The Fishline

General
Home
Forum
Links
Sponsors
E-Mail Peter Z

Do It Yourself
Projects
Do's and Don'ts

Information
Intro-Quarantine
Feeding
Invert's
Fish Foods
Food Kinds
Disease
Disease Chart
Additives
Anemones
Coral ID
Lamps & Lights
Micro Algae
Reef Notes
Tips & Tricks
Trouble Shooting
They Live Here

Pictures
Fishy Pictures
Member's Reefs
My Reef Tank

Revised March 28 2002

Additives

Calcium [Ca] - Required addition. A range of 400 - 450 ppm Ca++ is recommended. The preferred method is the usage of Kalkwasser [Lime water] for all evaporation make up water. The use of Calcium Chloride (CaC12) is known to cause problems with alkalinity (provable by balancing the relevant chemical reactions occurring in the tank when CaC12 is added). Still, CaC12 is occasionally useful to repair serious Ca++ deficits.

Calcium - The efficacy of chelated calcium products available for the reef aquaria is questionable. To the best of our knowledge, there exists no scientific evidence indicating that chelated calcium is especially available to corals and other CaC03 depositing invertebrates. Nothing is known about the uptake of chelated calcium by corals. And most importantly, there exists no evidence showing that chelated calcium products support stony coral growth rates in excess of, or even comparable to growth rates documented in aquaria where calcium is supplied as aqueous Ca (OH)2 [Kalkwasser].

Chelated calcium products also interfere with the ability to measure actual calcium levels in the aquarium. In particular, chelated calcium cannot be measured by any kit which uses EDTA titration, including the highly recommended HACH kit. Some people find the SeaChem kit, which does measure chelated calcium, to be impossible to read with any accuracy. Until such time as vendors supplying chelated calcium products make available well conceived, carefully documented uptake and growth studies with their products, or the same experiments are performed and published by third parties, regard the use of chelated calcium products in the reef aquarium to be experimental at best especially when Kalkwasser and other non chelated calcium sources are known to support the growth and even reproduction of stony corals in the home reef aquarium.

Iodine [I] - Enhances soft coral growth. It is removed by skimming. The use of potassium IODIDE is preferred over the use of other types.

Strontium [Sr] - Used rapidly by most hard corals (Weekly additions are usually performed.

Buffers - Increase alkalinity and control pH. The desired range is 2.5 - 3.5 meq/L (7 -10 dkh) alkalinity. Alkalinity can be raised by the addition of one of the many commercial buffer compounds. The addition of kalkwasser which is added to maintain calcium levels, will also raise the alkalinity level. SeaChem's Marine Buffer, reef Builder and Kent's Superbuffer dkh are popular. The

Coralife and Thiel buffer products have had less favorable reviews.

Iron [Fe] - Used by algae's. Add this if you want good macro algae growth. Be sure that macro algae growth is favored or else plague levels of hair algae may result.

Copper [Cu] - Used as a medication in fish only tanks. Copper is highly toxic to invertebrates, even in very small concentrations. DO NOT USE THIS, IN ANY FORM, EVER, IN A REEF TANK OR ANY TANK THAT CONTAINS INVERTEBRATES. PERIOD !

Other additives, especially the commercial "secret formula" mixtures are more controversial. Some people report good results from some of them other people report disaster or no effect. Experiment cautiously with them if desired.

Parameters

Alkalinity - Alkalinity is a measure of the acid buffering capacity of a solution. That is, it is a measure of the ability of a solution to resist a decrease in pH when acids are added. Since the acids are normally produced by the biological action of the reef tank contents, alkalinity in closed system has a natural tendency to go down. Additives are used to keep it at a proper level.

Correct alkalinity levels allow hard corals and coralline algae to properly secrete new skeletal material. When alkalinity levels drop, the carbonate ions needed are not available and the process slows or stops.

Alkalinity is measured in one of three units: milliquivalents per liter (meq/l), German degrees of hardness (dKH) or parts per million of calcium carbonate (ppm CaC03). Any of the units may be used but dKH is most commonly used in the aquarium hobby and meq/l is used in literature. The conversion for the three units is:

1 meq/l = 2.8 dKH = 50 ppm CaC03

Alkalinity is often confused with carbonate hardness since both participate in acid neutralization and test kits may express both in either of the three units. However, carbonate hardness is technically a measure of only the carbonate species in equilibrium, whereas alkalinity measures the total acid binding ions present. Which may include sulfates, hydroxides, borate's and others, in addition to carbonates. In natural sea water, carbonates make up 96% of the alkalinity so equating alkalinity with carbonate hardness isn't too far off.

