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DecOcean
Aquarium

Water values in the Saltwater Aquarium

A handbook and simple guide to the
chemistry of the saltwater aquarium

A stylized, light blue graphic of a nautilus shell, showing its characteristic spiral pattern, positioned in the bottom right corner of the page.



KH

KH is the carbonate content of water. This is always the most important element to test

Optimal range between 6.5 and 9.5

In nature, KH ranges between 6.5 and 8.5.

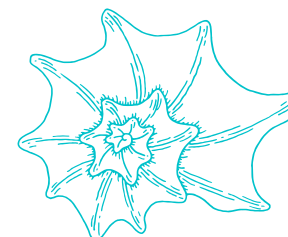
Despite this fact, we at DecOcean recommend that our customers keep their KH between 8 and 9. This is because the upper limit for coral tolerance is as high as 14, while the lower limit is just 5. If an aquarist keeps his KH at a natural 6.5, it won't take much before a fluctuation in the aquarium's chemistry can cause corals to die. If, on the other hand, we keep our KH in the middle of the scale, around 8-9, then we will have good room to maneuver at both ends, if an accident occurs. Regardless of the chosen value, the most important thing is first and foremost always consistency.

CALCIUM

Calcium is the element coral uses to build its skeleton, along with carbonate

Optimal range between 400 and 450

On natural reefs calcium is stable around 420 ppm. At DecOcean, we recommend that aquarists keep their calcium between 400 and 450. Calcium below 380 can be life-threatening for sensitive stony corals. If calcium exceeds 500 ppm it will start to deposit on heaters and in pumps where it can cause damage to the equipment.



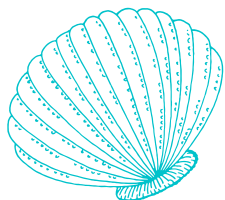


MAGNESIUM

Magnesium prevents calcium and carbonate from depositing as limestone on aquarium glass and equipment. Without magnesium, corals cannot absorb those from the water

Optimal range between 1300 and 1400

Magnesium on natural reefs ranges between 1250 and 1350 ppm. At DecOcean, we recommend that our customers stay between 1300 and 1400 ppm. If magnesium becomes too low, calcium and carbonate will precipitate from the water as sand, thus becoming inaccessible to the corals.



PH

pH is a measurement of water's ability to neutralize acids

Optimal range between 7.8 and 8.4

In nature pH ranges between 8 and 8.4 on coral reefs. PH is a unit of measurement for how acidic the water is. These acids are especially relevant for calcium, which is easily dissolved by even weak acids. A low pH will therefore prevent corals from being able to bind calcium in their skeleton, which is harmful to the coral. A pH below 7.6 is lethal to stony corals. Similarly, a pH above 8.5 will accelerate the amount of calcium that binds to heaters and pumps, and a pH above 8.8 will neutralize the corals' own biological amino acids, resulting in death of the coral.



NITRATE

Nitrate is a harmless and bioavailable source of nitrogen, the most important element in the production of new proteins in all organisms

Should always be kept below 5

Nitrate fluctuates between 0.25 and 5 ppm on most coral reefs. Corals have very varying tolerance to increased levels, based on species and family. Corals adjust their inner balance with their symbiotic algae, zooxanthellae, and other microorganisms, through their access to nitrate. If nitrate becomes too high in the water around the coral, the coral can no longer control its internal "intestinal flora". This leads to many diseases that can quickly kill the coral.

PHOSPHATE

Phosphate is an important building block in the DNA of all organisms, and it is therefore an essential element in the aquarium

Optimal range between 0.03 and 0.08

On natural reefs, phosphate averages 0.05 ppm. Corals and fish do not need more phosphate than they can get through their food. At the same time, other organisms have evolved to be able to use phosphate in large quantities, and especially algae will utilize increased phosphate in the water. In addition, increased phosphate prevents stony corals from binding calcium carbonate to their skeleton, and can therefore not grow optimally under high phosphate concentrations. Delicate stony corals can begin to die at levels above 0.1 ppm. If phosphate drops below 0.015 ppm, the metabolism of the corals will be inhibited.



AMMONIA

Ammonia is a toxic form of nitrogen that is especially toxic to fish. Ammonia in the water is a sign that something in the aquarium is rotting

Should always be kept below 0.01

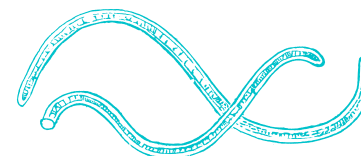
Ammonia is the most energy-rich form of nitrogen, and it is the first form of nitrogen released from the decomposition of organic matter. Likewise, many higher organisms, including fish, excrete ammonia when they digest food. Specialized bacteria are able to break down ammonia into nitrite before it reaches toxic levels. If you measure ammonia in your water, it is a sign of an imbalance in the biological foundation of the aquarium.

NITRITE

Nitrite is the by-product of the metabolism of ammonia-eating bacteria. Nitrite is a less energy-rich form of nitrogen, yet still very toxic

Should always be kept below 0.001

Nitrite is the biological intermediate between toxic ammonia and the non-toxic nitrate. Nitrite is very toxic to corals, and is also broken down by specialized bacteria. If you measure nitrite in your water, it is a sign of an imbalance in the biological foundation of the aquarium. Nitrite is therefore most often associated with a young and "immature" aquarium.





TRACE ELEMENTS

Trace elements are a collective term for all the elements that corals need to perform basic biological functions

Should be tested monthly

Corals, as well as humans, require many minerals and vitamins for optimal health.

In the aquarium it is difficult to give corals a varied diet, but fortunately the corals can absorb the trace elements they need directly from the water. This means that the aquarist must be careful that these trace elements always are available in the water. If one or more trace elements are depleted, the corals in the aquarium can quickly begin to die as a result of mineral or vitamin deficiency.

TRACE ELEMENTS

Trace elements have varying degrees of importance to the health of corals, but a handful are considered absolutely essential. These essential trace elements are: Iodine, Potassium, Lithium, Iron, Boron, Bromine, Strontium, and Molybdenum. Trace elements cannot be tested with normal test kits and therefore a sample of the aquarist's water is sent to a laboratory where it is examined. This type of test is called an ICP test (inductively coupled plasma) and can be purchased from DecOcean.

