Casting Polyester Resin for Pens: A Complete Guide for the Beginner And Maybe a Few Hints For a Pro

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Oh great, another boring article on casting resins. I have read a lot of the articles on this subject, and I thought that I would put my own two cents in, since I do it a slightly different way, and the fine pen stores that I have sold my pens in, like the way my plastics look (hey, a little horn tooting helps what little ego I have) over the commercial plastics.

For those who are tired of using store bought ready made plastics that everyone else has, casting your own resin for turning hand made pens can be as rewarding as turning the pen itself. The possibilities are endless using different colorants and embedments, only limited by your imagination. There are different patterns that can be made, these are my own terms that I have used over the years to describe these patterns, they are: swirl, splotch, crackle, vein, and end of day. There is also ribbon, but the Jay Pickens article on ribbon is excellent so I will not reiterate it here.

Clear polyester resin, can be obtained in most art supply stores locally around the country along with its chemical catalyst, methel ethyl ketone peroxide, or over the internet. The resin is heat activated, either by its catalyst (the prefered method) or by physical heat. An opened container of resin will solidify over time without the catalyst added, so do not let others tell you that it will not. Not all colorants are compatible with the resin, sort of like mixing oil and water, others will mix but will degrade the resin (more on that later on).

Certain things will be needed for safety, but the most important is adequate ventilation. Let”s just face it, this stuff stinks, and if you follow these directions, it will still stink, possibly even more since I do a double cure. Of all the chemicals that I use in the process, acetone is the worst part of it, but you will need it to clean up any messes, spills, hands (even though I use disposable latex gloves, this stuff is live, and it gets everywhere), the vapors will bring you back to the ‘70’s, so if possible, an organic vapor respirator will be a big help. Also, wear a shop apron, if you value your clothes, a pair of safety glasses, if you value your eyes, and disposable latex or nitrile gloves, if you value your skin. Disposable polyethelene sheeting would also stop your workbench from becoming a sticky mess.

Well enough with the premilinary stuff, lets just get into it. First, put everything you will need in front of you on your workbench, this stuff is slow to start but once it gets started sometimes the resin will set before your are finished wasting time finding the stuff you need. Lay out your poly sheeting on your bench, your colorants, your molds, mixing cups and popsicle sticks, measuring devices, shop towels and cleaning parafenailia.

Re-usable molds:

There are two types of molds that the resin will not stick to without the mold release agent; they are polyethelyne (either high density or low density) and silicone. The polyethelyne molds can be the commercial ones from the art stores or tupperware, rubbermaid, or ziploc storage containers from the grocery store. Silcone molds can be the new silcone baking pans from kitchen stores. The problem with all of these molds is that they are not the size that you need to make a brick of plastic to suit your needs for a pen blank, without a lot of waste of costly resin. The solution is to make your own molds. Now you can search the art stores, jewelry supply houses and the internet for RTV molding compounds with very limited success and a big hole in your wallet, but, nah, it isn't that hard, you can do it with stuff around the house.

First, you have to make a positive for the negative mold. Measure out a block of wood, the dimensions can be for a single pen blank, or a brick to cut many blanks, make sure that the surface is smooth, for any imperfections will be telegraphed into your casting. I usually take some iron on veneer and veneer the end grain so that will not show up.

Now you have to apply a bond breaker to you positive, or else your molding compound will stick to your positive, and you will become really ticked, and I get enough bad emails. Simply apply paste wax to the wood block (Johnson's, Butcher's) let dry and the buff. Now place what you want the bottom of the mold facing up, and the top of the mold on top of a piece of polyethelyne sheeting (glass will work, but just don't do it, it's not worth the headaches).

Now for the mystery RTV molding compound, standard acetic acid cure silicone caulk. Yea the stuff you used to seal the bathroom with, the stuff that smells like vinegar. It's cheap, you can get it at any local hardware store, it's non stick, and it's flexible enough for your purpose and yet still rigid enough to hold your chemicals. I personally use the clear, but any color will do, just so long that it is the acetic cure (acid cure, in the caulking biz) and not neutral cure. Neutral cure silicone caulk is too flexible and your mold will fail, the weight of the resin will cause the sides of the mold to bow.

Acid cure silicone caulk, is what is called a moisture curing caulk, which will be a big help a little later on. First turn the exhaust fans on in your shop, because you'll swear that you are in one big salad bowl, and it can get overwhelming. Make sure you have enough tubes of caulk on hand, although you can add onto

previously cured caulk, why prolong the smell. To make an adequate mold of a ¾" x 5" x 6" block of wood, you will need 4 tubes of caulk. Start by squeaking out beads of caulk on the top of the wood block (which is actually going to be your bottom), and then all the sides, onto the sheet of polyethelyne. Take a disposable plastic picnic knife; dip it into soapy water (a couple of tablespoons of dishwashing liquid in a large container of water, and save it for later) and start smearing the beads of caulk as if you are icing a cake.

