**Setting Up a New Tank**

**An easy to understand guide**

**“Nothing good every happens fast in saltwater”**

**This guide is a free offer of help and is no guarantee of success for your tank. However, following these suggestions will certainly give you the best start and best chance at success. No person(s) or aquarium shop takes any responsibility for damages to person(s), place, or equipment in the use of this guide.**

Here is a link from the web site Reef Central. <http://reefcentral.com/forums/showthread.php?t=1031074> It goes into much greater detail about setting up a saltwater tank, however this guide is meant to make it easier overall and is a thorough overview.

An article from B&B Pets in Mobile, AL explaining the aquarium cycle process:

<http://www.bbpetstop.com/The%20aquarium%20cycle.pdf>

The following steps are the quickest way to have a tank up and running, however, **NO** tank can run and function without going through the natural “cycle” process. Without the cycle, there is no tank. While some tanks may complete the cycle faster than others may, generally it will take 4-8 weeks. **DO NOT RUSH THIS.** The entire health and stability of your tank will depend on a good foundation and a good cycle does this. One of the most important things to remember is the lower the nutrient levels the healthier your tank will be. Because the nitrogen cycle ends (for the most part) with nitrate (NO3-), and phosphate (PO43-) enters the system from feeding you must always be vigilant to keep these levels as close to zero as possible.

Assuming you have already purchased all of the equipment that you will need I will not go into that here. If not, read my handout titled “Aquarium Items to Buy”. Otherwise, I will tell you the best order of steps to take to enjoy your tank for years to come and have healthy animals for the long term.

**BEFORE YOU BUY YOUR TANK READ, RESEARCH, LEARN. KNOWLEDGE IS POWER IN THIS HOBBY. LEARN ALL THAT YOU CAN BEFORE YOUR HANDS GET WET.**

1. Decide what kind of tank you want: 1) FOWLR (Fish Only With Live Rock), 2) Reef, or 3) Mixed Reef, because each one has its own needs and concerns.
2. Chose the location of your tank considering the following things. The tank is for watching and relaxing.
3. Make sure you can sit and watch the tank from seating areas.
4. Make sure there is easy access to wall plugs.
5. Keep the tank away from windows. This will minimize unwanted light.
6. Keep the tank away from the direct line of air from AC/Heat vents. This will help with temperature swings.
7. Keep the tank out of areas where it can be broken (seems obvious), such as children’s rooms or playrooms.
8. Keep the tank out of ultra high traffic areas. This will constantly spook animals in the tank.
9. Make sure the area will allow for ease of maintenance, such as water changes.
10. Make sure that the area is structurally sound and level.
11. Make sure the floor can handle getting wet. It will.
12. Once location is decided set the tank on its stand with the canopy on. Sit where you would normally watch the tank and be sure you like the location etc. A full tank is **HEAVY**. Saltwater weighs approximately 8 pounds per gallon. On a 55g tank, the water alone will weigh 440 pounds. You will not want to move it later.
13. In your mixing container(s), add the appropriate amount of salt mix per instructions. Generally, most brands are ½ cup per gallon. Always add a little less than needed and test. You can always add more salt as needed to raise the SG.
14. A note about water. Water evaporates from the system constantly. This does two things; it helps cool the tank, it helps gas exchange and it **INCREASES SALINITY.** As water evaporates, the level in the tank will go down and so water must be added to correct the level. **WATER EVAPORATES—SALT DOES NOT**. **\*\*ONLY TOP OFF WITH RO/DI WATER\*\*** Topping of with saltwater will increase the salinity of the tank to deadly levels.
15. Rinse substrate sand in a 5-gallon bucket using a garden hose. Push the hose to the bottom of the bucket and let the water gently flow out of the bucket and rinse any dust from the sand. Mix the sand with your hand to help speed the process. There are two types of substrate sands that can be purchased—dry aragonite sand and “live” sand. Both are 100% aragonite sand, but the “live” one is wet and is supposed to contain the beneficial bacteria needed for the nitrogen cycle. Dry sand will become live during the cycle. The “live” sand will help speed up the cycle. True “live sand” will come from the ocean directly or from an established tank. This true live sand is great and should contain many micro fauna, such as brittle stars and bristle worms. **Do not rinse live sand!** Doing so will kill all of the good stuff.
16. Once the water runs clear, pour off the excess water. Place the sand into the aquarium until the depth is 1.5-3 inches. Cover the sand with the bag(s) it came in.
17. Slowly add the saltwater by pouring it into a shallow glass dish sitting on top of the plastic bags. This will allow the water to flow into the tank without disturbing the sand bed too bad.

