All ETSS Downdraft Skimming Tower Design Skimmers
Advanced Tuning Guide
US Patent 5,554,280

Parts of the Skimmer:
1-Base is the sump box at the bottom of the skimmer.
2-Skimming Tower (**this is your skimmer**) is the small slender tube extending from the base.
3-Injector assembly is mounted on top of the skimming tower and connects to the water pump.
4-Foam collector Riser section usually attached to the base.
5-Foam collector Cup & Neck- removable collection cup is attached to the Riser with a flanged connection.

Installation:
Height of the skimmer is in relation to the sumps water level.
Base of skimmer should not be submerged or mounted more than 6" below the sumps water level.
Rule of thumb-The outlet gate valve's handle should always be above the sumps water level when facing up.

Skimmer drain plumbing:
The drain line of the skimmer, outlet located in the base unit, should be as straight as possible to the sump.
Outlet drain plumbing should be horizontal or downward. NEVER UPWARD.
Avoid 90 Elbows especially in drain plumbing. Use two 45 instead whenever possible.

To check your drain plumbing open the output valve fully. Start your pump and cover the air intake barb on the injector cap temporarily.
The water level in the skimmer should be about 2-3” below the top of the skimmers base unit.
If you see water in the foam collection riser section above the base your drainage is too restrictive.
Never reduce the factory outlet plumbing size. The skimmer will not drain or function properly.
Either improve your drain lines capacity by removing restrictive fittings or raise the skimmer in relation to the sump. Raising the skimmer 2” will drop the water level in the base by 2” , etc.
Lowering the water level in your sump will have the same effect as raising your skimmer.

Bioballs
Bioballs will need to be added to the skimming tower anywhere between 1/2 to 2/3 of the skimming towers height.
Leave an empty space at the top of the skimming tower of at least
4" on smaller skimmers (Mini Bio-balls 1" Diameter) or
6" on larger skimmers (STD Bio-balls 1 1/2" Diameter)
Bioballs will deteriorate over time and should be replaced every 6 months or whenever performance takes a noticeable drop. Don't clean the bioballs,cleaning only helps them deteriorate faster.
Service your pump also at this time, See pump manufactures instructions.
Quick Bioball change trick. Attach fishing line to the first Bioball inserted and the last.
Whenever changing Bioballs pulling out the first ball will also pull out all the bioballs in the skimming tower.

Bioball Note: Smaller pumps and a lower flow rate through the skimmer requires less bioballs. This creates more air flow. Producing a larger volume to the waste foam. Fill the skimming tower about half way with bioballs.

Larger pumps and high flow rates needs more bioballs. This reduces the foam volume to manageable levels in the foam collector section. Fill the skimming tower to 2/3 full or up to 6” maximum from the top of the skimming tower.

Injector Assembly
Mounts on top of the skimming tower. The water pump's output attaches to the large hose barb or PVC input fitting. Depending on the model of the skimmer.

Air intake, small elbow, on the skimming tower injector cap.
Normally needs nothing connected to it. It aids in air intake noise reduction.
It should be facing up. It needs to be cleaned of salt buildup occasionally.
For extra quieting of the intake air 2-3 ft of vinyl tubing can be connected and placed above the skimmer.
For extra intake filtration a foam sponge can be attached directly to this fitting or with vinyl tubing.

We make a remote Carbon Air Filter Cartridge that eliminates all intake noise while carbon filtering the air going into the skimmer. It can be connected to the skimmer's intake barb with vinyl tubing of any length.

Non- XR model injectors just slip-in and are usually held in place by the water intake plumbings weight.

XR models will have an O-ring seal and mounting plate to attach it to the skimming tower's plate.
This flange should be tightened evenly to provide and equal gap at all screws.
There is a straight cut machined in the clear acrylic guide tube on the injector assembly.

Foam Collection Riser
This is where the really wet foam collects from the base section.
It should be wiped clean with a wet paper towel whenever the collection cup is removed.

Foam Collection Cup
Bolts to the riser with keyhole flanges and a large O-ring seal. Loosen the screws and twist the collection cup off for cleaning. No need to remove the screws.
The top of the collection cup (lid) removes the same way for easy cleaning access.
Clean only with water. Never use cleaning aids such as soaps or chemicals.
A bottle or mug brush aids greatly in expediting the cleaning process. Usually available in supermarkets.
Wet paper towels can also be used. Rinse gently, do not over clean or the cup will need a break-in period again to skim properly.