This next part is optional, I do not know if it helps or hinders, but what the hell, I do it anyway. Take either some cheesecloth, or wire form (a fine wire mesh that you can purchase in art stores) and embed it into the uncured caulk, not to deep, and use your plastic knife to get full coverage. If the knife gets too messy, throw it out and use a fresh plastic knife. Now, the moisture curing aspect comes into play, spray with a fine mist of water, this will start to accelerate the cure. While that starts, take some more caulk and squeak it into the large container of soapy water, and with gloved hands, start playing patty cake with the caulk under the water. This will start curing the caulk and when it is a squishy consistancy, take it out and lightly press it onto the block of wood that you have previously coated. You might have some pockets of water in your silicone patty cake, but that is all right, just so long as you follow these directions. Do not do the patty cake directly onto your wood block, or else you will end up with pockets which will end up as imperfections on your casting.

What you want to end up with, is a mold that has approximately ¾" to 1" thick walls that is square and flush its entire thickness. Do not try to put fancy lips or tapers on the mold, to quote my kids, been there, did that, and now I am writing about it. While the caulk is still pliable, put another piece of polyethelyne sheeting on top of the caulked up mold, and run a level across it in all directions to try to get the thing as level as possible. Now after all that is done, your head is spinning, you have this sudden urge to eat a salad, go have one and let that stuff sit for a day or two. When you come back, peel off the polyethelyne sheeting from both sides, slowly peel the silicone off the sides of the wood block, then pull the whole thing out (it will make a peeling sound). It might not look pretty, but it will get the job done time after time, with a minor maintenance cleaning of acetone.

Fill the mold up with water, then pour it into a measuring container (in ounces), then with a black sharpie, mark the bottom of the mold you just made with the number of fluid ounces it will hold, and whala, you are done making your mold. Now to get to the really fun stuff, acting like a mad scientist in a laboratory.

<u>Measuring:</u>

When I make bricks, I am usally making several at one time, and usually have a minimum of two colors and a maximum of six, after that, it just gets almost impossible to handle the stuff before it gets unruly. That is how I accidentally came into the splotch pattern, well anyhow, so get everything measured out

beforehand. First, use the cheap clear styrene drinking cups (i use the 10 oz. ones) from the grocery store or Costco (four times the amount for a fraction of the cost). Afterall, this is overhead that is a one time use item you will throw away, do not go for the expensive measuring cups from an art store, unless you like to throw away money, in that case, throw it this way.

Now, since I am using anywhere from four to twelve cups at one time, I could … measure out so many ounces of water in each cup, take my little black sharpie and mark the top of where the water is, pour out the water, dry the cups and pour the resin into the cups. Been there, did that, took pictures, and got the tee shirt. (my kids and their sayings!) Or …

Make a master measuring cup (not to be used with resin) of the current disposable cup you are using at the time. Pour ½ ounce of water in the cup, mark it with a sharpie, then keep adding ½ ounces of water to the cup, marking it each time with a sharpie until you get to get 6 ½ ounces in a 10 ounce cup (you can do more, but you will not have any room in the cup for mixing the resin). Now how are you going to get that mark from the master cup to the acutal cup you are going to use to measure and mix the resin? Why make yourself a marking gauge silly!

To make a simplistic marking gauge that will work, you will need a scrap piece of a ¾" dowel rod, 10"-12" long, and a scrap piece of flat wood ¾" thick, 2 ½"- 3" wide, and 4"-6" long, and 2 thumb screws, the diameter and length of your choice within reason. First the dowel measure the diameter of the ferrule of a sharpie, then drill a hole of that diameter at one end of the dowel, leaving ½" clearance from the end. On the end grain, in the center of the dowel, drill a hole, slightly less than the diameter of the thumb screw diameter, all the way through to the hole for the sharpie. Screw the thumb screw into the hole, letting the threads cut into the wood. This acts as a set screw for the sharpie and you are done with the dowel. Now for the piece of flat wood, on the side that is 2 1'2"- 3" measure out the middle and 7/8" from the edge, drill a ¾" diameter hole, drill a set screw hole perpendicular to that hole, like you did on the dowel,

Screw in your screw, slide the dowel through the hole, slide your sharpie through its hole, tighten the screws, and as Emeril Lagasse says…bamm, you have a marking gauge.

Now all you have to do, is take your newly made marking gauge, loosen up the screw that controls the dowel, take the master mixing cup move your dowel to the corresponding mark that you want to transfer, tighten the dowel screw, put your blank mixing cup in place of the master cup on the marking gauge platform, and make your mark (hopefully a straight line) on as many cups as you like. No drying out cups and no lint to contaminate the resin from drying out the cups. The next thing to do is to pour the resin to the line. It's okay if you go a little over the line, afterall, its just like stop signs and red lights, they are only guideline and suggestions anyway.

