-off into the venturi "T" and flush the salt every time your ato comes on.

**CO2 SCRUBBER** An alternative to the above is to use a CO2 Scrubber. To use a CO2 Scrubber with your Lifereef protein skimmer is easy: Insert the scrubber between the collection cup venturi hose and the venturi intake. Run the collection cup hose from the upper fitting to your scrubber, then the scrubber outlet hose to the venturi air suction port. Your CO2 scrubber will now be getting moist air which CO2 Scrubbers require. **NOTE:** Place the output fitting/hose of the scrubber above the collection cup, or as high as possible, to prevent water from backing up inside the reactor.

**WATER EXITING YOUR PROTEIN SKIMMER** This does not apply to the hang-on skimmers since the water will be exiting the skimmer above the aquariums water level. But still good to read for educational purposes, remember, you want to be knowledgeable to help others.....

Whether your protein skimmer is an in-sump model or an external model does not matter when it comes to sump water levels, the skimmer "sees" the same. Your skimmer does not know, nor does it care, if it is in your sump water or outside your sump. The same restrictions and rules apply to both installations.

Ideally the skimmers exit should be dumped back to your sump ABOVE the sump water level. This way the exiting water does not have to push or work against the water it is dumping into. Our sumps have a suggested operating depth up to 6 ½ inches and why the skimmers exit is placed at the 7" level. However, you can go up to 10 inches of water depth for the 24 series skimmers and higher sump depths for taller skimmers. The rule of thumb is that the sumps water level OR the skimmers exit plumbing go no higher than 3 to 4 inches BELOW the skimmers main body top. For example the 24 size skimmers can have the water depth up to 10" leaving 3" for water level adjustment. The 30 size skimmers can have a sump depth or exit plumbing as high as 17 inches, and the 36 size skimmers up to 23 inches.

Think of it like this: Your skimmer will have the same water level in it as does your sump, before you even turn on the skimmer pump. So, if your skimmer is put in 20 inches of water

your skimmer will have 20 inches of water in it too and we still need to turn on the pump which will of course raise the skimmers water level even higher. How high depends on the pump. If the water level rises up into the skimmers riser neck then the pump is too big or the water level of the sump too high. You need to leave some adjustment room so you can use the exit gate valve to tune your skimmer.

### **Installations where the skimmer exit is below the sumps water level....**

If your protein skimmer exit is under water, and your sump water level changes, so too will your protein skimmers water level and your skimmer will now be flooding the collection cup or too low to push the foam up the column, and you will be adjusting it all the time. In order to alleviate this your sump must have either an auto-top-off to maintain a consistent water level or a baffle/divider that maintains a consistent water level. This is not a problem with Lifereef systems using a Lifereef designed sump.

## **THE MOST IMPORTANT INFORMATION REGARDING ANY PROTEIN SKIMMERS ABILITY TO FOAM**

**This is crucial to understanding the foaming and non-foaming of your protein skimmer. It isn't a protein skimmer design issue, it's your water, or what you have put into it.....**

Whether it be a simple air-stone driven protein skimmer or a future fandangled wizbang bubble-thingy protein skimmer, all are affected by the water SURFACE TENSION (to be explained in detail below) and ability to foam. Rarely do skimmer manufacturers even mention this water quality, because they don't know, gee, and they make protein skimmers? They may mention that your skimmer will experience foaming or no foaming but don't tell you why. As I said before, I like to educate you too.

Protein skimmers do not, and are not, responsible for foaming action. A proteins skimmer sole function is to pump all that air/bubbles into the water, period. Once that has been

accomplished it is **100 percent up to your water quality and chemistry as to whether your protein skimmer, I mean water, will produce a foam.** Skimmers don't produce foam, they only provide the right conditions that allow the water to foam, provided the water's "surface tension" has not been compromised....

Water has a condition/quality called "surface tension". If the surface tension is high then the water's ability to foam and for the bubble to remain a bubble are good. If the surface tension is low, the water's ability to foam are less, the bubbles will simply pop when they reach the air, or upper portion of the skimmer. No skimmer in the world will allow foaming if the water surface condition is not conducive to foaming.

