

Information On Concrete Tanks For Aquaponics: (Courtesy of Friendly Aquaponics, Inc.)

Concrete tanks (because of their labor and materials costs) usually cost as much as solid fiberglass tanks do. However, if you have free gravel and labor, they can be really cheap. If you don't, they can often be more expensive than solid fiberglass tanks. Think twice before using concrete structures; they will still be here 1,000 years from now because they are difficult and expensive to remove. If you do use concrete tanks or troughs, make SURE you get them in the right place, and have any plumbing fittings installed in them before you pour or apply the concrete.

CRITICAL!!!You MUST wash the new concrete with an acid and then rinse to neutralize the high pH (alkalinity) of the new concrete, or the alkali will bleed off into the fish water and possibly kill or stunt your fish, or result in a prolonged and difficult system start-up (we have plenty of evidence from students who DIDN'T wash their tanks completely). High pH, or highly basic water, acts on the fish and vegetables exactly the same way that highly ACID water does: it stunts and kills them!

Here's the best way to neutralize your concrete tank: After your concrete has cured (if you don't know what this means, you have no business building concrete tanks anyway) plug the drain in your tank, and apply the acid directly to the concrete using a brush with plastic bristles, wearing rubber gloves, protective face shield, cartridge respirator, high rubber boots, and long-sleeved protective clothing. You need a hose with a squirt handle on it right at the top of the tank so you can hose yourself off and dilute the acid in case you accidentally get some on your clothes or skin! The acid is known as muriatic acid, and is sold in hardware stores and building supply stores; it's just another name for hydrochloric acid! After the acid has set on the concrete for an hour or so, rinse it off, but **DON'T LET IT GO DOWN THE DRAIN!** Leaving the acid and rinse water in the tank, now fill the tank to the top with the water (remember, you plugged your drain first?), and let it sit and soak for a couple of days. The diluted acid in the water will now have a chance to soak into and completely neutralize the highly basic new concrete.

There MAY be an alternative to this involved, caustic, and expensive rinsing process for concrete tanks, and that is to make the concrete out of high-silica sand that neutralizes the pH at or near 7.0 as part of the process of curing. This concrete is used by an organization called ReefBalls (<http://www.reefball.org/concretespecifications.htm>) and is neutral pH because the new reef organisms won't grow on high pH concrete for several years after it's cast and installed. The organisms

grow on the reefballs immediately because the concrete is formulated specifically for neutral pH. We also know of a student in India who had no need to neutralize his concrete; apparently the local sand used was a high silica sand and the resulting concrete was a neutral pH. Try it and email us if it works!

Now drain the tank water off to a location where the acidic water cannot harm animals, plants, or people. When it is empty, rinse the inside of the tank well with a hose, letting this water go down the drain also. An ideal safe place is into an existing cesspool or septic system.

Now, check the pH of the water supply you use to fill your tank, then refill the tank to the top with new water and let sit for two days. After two days, check the tank water pH and compare to the pH reading you took of your water supply two days ago. If the supply water pH was 7.2, and after two days in the tank it is now 8.5 or higher, you need to repeat this process with the acid wash, sit and soak AGAIN because your concrete is still bleeding off alkali (base) into the water. If your tank water pH reads between 6 and 8, you're fine and can start your aquaponics system.

The only exception to this might be when the supply water you started with is VERY basic, i.e. 8.5 or so. In this case, if you had pH 8.5 water, and after two days in the tank it was only 8.6 or 8.7, it's probably OK to start your system. This is an area we don't have a good solution for yet: how do you adjust your system if your pH is high? (See System Startup and Water Quality sections for more information on pH).

Important! If you have trouble getting the pH under control in your concrete tank for some reason, you can do what some of our students have done: either line the tank with a vinyl liner, or smear a thick layer of household paraffin (wax) on the inside of the tank. Both of these methods leave the inside of the tank a neutral surface that is safe for the fish. We've never gotten a concrete tank certified, though. To make sure your ability to get organic certification is not compromised, you should check with your proposed certification agency before committing yourself to concrete tanks.

WARNING! Do NOT try to bring high pH caused by having a poorly neutralized concrete tank in your system down by using citric acid! Citric acid is an organic HERBICIDE, and will kill your plants roots. They all turn black, then the plants all die (courtesy of one of our students whose name we forgot!).