Coloring:

First things first, everything you can put into clear casting resin to color it, will degrade it to some extent or another and affect its cure, no matter what. The trick is, to put the right amount of whatever into the mix to get the job done and to degrade it as little as possible. That being said, it's time to color.

Any commercial liquid coloring agent made for the resin specifically or for epoxies will work. They have transparent and opaque and they even have pearlescent additives. The colors are quite limited and sometimes wishy washy, and yes you can mix yellow and blue to make green, and to make it pearlescent, well there isn't enough mica flake in it to make it look somewhat descent. Mind you, they are good to start off with, but after a while you want to do something more. And metallics, just forget about it, unless you use an embedment like metallic foils, but I have had them flake off while turning the pen leaving gapping holes to fill. They are a bondbreaker floating in the resin.

Unless … you expand into the fasinating world of dry pigments. There is a whole 'nother world out there my boy, the range of colors, the types of pearlescents, metallics, color changing, and even the ketchy glow in the dark. There is just one teeny weeny small problem. Ask any baker what happens when you just dump flour into water, it clumps. Well the same thing happens when you dump dry pigments into the clear resin, and no amount of stirring will get rid of it entirely. After the resin has set and cured, the large clumps, when you hit them while turning, will be like a geode, the hard outside of the clump will cut and leave the exposed dry pigment that was not hardened, and when spinning will go in a puff of colored dust, leaving a void in your partially finished blank. The small clump will be hard as it was saturated with resin, but will look like what it is, a small darker shade clump in a field of color. It will look coarse and inconsistant instead of smooth and consistant color.

Trying to mix the dry pigment with a small amount of resin theoretically should work, but in reality does not. The resin is just too thick to fully suspend the pigment. I tried many chemicals but everything I tried resulted in either a full or partial failure. After many of phone calls over a six month time frame, I came across one chemical that is liquid enough to suspend the pigment and not degrade the resin to the point that it was unusable. It's acronym is dpm, which stands for dipropylene glycol mono-methyl ether (boy, that was a mouthful). It should be available from some local chemical houses, and a gallon should cost between $15 and $20 and should last for the rest of your life. So there is my little secret, out for everyone to use, if you like. Now, on how to use it.

We all have our little formulas, I will tell you mine, but experiment to find out what suits to you and your techniques. All dry pigments react differently depending on what they are, natural earth pigments, metal pigments (not to be confused with metallic pigments), metallic pigments (not to be confused with metal pigments), and synthetic pigments. They absorb dpm differently, they mix differently, but

when done properly, they all end up the same way, smooth and in the resin. For every ounce of resin, I use ¼ teaspoon of dry pigment, mixed in a 30ml/1oz glass shot glass, with a small artist pallet knife as a mixing stick. All of these are re-usable, and must be cleaned after every use, since any residual coloring left from a previous use will ruin whatever color you are working on now.

Do not, and I stress, do not re use any of these items in the kitchen once they are used for this purpose, some of the colors are poisonous, and you should also use a dust mask when using these colors when dry. Well enough with the scary stuff, put your ¼ teaspoon of dry pigment in your shot glass and with a dropper squeeze bottle (purchased in container stores) put five drops of dpm in to start, you will probably need more, but it is easier to add more than not. Stir and smush (is that a word?) with your pallet knife, adding more dpm (you will end up between 10-20 drops on average) until you get a loose paste. That is it, sounds like a lot, but in reality it goes pretty fast. If you end up with a liquid instead of a loose paste, you will still be all right but the resin will end up looser, more liquid, and less desirable, and it will take a longer time to cure, with the cured surface remaining more tacky, which is not a good thing.

The only thing left to do now, is to dump the loose paste pigment into the resin, pretty simple huh? Yea, it is, just use your pallet knife to scrape the sides of the glass shot glass and get as much pigment out of the glass with the knife and tap it into the resin. After all, some of these pigments can cost $25 an ounce (metal blues and greens) and in the world of dry pigments, that's expensive. Do not put your pallet knife in the resin to get the pigment off and stir; they are too expensive to throw away. Also, do not get the plastic pallet knives, it will not last long at all.

Mixing:

First off, the cups being used are made of styrene plastic, not polyester, they are not compatible. Liquid resin cannot be left in styrene cups for any extended length of time, after a couple of hours, the cup will start to desinegrate, and then you will have one hell of a mess to clean up.