Remember the silicone grease mentioned earlier or the ozone? Silicone is a fantastic surface tension breaker and will prevent foaming and so will the use of ozone. So too are many water additives that will lower the surface tension and thus no foaming action. And so too are the natural skin oils on your fingers, hands, and arms. On the other hand there are products that will cause an excessive amount of foaming. Coral epoxies are one good example of excessive foaming action. So too are Amquel, StressCoat, NovAqua, ick medications. Flake foods will cause a loss of foam. I cannot possibly know of all the effects water additives have, anything added to your water whether it be a liquid or a solid is a "water additive" and will change the foaming characteristics.

**So, it is a good idea to observe your protein skimmer foam, or what it is producing, prior to adding anything to your water, add the product, and watch what the skimmer foam column does. Stick your finger in the water, your hand, submerge your arm, watch what the foam does. This way you will know what to expect with the particular products, foods, chemicals, etc that you use during your aquarium keeping. The Lifereef protein skimmers have a tendency to regain their foaming much faster than other skimmers too.**

**Low Surface Tension,** your skimmer will have 1/2 to 1 inch layer of wet bubbles on top

**Medium Surface Tension,** your skimmer will be foaming nicely

**High Surface Tension,** your skimmer will foam profusely, may require turning off for a day or two.

**THE ABOVE IS IMPORTANT, READ IT AGAIN, AND AGAIN IF NEEDED**

## **LOSS OR REDCUCTION OF BUBBLE ACTIVITY IN THE SKIMMER BODY**

Your protein skimmer should be so white and opaque that you cannot see through the upper section. The lower section should be bubble-free or very few bubbles reaching the bottom. If you observe your protein skimmer has a loss or decreased bubble activity it means that the C.V.C. hose or fitting may be clogged (rare) or that your venturi is clogged (most common, use the V.A.M.P. feature to check and clear the obstruction) or that your pump has an inlet restriction or an impeller that has broken off and is lodged inside the pump or stuck in the venturi.

Observe your protein skimmer after a few days of operation to get an idea of how white and opaque the water is, your baseline, take a photo if needed for reference.

## **POWER OUTAGES, TURNING OFF/ON AND HOW IT AFFECTS THE SKIMMER**

When you lose power, or you turn off your system pump your sump level will rise. And it is possible that the exit of your protein skimmer is now under water putting resistance on the water leaving the skimmer when power comes back on. Whether or not your collection cup will overflow (low chance with the CVC feature but still a possibility) depends on how fast your sump water level drops vs how fast the protein skimmer starts foaming. So, it's important to check this as part of your aquarium duty by turning off all power, and then turning it on again to see what happens. It is also important to unplug your protein skimmer pump if you turn off your main system pump.

One idea to prevent skimmer issues is to have a float switch mounted in your sump that prevents the protein skimmer pump from turning on until the sump level reaches its operating level.

It will take your protein skimmer a few minutes to regain its operating level if turned off so don't make any adjustments , just leave it alone and it should come back to it's proper level. If you've done a water change, or had your hands I the water, added anything to the water, etc it may not come to its prior level and is now acting per the new water conditions but leave it alone and it will eventually come back. If you've added something that causes excessive foaming it will need to be turned off and tested every now and then to see if it can be run without foaming out of the cup.

## **PROTEIN SKIMMER "BREAK-IN" PERIOD**

This has very little to do with a protein skimmers building up a slime coating and more about the surface tension issue noted above. Remember the skin oils and how that will reduce any foaming for awhile. Well, when you are installing a protein skimmer on an aquarium whether in-ump, external, or hang-on you will probably stick some fingers/hands/arms in your water compromising the surface tension. Some will use Teflon grease or paste (not good), you'll turn off your pump which washes built up stuff from the sides of your sump, stir up particulates which act as needles on the bubbles and pops them, etc. Numerous things can cause a protein skimmer to go through this break-in period, you've compromised the water's ability to foam so it will take some time, break-in time, for the water to foam. This can be days or a week, give the skimmer time, it will start foaming.

If installing a protein skimmer on a new aquarium don't expect it to foam at all unless you use a salt that has lots "stuff" in it, some salts will cause lots of foaming, others not so much. Also your new aquarium has no proteins, your fingers/hands/arms have been all over the place putting oils on parts and such. The skimmer, or the water will foam as soon as the water surface tension is able to do so. All you can ask of any protein skimmer is that it put lots of bubbles into the water, foaming is water related not a skimmer problem.

