

## Calcium Reactors and Small Polyp Stony (SPS) Corals

**How are calcium reactors used and are they necessary for small polyp stony corals?**

*By Jeremy Gosnell*

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Popular variety of SPS coral, Acropora,  
by Oliver Lucanus.

Q. I was wondering what exactly calcium reactors do? Are they needed to keep sensitive reef corals like SPS (small polyp stony) species?

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A. Often, when reef hobbyists look at calcium reactors they assume them to be an overly complicated and unneeded piece of aquarium equipment. The reality is calcium reactors add stability to any reef aquarium, but many of the units available are tough to use. Calcium reactors require a hefty initial investment, but in the long haul they often save money. Many aquarists who don't implement calcium reactors use two part buffer systems or other liquid additives to maintain calcium and alkalinity levels. These liquids don't last long and the constant cost of replacement adds up. As the organisms in your reef aquarium grow they remove alkalinity and calcium from the surrounding water.

A calcium reactor maintains the level of calcium and alkalinity without dynamic fluctuation and keeps it in balance. Where calcification is concerned in reef organisms, the balance of these two variables is very important and they are both interrelated. Using two part buffers or other mixtures to maintain calcium and alkalinity levels often leads to an unbalanced water chemistry, which can become dangerous to sensitive animals like small polyp stony corals.

A calcium reactor in theory is nothing more than a specialized chamber that holds some kind of calcium based substrate. When this media is kept at a normal marine aquarium pH, (8.0 to 8.3) the media stays intact and is insoluble just like your aquarium substrate. When kept in lower pH values the substrate within the calcium reactor begins to dissolve, thus freeing calcium and alkalinity ions allowing them to flow back into the aquarium. In order to keep the pH within the calcium reactor down, a small amount of carbon dioxide is injected into the water circulating within the chamber. A pH of about 6.7 often works best though a lower pH can destroy the substrate within the calcium reactor and a pH that is too high won't dissolve the substrate. As you can see maintaining this pH balance is critical to a reactor's efficiency.

As acidic water is rushed through the calcium reactor several things are taking place. Aquarium water is injected into the reactor while calcium and water high in alkalinity is taken back into the aquarium. This is typically done at the same time so that the calcium reactor itself does not overflow. Often the flow rate is tremendously slow with either a single drip per second or several drips per second being average.

Although a calcium reactor is not needed to keep small polyp stony corals, I have never, on any of my reef aquariums used a calcium reactor, though I have kept a variety of small polyp stony species. While I have never kept aquariums dominated only by small polyp stony corals like many of those featured in "Aquarium of the Month" awards online, I have kept aquariums that had a large amount of small polyp stony corals of various species. I have always implemented two-part liquid buffers, rigorous testing of calcium, alkalinity and other variables as well as other liquid additives.

A calcium reactor (when properly tuned and set up) would make maintaining small polyp stony species easier. Large aquariums dominated by calcium-demanding small polyp stony corals would benefit most from a calcium reactor, though hobbyists will find maintaining their reef aquariums easier with a calcium reactor, once it is properly set up.

The problem with these units is that they can produce highly undesirable results when not used correctly. High calcium values, low calcium values, alkalinity and calcium that is not in sync are minor problems with reactors. High pH swings, problems with carbon dioxide injection and others are major problems with calcium reactors that can lead to loss of saltwater fish and livestock.

I am neither a proponent nor opponent of calcium reactor use. I personally don't view them as necessary in any aquarium except in systems that require high levels of calcium. I do feel that a properly used calcium reactor would make reef management easier and better stabilize your water parameters. As for keeping small polyp stony corals, in my

opinion, nutrient-free water and a proper source of high intensity light are the best starting points for success.