

Some Thoughts on Mixing Alginate

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Recently, there was some discussion on mixing alginate on the Association of Lifecasters International "Forum." I just assumed that since "great minds think alike" or that great minds would have for the most part come up with similar solutions to the same problem. I was wrong. I will come back to that later after I have discussed some thoughts about alginate in general and described a surefire mixing method.

The Basics

Alginate comes to us in powder form which is mixed with water to a consistency similar to pancake batter. The viscosity or "runniness" of the mixture is controlled by the alginate/water ratio. The desired viscosity depends on how we are using the alginate. For example, if we are making a "skin" mold (in which the alginate is spread over the model), the alginate needs to have a higher viscosity than if making a "block" or "pour" mold (in which the part to be cast is either submerged into a container of alginate or the alginate is poured into a container surrounding the part). For best casting results, it is essential that the alginate/water ratio be just right for the particular application. I call this the Goldilocks Principal, too wet and it's too runny, too dry and it's too stiff, somewhere in-between and it's just right.

But the alginate/water ratio also effects several other things. Less alginate or more water slows the setting time of the alginate along with a low viscosity. A far better way to increase the setting time is to use "Algislo" by EnvironMolds or just purchase a slow set alginate. (See "How to Extend the Setting Time of Alginate, Testing a New Product," Sculpture Journal, March 2003, by yours truly. Using less alginate than what is recommended by the manufacture will reduce the strength of the alginate and can make it more like a soft boiled egg than rubber. Too little water or too much alginate will make something that feels like bread dough, too thick to apply or even submerge something into it. Below I will describe just what Goldilocks would have liked.

The temperature of the water is very important. The setting times claimed by the manufacture are for the recommended alginate/water ratio at a water temperature of 80 degrees F. (27 degrees C). 80 degrees sounds pretty warm

but that is about the water temperature of most swimming pools which feels pretty cool when you first get in. If you are tempted to use water cooler than 80 F. to extend the setting time, your model may demand victim pay as additional compensation. Again, using Algislo is a better solution. Warmer than 80 degrees will significantly reduce the setting time and if you are not anticipating it could prevent you from completing the casting.

I have seen this next thing happen only once but have heard of it several other times; the alginate fails to setup. Alginate not kept in an airtight container especially in a humid climate can loose its potency with time. However, a more likely culprit is the water. Iron in water can prevent the gelling process. In my case, the water had come from a well and even a day later, the mixture looked like cottage cheese curds in water. The solution is simple, if you have any reason to question the water, make a small test batch first and if there is a problem, use bottled drinking or distilled water.

Something that I have always found curious is that mixed volume of alginate plus water is no greater than the water was by itself. The reason that that seems strange is that the volume of the alginate is, depending on the alginate, between half and all the volume of the water. In other words, if you needed a gallon by volume of mixed alginate, one might expect the he/she would start with less than a gallon of water and adding the alginate would increase the volume of the water. It doesn't. If you need a gallon of mixed alginate, you need to start with a gallon of water.

I always think of the amount of alginate needed for a particular casting in terms of the volume of the water and not the amount of alginate. Since a pint (volume) of water weighs a pound (weight) as in "a pint's a pound the world around," I calculate what I need to prepare by the number of pints but then talk in pounds. For example, the torso of a normal size female should take about eight pounds of water. My preferred alginate for skin molds is ArtMolds "Fibergel" by EnvironMolds which takes five ounces/pound (312 grams /liter). It makes more sense in my mind to say I'll need eight pounds (1.8 liters) of water, which is constant, than forty ounces (1.3 kilos) of alginate, which could vary considerably with different alginates.

I wish I could simply and absolutely state that the alginate/water ratio is in all cases such and such, period. Not only does it vary depending upon the application, but also by the brand. In addition, individual batches from the same manufacture may ever differ slightly. As a general rule, the ratio will be around 4.5 to 5 ounces of alginate per pound of water (281 -- 312 grams per liter) for a skin mold. For a block mold you can reduce the alginate by 10%, more or less, to make the mixture pore more easily if you want. The alginate that I have used with the least alginate to water ratio is MoldGel by EnvironMolds. It only take 3 ounces per pound (187 grams per liter). If you are comparing the cost of different alginates, the actual cost isn't the price per pound but the price of the amount needed. What looks inexpensive may in fact not be the good deal it first appears. I think that this is the third time that I have mentioned Goldilocks in this article. But here is where the "just right" is really important. If it takes 5 ounces of alginate per pound of water, 5.5 will be too thick, and 4.5 will be too runny.

Often the directions for mixing alginate may state the ratio by volume only. The reason for this is that not everybody has a scale and the manufacturer wants everyone to use the alginate and not just people who own scales. The bad news is that the alginate in power form may not have a uniform density. The weight of the alginate scooped out of the top of a container may weigh something different than what is scooped from the bottom. It probably matters little if you are mixing for a pour mold where Goldylocks isn't as picky. But the alginate water/ratio for a skin mold is more critical. An experienced caster can recognize too runny or too thick and quickly add more water or alginate. The problem is that even slow set alginates gel in six or seven minutes and there isn't a lot of time to waste trying to tweak the mixture. The good news is that you can now purchase very accurate scales for very little money. Harbor Freight has a twelve pound scale accurate to within two grams for about thirty bucks and often on sale for about twenty. Weighing the alginate and water will assure consistency and save time.