Some say that their protein skimmer will foam a lot after cleaning it, I don't doubt that because what have they done but wash/rinse the gunk in the skimmers neck with water back into the skimmer body and guess what, the skimmer starts foaming immediately due to all the gunk just dumped in there. It does not mean that a clean skimmer performs better than a dirty skimmer.

Micro-bubbles exiting the skimmer will occur for the first few days so don't panic if your sump has lots of microbubbles in it. As the skimmer breaks in the bubble layer will rise and you will have about 1/3 clear water at the bottom of the skimmer and the top 2/3rds with dense bubble activity.

## **CHASING THE FOAM.....**

What this means is trying to force the skimmer to foam when foaming conditions are not present, flooding the cup, lowering the skimmer water level because you flooded the cup, then not getting the foam up into the cup, raising the level again, flooding the cup, lowering

the level, etc, you are “chasing the foam”. With this scenario you will never get the skimmer tuned to the best operating water level. Proper adjustment of the skimmer can only be accomplished when there is a nice head of foam on top of the wet bubbles. Once adjusted properly your skimmer gate valve rarely needs further adjustment. When the skimmer isn’t foaming just leave it alone, when it begins to foam your level will have already been set.

## **INSTALLATION (finally we get to the fun stuff!)**

Look over the diagrams, they are pretty straightforward: skimmer input, skimmer output. The diagrams are fairly accurate but some installations might have specifics of which I’ve included sketches and/or photos of your protein skimmer mocked up to show you what to do. Remember the Teflon tape, not to over-tighten fittings, putting on the hose clamps and using pliers to secure the clamp. Two clamps provided for each fitting, but use only one. If it leaks from the hose connection put on a second clamp so that it’s gripper teeth are on the opposite side of the fitting. You may have more fittings than needed, doesn’t mean they all have to be used, sometimes additional fittings are included for alternate connections or installations. For Lifereef sump systems no additional fittings have been provided as there is only one way to install it in or onto a Lifereef sump.

The collection cup o-ring positioning is important for a good seal. Do not let it slide up to the underside of the collection cup, it won’t seal. The o-ring must be pinched between the collection cup neck and the skimmer body receiving neck. **In order to prevent the o-ring from sliding up to the top of the neck all must be dry: the o-ring, cup neck, and receiver neck.** Put the o-ring about 1/4 inch onto the cup neck and then push into the skimmer body receiving neck. The o-ring will roll up the cup neck and be pinched between the two surfaces. If you clean the o-ring with Windex or similar cleaner and wipe dry will give the o-ring a bit of stickyness and allow it to grab instead of slip.

## **OPERATION AND ADJUSTMENT**

**NOTE: The proper water level for your protein skimmer will be that level where the cup does not flood out or fill with water.**

**This level is different on every aquarium and protein skimmer due to numerous aquarium additives and foods and chemicals. You can only start with a suggested water level per the instructions, from there you make adjustments according to your water quality and what it is doing with the foaming action.**

**Do not expect the skimmer to be pushing foam 24/7, it will not.**

Your sump/system water pump must be running and your sump level stable. Allow the skimmer to run for a few minutes to make sure there are no leaks. If using freshwater as a test before adding salt: **YOUR SKIMMER WILL NOT PRODUCE THE SMALL BUBBLES NEEDED FOR PROPER OPERATION.** So with fresh water you are basically testing for leaks and you cannot adjust the skimmer properly. Once you add salt you can set the skimmer gate valve to adjust the water level. First, open the gate valve all the way counter-clockwise so the valve is full open. Second, start closing the gate valve (clockwise) and raise the water level to the Lifereef sticker/logo. The exact level will have to be determined with each aquariums bio-load so you will need to find the optimum operating water level for your water chemistry and that surface tension thing mentioned earlier. The CORRECT water level is that level where you don't keep filling up the cup with water. Once you achieve this position you can fiddle if you like up/down to see what happens with wet foam, dry foam, etc. At this point leave the gate valve alone, or fiddle to see what happens. At some point you will find the best position and then leave the gate valve alone.