**Live Rock**: Live rock is the term for natural rock that is populated with the beneficial bacteria that are needed for the nitrogen cycle. Live rock comes in many different forms and price ranges. The lighter the rock weighs the more porous it is. This in turn allows it to contain more of the good bacteria. Most live rock comes from reef areas and is actually old coral skeletons. Many companies make live rock in aquaculture facilities.

Live rock is usually sold in three ways; fresh (uncured), partially cured and cured. Fresh live rock will contain more “things” on it, but will always have die off. This die off is the result of small animals, sponges, algae’s etc. dying during transport and handling. This rock is fine to add to a new tank that is still cycling, but will cause an ammonia and nitrite spike in an established tank.

Partially cured live rock has been stored in the LFS for a period of time and most of the die off has occurred. This rock will still contain some of the extra “things”, however the rock will still have die off and will/can cause a small spike in ammonia and nitrite once added to a tank.

Fully cured rock generally has been stored in the LFS for the longest period of time and has had its die off finish. This rock may be added to a tank anytime with little to no spikes.

1. Carefully remove the dish and then the plastic bag(s).
2. Now is the time to get creative and make your tank look like a small coral reef. Add your live rock to the tank a piece at a time. Make sure to build a stable base with larger pieces on the bottom and smaller pieces on top. Be sure to leave room on the ends or back (depending on placement) for the power-heads. Arrange your rock so that you will get water flow through, behind, in front, as well as across the rock. The better flow you have the cleaner and healthier your tank will be. Before you finalize a design be sure to check the internet for pictures of “aquascaping” in other tanks. Try to imagine where your corals will be placed eventually. Also, make sure to leave holes and caves for fish and invertebrates to hide in.
3. Finish adding saltwater to the tank to raise the level approximately 1-2” below the top of the rim.
4. Turn on power-heads and external pump/filter (if using) and begin water circulation. Power-heads and filter/sump returns will have to be adjusted to prevent sand substrate from blowing.
5. Install heater into tank **THEN** plug it in.
6. If you will be soon or are running a sump style system, then the heater will go into the sump. Sump set up will be covered in another section.
7. Let water circulate for 24-36 hours to clear and oxygenate it.
8. Once the water has cleared, verify your live rock placement and make adjustments as needed.

**Sump Systems:** A sump-based system is the absolute best way to run a saltwater reef tank. Not only does a sump provide aesthetics by removing items such as heaters from the display, but it also increases the overall system volume that makes for better water chemistry. A sump is just a secondary tank located under the main display tank inside the tank stand. Tank water drains to the sump in one of two ways, an external overflow box, or through bulkhead fittings if the tank is drilled and “reef ready”. Water moves through the sump and is returned to the display tank using a return pump. A sump can be made from most anything, but most often, they are made from another aquarium or from acrylic panels. Generally a sump is composed of three sections; drain, refugium, return, however some will only have the drain and return. Some sump systems will have a separate refugium. Sections in a sump are separated with baffles. These are usually made from acrylic. The refugium is an area of slow water flow where macro algae are allowed to grow and often, beneficial micro fauna such as copepods grow as well. The macro algae help in the removal of nitrate and phosphate and the micro fauna is a natural food for many of your tank inhabitants. Often live rock rubble is placed in the drain section and live sand is placed in the refugium. These both help with the removal of nitrate as well. Below is a simple diagram of a tank and sump system.