Some recommended test kits for alkalinity are the SeaTest kit and the LaMotte kit. The SeaTest kit is very inexpensive and is one of the few SeaTest kits suitable for reef use. The SeaTest kit measures in divisions of 0.5 meq/l or, if the same amount of solution is doubled, 0.25 meq/l. The SeaTest kit uses

titration in which the acid and indicator are included in the same reagent. The LaMotte kit is a little more expensive, though still fairly cheap, and is more accurate. The unit of titration is 4 ppm CaC03 although in practice, one drop from the titration tube may be up to twice this amount making the resolution about 0.15 meq/l. The LaMotte kit has a separate indicator tablet and acid reagent which is a nice feature.

Calcium - Calcium content is referred to as 'calcium hardness' and is measured either in parts per million of calcium ion (ppm Ca++) or parts per million equivalent calcium carbonate (ppm CaC03). Calcium hardness is often confused with alkalinity and carbonate hardness since the 'ppm CaC03' units can be used for all three. As with alkalinity, a calcium level expressed as X ppm CaC03 does not imply that X ppm of calcium carbonate is present in the tank, it merely states that the sample contains an equivalent amount of calcium as if X ppm CaC03 were added to pure water. The reading also does not tell you how much carbonate is present. Calcium hardness test kits are different from alkalinity kits. Some people have reported difficulties with the LaMotte calcium hardness kit. The Hach 'Total Hardness and Calcium' kit has not had these reports. Both express results in ppm CaC03. The relationship between CaC03 and Ca++ is :

1 ppm CaC03 = 0.4 ppm Ca++

Calcium levels of natural surface sea water are around 420 ppm Ca++ In a running reef tank you will notice, sometimes dramatic, calcium depletion. Calcium addition in some form is essential. A calcium level above 400 ppm is required and a range of 400 - 450 ppm Ca++ is recommended.

PH - The suggested reef tank range is 8.0 to 8.3. The pH should hold it's own unless alkalinity is low. If alkalinity is OK but pH is low there is probably a buildup of organic acids or a serious lack of gas exchange or low water surface area to volume ratio.

Nitrate [NO3] - Two units are used to measure nitrate: nitrate [NO3-] and nitrate nitrogen [NO3-N or N]. The ratio is:

1 ppm NO3-N = 4.4 PPM NO3-.

Nitrates themselves may not be a problem but serve as an easily measured indicator of general water quality. Many hard to test for compounds like dissolved organics tend to have levels that correlate well with nitrate levels in typical tanks. Different authors cite varying upper nitrate values permissible. No higher than 5 ppm NO3- is a good number with less than 0.25 ppm recommended. Unpolluted sea water has nitrate values below detectable levels of test kits, so "unmeasurable" is the goal to strive for.

Most test kits measure nitrate-nitrogen. Do not forget to multiply by 4.4 to get the ionic nitrate reading. LaMotte makes a nitrate test kit that will measure down to 0.25 ppm NO3-N. Hach makes one good to 0.02 ppm N03-N, about

10x more sensitive, but you must be sure to order the saltwater reagents. They will only sell you the saltwater reagents in addition to the regular kit with freshwater reagents, not in place of them, which is annoying. This makes the Hach kit about twice as expensive in the end as the LaMotte kit but the 10x increase in performance makes this more acceptable.

Phosphate [P04] - Phosphates, along with nitrates, are a primary nutrient for algae.Tanks with "high" levels of phosphates tend to be infested with hair algae. All authors cite zero ppm P04 as a good goal.

Specific Gravity - The temperature dependent. See the table for a quick lookup of the recommended hydrometer readings. They are based upon a recommended S.G. of 1.025 at 60 degrees F.

Degrees F.	Hydrometer reading.
50	1.0255
55	1.0252
60	1.0250
65	1.0246
70	1.0240
75	1.0233
80	1.0226
85	1.0218
90	1.0210

1.025 is recommended for reef tanks. Note that virtually all hydrometers are calibrated for measurement at a temperature of 60 F. Included below is a short table of temperature adjustments. Add the value shown to your hydrometer reading to get an accurate reading.

Degrees F.	Correction
50	-0.0005
55	-0.0002
60	0.0000
65	0.0004
70	0.0010
75	0.0017
80	0.0024
85	0.0032
90	0.0040

If the hydrometer reading is at 1.0235 at 80 F, the actual Specific Gravity is 1.0235 + 0.0024 = 1.0259.

If your tank is between 75F and 80F, you should try and keep your S.G. around 1.0230 to 1.0235.

Copyright © Peter Z and The Fishline. All Rights Reserved.
Revised March 12 2002

Top - **Home** - **Forums** - **E-Mail Peter Z**

Copyright © 1997-2002 Peter Z and The Fishline. All Rights Reserved.

Website Design and Development by Jordan Gadd [Portfolio|Services|Contact]