**BUBBLES, BUBBLES, BUBBLES.....** For the most part this skimmer will retain the majority of the micro-bubbles within the skimmer body. The skimmer has the internal baffle tube to direct water/bubbles upwards where they hit the underside of the skimmer body, then bounce around to increase contact time and some may migrate to the bottom. The bottom pickup pipe is close to the bottom to minimize stray bubbles, but they do occur. Some water additives will cause excessive bubble action and allow some bubbles to migrate to the bottom but these conditions pass quickly.

**The “M” word: MAINTENANCE** Hardly any, empty the cup when full using the drain valve. **NEVER LEAVE THIS DRAIN VALVE OPEN** to freely drain into a bucket, container, or floor drain! **YOU WILL HAVE A FLOOD** and if using an auto-top-off you will ruin your waters salinity. Skimmers (water condition) can cause excessive foaming activity. All this wet foam goes into the bucket, bucket overflows, and if you have an auto-top-off putting fresh water into your aquarium, not good. Do not use one of those waste collectors with the floating ball mechanism, they don’t work the same on this skimmer as the do on others. Use the collection cup, that is why it is called a “collection cup” to collect the gunk. And when full, empty the collection cup. And when the cup is so dirty you cannot see through it, take it off and clean it in the sink, but turn off the skimmer first.

Only one condition can you dump your cup into a bucket or floor drain **BUT ONLY IF YOU DO NOT HAVE** an auto-top-off. You can install a float switch to your sump. If your sump level drops because your skimmer is dumping lots of wet foam or water it can turn off your skimmer pump.

**AREAS NEEDING CLEANING**, a foam cleaning/scrubbing pad is included to remove sludge from the cup and neck.

**Collection Cup Cap** will need rinsing to remove sludge

**CVC Elbow and Hose** will need rinsed when cleaning the cup

**Collection Cup** will need rinsed when dirty, it will collect sludge. Note: the drain fitting will not allow complete emptying of the cup. This sludge left in the bottom does not affect skimmer performance.

**Riser Neck** will require cleaning as it will collect sludge

**Venturi**, rarely. Only if something blocks the incoming water will you need to remove the V.A.M.P. plug or disconnect the union to remove the blockage.

**Skimmer Main Body** does not have to be cleaned to keep the skimmer working. It only needs cleaning for aesthetic purposes. Once per year you can remove the skimmer, close the gate valve, fill with white vinegar and let soak overnight. Then empty half the vinegar, put hand over the neck and shake, not stir. Then dump the loose contents and rinse with water.

**Pump** will need maintenance as calcium deposits coat the moving part. Only you can determine when this requires service.

**REPAIRS** Should you bust something on your skimmer it is repairable. DO NOT use that rubber spray-on stuff they sell on TV. This material will need to be ground off the skimmer, or the entire area cut out and replaced. It is not a mechanical fix and any break will continue to break. DO NOT use silicone sealant, it will not fix anything. Cracks must be repaired by sending the part back to me. Cracks are not covered under warranty because cracks don't just start by themselves, they need force to initiate. Small micro-cracks may appear around bonded areas but these have never lead to larger cracking or failure. So any large crack or leak has been caused by excessive force.

Any questions regarding installation, performance, operation, etc will be readily answered, don't hesitate to call or email, and sometimes a photo of your installation will expedite any issues. I like to see foam properties, water levels, etc.

Let others know how wonderful your Lifereef protein skimmer is. Let them know the problems you had with your previous protein skimmer, or skimmers. Save them the hassle, frustration, headache, tons of time on the bulletin boards, and money.

If there is anything you would like to see changed with your Lifereef protein skimmer, give me a call, I'm open to any ideas.

Don't forget to get some of the other Lifereef products to make your system all Lifereef!

#### **SOME MISCELLANEOUS QUESTIONS ASKED OVER THE YEARS ABOUT THE SKIMMER.....**

**WHY IS THE DRAIN VALVE ON THE SIDE AND NOT THE BOTTOM,** I can't drain the cup completely. First off, the cup does not need drained completely for the skimmer to operate. Second, you can rinse out the sludge when you take the cup off for a good cleaning.