1. Next comes the most dreaded but utmost necessary part of owning a saltwater tank—waiting for the cycle to start and finish. As stated above this can take from 4-8 weeks, but if you use cured live rock and live sand, either bagged or from and established tank, you will cycle the fastest. During this cycle period, you will need to add a pinch of fish food daily. This provides a food source (ammonia) to the bacteria that are beginning to colonize every surface in the tank, but especially the sand and rock.
2. Test for ammonia (NH3), nitrite (NO2-) and nitrate (NO3-) every couple of days. This gives you an indicator of your cycle progress. Test for ammonia first—if you have a reading then test for nitrite. If nitrite is zero, do not test for nitrate. Wait several days and test again. You should see the following pattern: First few days to a week high ammonia levels and little else. Then you will start to see a rise in nitrite and ammonia drops off. This could take several weeks. Then nitrite will begin to fall off and nitrate will spike. When nitrate then levels off your cycle will be complete.
3. Now is the time to being adding live stuff! Your first purchase will be snails and hermit crabs. These little guys are the “garbage collectors” of your tank. They are known as the Clean Up Crew (CUC). They will sift sand and eat detritus and bad algae. Your LFS will help you get what you need for your size tank or you can order online. Most online vendors sell CUC packages rated by tank size.

**Acclimation:** Acclimation is a very important step when adding animals to your tank. Acclimating does two things—it slowly matches bag temperature to tank temperature and slowly brings bag chemistry to tank chemistry. There are a couple of ways to do this depending on the animal, but always float the **UNOPENED** bag for 15 minutes. 1) CUC, shrimp, and fish are floated and then the bag is opened and tank water is slowly added over 15-minutes. A refillable IV bag is a great way to do this if you have access to one. If not, just add a small amount of tank water to the bag every couple of minutes. You want to double the bag volume at the least. 2) For corals, float the bag for 15 minutes as well. Next, you will use a “coral dip” to remove any parasites that may be attached. A “coral dip” is a special chemical that is added to a small amount of tank water to remove parasites. Just follow manufacturer direction and **DIP EVERY CORAL**. Also, **NEVER** pour bag water into the display tank—you never know what may be in the water. Pour the animal and water into a net over a plastic bucket or sink and release the animal from the net.

A very important thing to remember about acclimation is that longer is not always better. Most live animals are shipped/ sent home with oxygen pumped into the bag. While the animal sits in the bag is it producing waste—namely ammonia. In a high O2 environment, ammonia is in a fairly safe form called ammonium. As soon as the bag is opened, the ammonium reacts with atmospheric CO2 and immediately becomes toxic ammonia. Because of this, the longer an animal sits in its bag the longer it is exposed to the ammonia. **30 minutes from float to dump.**

1. Your tank has been running now with the same water you started the tank with. Now it is time to do your first water change. Using clean buckets mix fresh saltwater (by manufacturer directions) equal to approximately 25% of your system volume. Ex) 100 gallon volume (tank and sump) = 25 gallons fresh/clean saltwater. Make sure all of the salt is dissolved before adding to your tank. Many people will make clean water ahead of time and use it as needed, however the clean water should be aerated but MUST be very close in temperature (2-3 degree difference at the most). Turn off all of your pumps. Drain off the 25% and discard. To ensure you have enough clean water to replace what is taken out, measure the amount removed (5-gallon buckets work great). Pump the clean water into the display tank being careful not to disturb the sand. Turn pumps back on.

\*\*The first water change is the biggest. All other changes will only need to be about 10-20%. Water changes should be performed once a week in the beginning (first 3 months) and then can be lessened according to tank needs.

1. Add fish and beginner corals. A few fish may be added at this time as well as beginner corals. Only add one or two fish at a time to avoid overloading the biological system. The bacteria in the tank must reproduce to accommodate the additional waste. Corals however, add very little “bio-load” to the system and several can be added at once.
2. By now, you will have had at least one type of algae outbreak if not three or more. The first type of algae that EVERY tank has is brown algae. It will cover the glass, the sand, and the rock. It generally lasts a week or two and goes away on its own. These brown algae are a calcareous animal called a “diatom”. The have “shells” that are made from silicates. Once all of the silicates are utilized, the diatoms die out. All you can do is keep the glass clean. This brings up a very good reason to either buy RO/DI water from your LFS or invest in a unit yourself. Tap water is the worst water for saltwater aquariums. It contains many of the items that help cause problems in our tanks—nitrates, phosphates, silicates, and copper to name a few.

Another algae is called Green Hair Algae (GHA). It is a very tough algae to remove and eradicate. The best way to fight GHA is low nutrients, CUC, and manual removal.