The Correct Mixture

Photograph #1 shows a model's torso covered with a "skin" of alginate. Notice that the torso is completely covered with a smooth layer of alginate but it is not dripping or running. The thickness should be from 1/8th to 1/4 inch (0.3 to 0.6 cm.). I suspect that the biggest mistake that I have seen new life casters make is to mix the alginate for a skin mold so that it is too runny. The assumption is that the runnier it is the less bubbles you will get on the surface. But the problem is that it will not stay in place and just runs off the model. If you move the alginate over the model's skin as if "putting icing on a cake," don't just slop it on, you have almost no bubbles on the skin surface, no drips, no runs, no errors.



Photo #2



Photo #1

In photograph #2, she has her hand in a two liter plastic soda bottle full of alginate. The viscosity in this case is far less critical. The alginate/water need only be mixed so that it is thick enough to set up somewhat stronger than a soft boiled egg yet not so thick that you can not pour it into the bottle. It might also seem that the runnier you mix the alginate, the less bubbles you will get on the surface of the skin. But in fact, if the alginate is runny enough for the bubbles to easily rise, they will come up as stick to the skin especially if the surface has a horizontal component. The If you use about 10% less alginate than you would have used for a skin mold, you should be about right.

Making it Simple

If you are still with me, you must be thinking that this is way too complicated! It really isn't and now I am going to make it very simple. I purchase alginates in larger quantities, usually fifty pounds at a time. The first thing I do is make a quick test so I know exactly how to mix the new batch. I put four ounces (114 grams) of 80 degree F. water into a small cup. I measure out the correct amount of alginate as per the manufacturer's recommendations. I set a timer and dump the alginate into the water. I stir with a "giant craft stick" until

smooth and creamy, thirty seconds to a minute. (A “giant craft stick” looks like a tongue depressor but costs about one cent rather than a dollar.) If the thickness doesn’t seem right, I add a little alginate or water until it does at which time I reweigh it. Holding one of my hands vertically, I spread the alginate over the palm and wait for it to gel and note the time. I write the setting time and the mixing ratio on the container such as 7 min., 5 oz./lb. I know the proper ratio and what the setting time will be .

To mix the alginate/water for an actual casting is a piece of cake. I have found it is easier to mix two four pound batches than one eight pound one. My favorite mixing containers are the red one gallon plastic buckets from Ace Hardware which are just the right size and very durable. I take four clean buckets and weigh out four pounds (1.8 liters) of 85 degree F (29 C) water into two of them. The water will cool slightly when the alginate is added. Into the other two I weigh 20 ounces (568 grams) of alginate.

For very small amounts of alginate, i.e. a one pound of water batch, a whisk works just fine. But for more than that, I use an electric drill with a speed range of 0 to at least 2,500 R.P.M. rated for at least seven amps. I would not use cordless drills because they probably don’t have the speed and I don’t want to chance the battery dying in the middle of mixing. Attached to the drill is a 2 1/2 to 3 inch “Jiffy Mixer” or a lower cost paint mixer available at any building supply, paint, or hardware store. To contain any splashing, I put the one gallon bucket into a larger one. I start off at a slow speed until all the powder is wet and then increase to full speed while moving the mixer all around the bucket. The four pound batch should take no more than one minute to become creamy smooth and lump free. If mixing two batches, I have an assistant mix the second one either simultaneously or right after the first, either way works just fine. I always have a spare drill and mixer handy even if I am only planning on using one.

Several times above, I mentioned using “Algislo” to retard the setting time. You do not want to just add it to the water because doing so would change the alginate/water ratio. I normally add an ounce of “Algislo” per pound of water. I scoop out about an ounce of water per pound and then add the same volume back in of “Algislo.”

I would like to tell you that I have never screwed up my measurements and had a batch that obviously wasn’t right. But that would be a lie and I would hate to waste a lie on something so trivial. I always have some water and alginate close by if needed. When you have been mixing alginate for over 20 years as I have, you get so that you can eyeball adjustments pretty well. But I tell the newbies in my workshops that if they even suspect that something isn’t right and can’t figure it out immediately, stop and start over. Even with slow set alginate, one doesn’t have much time to waste and trying to use alginate which is too thick or too thin will probably result in failure. Even if you get the mixture finally correct, you may have lost too much time to get it on the model.

There is an old argument about how to combine a liquid and a powder. Do you mix the liquid into the powder or visa versa. One of my old girlfriends in college, Patty the home ec. major, would have insisted that you always add the powder to the liquid. If you pour the power into the liquid fairly slowly stirring all the while, the liquid will gradually

thicken. But if you try to slowly pour liquid into a powder while stirring, you will just get a big glob until you get enough water in to completely wet the powder. Patty was right. However, if you have the right amount of water and powder, you can just combine them any way you want and start mixing. It really doesn’t make any difference. And very experienced life casters can probably mix alginate in a swimming pool with a toothpick.

What I have described is what I have found to be the easiest way for me to mix alginate which is also the easiest way that I have seen for a newbie to do it as well. Over the years, when I have told attendees to my workshops to just combine and mix from plasters to alginate until it looks right, I have looked up and seen a room full of lost puppy dog eyes. They were so relieved when I gave them some numbers to use. By the way, for myself, I do mix some things like plasters by feel, but I always carefully measure alginate.