**WHY IS THE CUP O-RING NOT SECURED IN A GROOVE** If the o-ring were in a groove you could not insert the cup into the skimmer neck without adding lube, like silicone. You don't want silicone in contact with the water as it will reduce foaming. Having a rolling o-ring allows easy removal and insertion and makes a nice tight seal.

**WHY IS THE COLLECTION CUP COVER NOT SECURED,** The weight of the collection cup cover is sufficient to prevent it being pushed off by dry foam and since no air is leaving the collection cup it is not being "pressurized". If you wish to secure it mechanically a large rubber band can be used.

## Warranty

All Lifereef products are hands-on assembly and fabrication. There may be fingerprints, minor scratches, minor glue blems, small “voids” where a glue bubble popped, all considered part of a hand-assembled product. Items are not hand-polished prior to packing and may in fact have plastic residue, chips, etc as these are removed from the assembly area, stored very shortly, and then packed for shipment. Dust may have accumulated and quickly blown or wiped off (maybe not) , it is not a used product. These are not considered warranty issues. As long as the product is not affected in the performance, the product is considered fit for sale.

All Lifereef fabricated products are warranted to be free from defects (with regards to specific manufacturing artifacts that occur during assembly or age as specified below) and from any glue bond from coming apart or leaking at a glue bond or seam. Acrylic glue bonds are permanent and do not come apart by themselves. Acrylic does not suddenly crack, it must be hit, dropped, or other force applied. Micro-cracks are common with all acrylic products and are not considered defective nor covered under warranty. Over time and/or during assembly there can be reactions between the glue and the acrylic. These are not considered defects unless extreme and often I will offer these products at a reduced price. Any Lifereef product sold as a “blem” is fully covered against failure. Over time small micro-cracks can develop on any of the bonded areas, including “in field” areas where no bonding was done. These are not covered under warranty and are considered normal to any acrylic product. None of these micro-cracks has lead to failure. The use of ozone can discolor pvc and acrylic and are not covered under warranty. Vinyl tubing, fittings, valves, are not covered under warranty and must be replaced if brittle, split, folded, worn out, etc. The use of rigid pipe connected to any Lifereef product (unless supplied with your order) will void the warranty. Only Lifereef manufactured products are covered, no other parts used or added are covered. Water pumps are covered under the product manufacture warranty. With regards to water pumps all I can assist with is providing proof of purchase date should you have lost your invoice. Lifereef warranty is for the original purchaser only. Should any warranty issue come up it will be at my discretion as to whether the part/product will be repaired or replaced.

Don't forget to look at the other fantastic Lifereef products if you don't already have some:

**Wet/Drys, Berlin Systems, Nano Systems, Calcium Reactors, Media Reactors, Bio-Reactors, SAFE Prefilter/Overflow/Siphon Boxes, Silencers, Custom Reservoirs, Custom Anythings**

## Once Again!!!

**THE IMPORTANCE OF NOT OVERTIGHTENING PVC FITTINGS CANNOT BE MADE MORE CLEAR... I HAVE PERSONALLY ONLY SPLIT ONE PVC FITTING, AND THAT WAS OVER 30 YEARS AGO. DO NOT TIGHTEN TO THE**

**POINT OF TIGHT. TIGHTEN BY HAND OR FINGERS ONLY. FOR PARTS WHERE SOME LEVERAGE CAN BE HAD BY THE FITTINGS LENGTH OR SHAPE OR SIZE, BE MORE CAREFUL. FITTINGS SHOULD FEEL AS IF THEY HAVE MORE "GIVE" WHICH IS GOOD IN CASE IT LEAKS, THEN YOU HAVE SOME MORE YOU CAN TIGHTEN, BUT AGAIN, NOT COMPLETELY TO THE POINT THAT THE FITTING CANNOT BE TURNED AT ALL. USE AT LEAST 12 TURNS OF TEFLON TAPE ON ALL LARGE 3/4 AND 1 INCH THREADED FITTINGS AND JUST A FEW TURNS ON THE SMALLER 1/4" THREADED FITTINGS**

**Lifereef Filter Systems    4628 S Ward Way    Morrison, CO    80465    303-978-0940**

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