Cyano bacteria, aka, red slime or blue green algae are actually photosynthetic bacteria. It thrives in high nutrients, low flow areas. Easy to remove: siphon off of rocks, lower nutrients and increase flow.

By now your tank should have clear water, clean glass (for the most part), healthy fish and inverts and maybe even a few corals as well. You should be somewhere around the 12-16 week mark. This is a time when the tank really begins to settle down and starts looking like the tank you imagined. Remember to 1) **test your water**. If you have corals, you need to check calcium, alkalinity and magnesium as well as pH, nitrate and phosphate. If you only have fish, test, pH, nitrate, and phosphate. Always keep up with temperature and salinity. 2) **Do water changes**. They remove bad stuff and replace good stuff. 3) **“Nothing good ever happens fast in saltwater”.** This is a very important statement to remember. Have patience 4) **this is a hobby** so treat it as one. Enjoy it. Learn all you can from many sources (including your own experience) and use it to relax. If it becomes a “job”, it’s no longer a hobby.

Here are a few notes about safety and a saltwater tank. First and foremost—water and electricity **DO NOT** mix—especially saltwater. It is strongly recommended to use GCFI receptacles for your tank. If you do not have them installed, contact a licensed electrician to do it for you. It could save your life. MANY things in saltwater sting, bite, infect or poison. Know what animal you are dealing with and know what precautions go with it. An example are the group of corals known as *Zoanthides*. These beautiful small corals look like little flowers. They come in a vast array of colors and form mats over rocks almost like carpet. They also secrete what is considered one of the most deadly natural toxins found. Aside from these there are trip hazards, slips, muscle pulls, broken glass etc. The point is BE CAREFUL.

A very important thing to remember about saltwater tanks—**COPPER KILLS**. While copper based products are used to treat certain ailments in SW fish, copper or copper-based products can **NEVER** be used in the display tank. Copper is extremely toxic to marine invertebrates, even in very small amounts. This includes all corals, shrimps, crabs, worms, and even the beneficial bacteria on live rock and sand.

**Ich**--Another important topic to read about is Marine Ich, *Cryptocaryon irritans*. Some species seem to be more susceptible to getting Ich or bringing it to a tank. Here is a link from Reef Central that gives a very good overview of Ich and what can be done to combat it. <http://reefcentral.com/forums/showthread.php?t=1985626>

**Quarantine/Hospital** Tank--Many tank owners set up and maintain a separate small (5-10 gallons) tank that they use as a quarantine/hospital tank. This tank is kept at the same water parameters as the main tank using a simple corner filter with floss and carbon (like the old style FW tank filters) an air pump, a heater, a simple light source, and some simple places for the fish to hide. PVC pipefittings make excellent hiding places. When a new fish or coral is bought, they are put in the QT/Hospital tank for up to 8 weeks. This is done so that the new animal can be observed for disease and if need be, treated. Because most fish treatments are copper based, corals should be QT’d separately. Corals generally suffer from parasites that eat the polyps, but generally dipping the coral will rid the piece of any hitchhikers.

**Lighting**—Lighting for a saltwater tank is generally dependent on the kind of tank that is owned. Lights for saltwater are sold by the color of light they give off. This color is known as its “color temperature” which is a Physics principle that states that a solid black object will give off different wavelengths of color the hotter it gets. This color temperature is described in “Kelvin degrees”, or just “Kelvins (K)”. The higher the Kelvin temperature, the bluer the light while the lower the temperature, the whiter the color. An example is the “cool white” fluorescent bulbs sold in stores. They are generally a 6500K bulb. Also sold are bulbs listed as “**ACTINIC**”. These bulbs give off a deep blue and even a purplish color. This color is very close to ultraviolet and is very important to the photosynthetic animals in a tank (i.e. corals and anemones). To further confuse the color issue, actinic bulbs are usually listed by the wavelength of light they give off in nanometers (µm). Almost all actinic bulbs will claim to have a major peak in its color spectrum at 420 µm. This has been found to be the most effective wavelength for photosynthesis.