Skimmer Cup Drain Fitting:
This is the hose fitting attached to the collection cup.
The drain fitting must never be restricted as it vents the air flow form the skimmer.
You must attach a hose to this to drain into a remote container. The drain hose must run horizontal or downhill to the container. If water/waste collects in the hose the skimmer will not work. The drain line should be as short as possible.
This hose must never be submerged in the container as that will shut down the skimming action.
We have an Auto Shut-off Waste container available that will stop the skimming action when full.
This is the best method of draining the skimmer cup.
Another method is to use a large empty 1 gallon milk jug or similar and place the hose end about 1/3 way into the jug, allowing air to vent without back pressure. When filled it will submerge the drain hose and reduce the skimming action until emptied.
A simple test of the drain line proper installation would be to remove the skimmer's collection cup top lid. If the skimmer foams better there is a problem with the drain line being restricted. Find and remove the restriction and retest by attaching and removing the collection cups lid. When the foaming action is the same with the lid installed or removed all is well.

Dedicated Skimmer Pump
One of the greatest advantages of Downdraft skimmers is that they can use any of a wide range of pressure rated pumps. No Special designed pump needed.
Because the skimmer requires a high pressure water source only dedicated pumps can be used.
Trying to feed the skimmer from a return pump will not work as the pressure cannot build but vents to the tank.

The aim of skimmer design is to build up pressure from the pump. This means that most pumps will operate at 12-24 ft of head pressure depending on skimmer model.
The higher the **feet of head** (this is the maximum PSI a pump puts out) rating for a pump the better the skimming action, as it will atomize the water from the injector nozzle better.

Note: PSI (pounds per square inch) = Feet of Head / 2.31 they are the same measurement but different scales. Similar to measuring temperature in either Fahrenheit or Celsius

Powerhead/submersible pumps- look for the best **feet of head** rating for given flow range.
The higher the Feet of Head rating the better the pump will work in this application.

External pressure rated pumps-Use only the pressure rated versions. Again look for the best **feet of head** rating for given flow range. These are the best for skimmer application. All skimmers where designed using Iwaki pressure pumps. Best skimming action will be obtained using these pumps or their equivalents.
Do not use external low pressure flow pumps used for returning sump water to the display tank will not work well.
These can usually be spotted by their LOW Feet of Head pressure rating. They will show a much larger GPH (Gallons per Hour) rating than pressure pumps but this is meaningless in a skimmer application.
Flow pumps do not build pressure when restricted they just deliver less total water volume.
They cannot produce a strong stream of water so vital to good skimming action and oxygen-water mixing.

Skimmer Break-in
New skimmers need to develop an organic coating to foam properly and operate stably.
This can take a while a day to a week. The skimmers foam collector section will look like boiling water initially. This means the skimmer is not broken in. Keep the water level low, ½ inch into the foam collection riser.
It will start foaming eventually. When this happens allow the foam collector to build up a good amount of dirt initially. After the foam collector first cleaning it should run very stable and final Gate Valve adjustments can be made.

Foaming Action in the skimmer.
Downdraft skimmers flow a lot of air and water for their size. The foaming action depends on the surface tension of the tanks water. Changing the surface tension of water will cause the foam column to drop to a boiling water look. This is normal when introducing oils from food or hands into the tank's or sump's water. It is temporary and skimming should resume shortly, depending on how much oil was introduced. ½ to 2 hours can be normal. DONOT readjust your skimmer at this time.
Washing hands and arms in hot water, no soap and rinsing food well will help a lot. Using tools / tongs when working in your tank to avoid putting hands and arms into the tank is a great idea. Prevents a lot of pollution from skin oils.

ETSS Skimmer High-Performance Tuning (WIP)

While some will be happy with the standart easy setup. Other's will want to tweek them for maximum performance. Knowing your skimmer well, will also serve to increase your tank's water quality.
The aim of all tuning should always be to produce a Dark Waste Product in the collection cup.
As long as the skimmer can produce good dry waste, all tuning is successful.

The three basic skimmer controls:
1- Pumps flow rate, adjustable with a ball valve on the pump.
2- Air flow through the skimmer-Adjustable with the bio-ball count in the skimming tower.
3-Outlet gate valve-adjustable foam consistency in the cup, from wet to dry foam.