A fish only tank will use completely different lights when compared to a tank growing only SPS corals. There are basically three styles of lights—Metal halides (MH), fluorescents, and Light Emitting Diodes (LED). Metal halides have long been the standard for growing hard corals. These lights give off tremendous light, but they use a lot of electricity, are costly to buy and operate, and generate a lot of heat. One of the things favored by users of MH lighting is that it gives the tank a “shimmer” effect. This looks like natural light in the tank. Fluorescents come in several styles, T12VHO, T5HO, Power Compact (PC) and a few other odd styles. The most commonly used style now is the T5HO. This is a very small (5/8”) diameter bulbs that gives off a lot of light. The benefits of this style is that because of their small size, more can be used, thus giving off more light. The generate much less heat than MH and use much less electricity. One drawback of fluorescent lighting is the lack of shimmer. The newest type of lighting available are LED’s. These lights take the best of the MH and fluorescents by combining high light output, low heat, very low power usage and many different color temperatures and they give shimmer. The major limiting factor of LED’s is cost. A high end LED light for a large tank can easily cost several thousand dollars.

**Do not skimp on lighting**. Poor lighting will cause corals to grow poorly or not at all, anemones to die and algae to grow. Spend the extra money in the beginning for quality bulbs and lights—you get what you pay for. In addition, bulbs need to be changed every 8-12 months depending on the type (MH, T5 etc) and quality. As bulbs age their spectrum, can/will shift and often results in a reduction in coral growth and increase in algae blooms.

**Protein Skimmers (foam fractionators)**—Protein skimmers, skimmers, are a vital piece of equipment that should be bought regardless of the type of system being set up. Skimmers remove dissolved organic compounds (DOC) that can foul aquarium water and cause many problems from algae blooms to sick fish and corals. Skimmers work by mixing aquarium water with a stream of micro bubbles inside a reaction chamber. DOC’s have an ionic charge to them and when they contact the micro bubbles they stick. The bubbles then move up the reaction chamber and collect in a cup. This cup is occasionally removed and cleaned, thus removing the contaminates from the tank. Skimmers come in several styles, Hang On Back (HOB), usually for smaller tanks, in-sump style, and out-of-sump style. The out-of-sump style is usually found on very large complex systems.

Skimmers are like lights—**do not skimp on the cost**. Buy the best you can afford and buy one slightly bigger than you need. Next to lighting, a skimmer is one of the most important pieces of equipment you will buy and your tanks health depends on it.

**Auto Top Off System (ATO)**—An auto top off system (ATO) is essentially a container in which RO/DI water is stored close to the sump. A very small pump sits in the container and is controlled by switches in the sump. As water evaporates from the system, the level in the sump will decrease. The switches then activate the pump and water is added back to the system, thus keeping the display tank water level and salinity constant. Because water is added in small amounts many times during a day, there are no salinity swings. The great thing about the ATO is that the display tank levels never drops. This keeps the tank quiet and much more appealing. Depending on the system used, an ATO can be very inexpensive and very easy to install.

**Water Chemistry and Testing**—One of the chores of owning a saltwater tank is water testing. Even though this may seem daunting, confusing, and even unnecessary, it is actually one of the most important things that must be done. Here is a link to an article from Reefkeeping Magazine. The article explains various water chemistry parameters and their function in a tank as well as what levels to maintain them. <http://www.reefkeeping.com/issues/2004-05/rhf/index.php>. As stated above, the bare minimum tests to have and use are pH, alkalinity, and nitrate for fish only systems and additionally phosphate, calcium, magnesium for a tank containing corals. API and Salifert are two of the most popular brands and are easy to use. Also, always test your salinity and temperature when performing water tests. Make sure to keep a log of your water tests so you may watch for trends in your tank. An example is calcium. If calcium is measured at 420 parts per million (ppm) for several weeks and then dropped to 350ppm you would have a record and realize that you will need to raise your calcium levels back to normal.

Several things to remember when testing your water: always follow instructions very carefully, take your time while testing so that the most accurate results are obtained, get into a routine, and test the same time the same way (i.e. every Sunday afternoon starting with pH and ending with phosphate.)

**Good luck, enjoy your new hobby, don’t give up and ALWAYS research, learn and ask questions. The only “dumb” question is the one never asked.**