So now you have this lump of color paste sitting on the bottom of your cup of clear liquid resin. Got your disposable gloves on? You're going to need them. It is very rare not to pour and not get something on your hands, also the catalyst, MEKP, if left on the skin for anything more than a minute will burn, and its not too comfortable. Do you have your disposable mixing device (a popsicle stick, I am from DC and speak fluent governmenteeze), which one? Get rid of the standard stick and use a jumbo popsicle stick from an arts and crafts store, it has more surface area and will not create as many air bubbles as the standard stick. The trick to mixing is to create as few air bubbles as possible. Quick movements, twisting the stick as you mix will create air bubbles, which will create a void in your pen blank. Start stirring slowly, scrapping the bottom with the paste in an

upwards motion, in other words using cooking terms, fold the mixture, scraping the sides of the cup, until the color is smooth and uniform.

If you are doing multiple colors, mix all the colors in their appropriate cups before you add any catalyst to any of them. If you add catalyst to a mixed color and then start mixing another color, then adding catalyst to that one, your first color will start to gel first, and you might not get the results you want (unless you are going to make a splotch, then that is the desired effect).

All the colors are mixed, it is time for the catalyst, like Brylcream, a little dab will do ya (what the hell is Brylcream, I am showing my age, if you don't know, ask your father or grandfather). The basic rule of thumb for a thick mold (i.e. ½" and up) is five drops of catalyst per ounce of resin, for a normal cure, more for a faster cure and less for a slower cure. Thin layers require more than normal catalyst since the volume of resin is not there to generate the heat needed to cure. If you are using ½ ounces, the five drop rule still applies, just round up to the nearest fifth. So do your multiplication (see kids, you do use math in everyday life), and put your drops of catalyst in the mix and start to fold the mixture, scrapping the sides of the cup, slowly, not inducing any air bubbles, until thoroughly mixed. Its time to pour.

Pouring:

This is the fun part, but it must be done in a timely manner, or else the desired effects that you want may not come out the way you want them. This is where you can do, for lack of a better word, patterns. You can just pour the colors in, all at one time, having major pools of color in areas. Or you can do that plus take a toothpick and swirl the colors together to produce a marble cake effect. You can wait until the resin has a slight gel and then do the toothpick thing. But before you do that, make sure that your molds are level on a level surface, or else you will get creep to one side of the mold as it solidifies. Also some colors are heavier than others and will sink to the bottom while the resin is still liquid. To compensate for that, bring them up from the bottom with a toothpick.

One small piece of advice, write your formulas down as you make them up. Trying to recreate the exact composition of a favorite color combination formula a year later is a damn hard thing to do. If it's a keeper, great, you'll have it to make again. If it's a failure, still keep it to remind you not to try it again. And save your scraps, good or bad, save them, you can use them, I'll explain later.

Swirl

This consists of two colors or more, although after six colors, it can be difficult to handle. The colors can be of equal proportions, or unequal, it all depends on what you want to do. This is one of the easiest to pour, and one of the most popular in sales.

The process is simple, drizzle your colors, one at a time, in your mold. Zig zags, lines, circular, random, fine lines using your mixing stick, medium or thick directly pouring from the cup. Keep on doing this until your mold is filled up, and if you've done your mathmatics correctly (yes kids, a real life test), you will not have any resin left (kids you fail if you have any left, and you are really screwed if you don't have enough). The physical act of pouring will relieve some of the air bubbles, if you have them. You may want to use the toothpick for an additional effect, you may not, the choice is up to you. You are done, leave it untouched for a few hours for its initial cure.

Splotch

This one is all about timing. In it's final effect, you have a base color, with irregular patches or splotches of a different color or two in a random pattern. Two to three different colors can be used, although I have done it with more, it is difficult to handle (you'll swear and cuss like a sailor, but you'll keep coming back). The ratios amongst the colors can be equal, more base to accent, again the choice is up to you (you're the artist painting your canvas, you figure it out).

To do it, here's how. Your colors are all mixed up, catalyze your accent color(s) first. But instead of using the 5 drop rule, double it, use 10 drops of catalyst per ounce of resin. Put that to the side and work on your base color, do the multiplication for the five drop rule, then cut it in half, you want a slower cure for the base. Intermission, take a drink, have a smoke, do whatever for a minute or two, you are waiting for the accent color(s) to start to solidify. Whoops, times up, back to work, it's time to work fast, pour aproximately ½ of your base color in the mold, your accent color(s) are now a sticky, gooey mess in a cup and you're starting to panic. With the help of your stirring stick, guide plops, bloops, however you want to describe them randomly into the mold, use the side of the cup and the stick to scrape them off (bet you wish you had those gloves on now). You should have about ½ of your accent color(s) left in the cup. Our the balance of the base color in the mold. Now it's time to start panicing, because your accent color(s) are hardening as we speak. Keep ploping the accent color(s) splotches in the base, if they get to hard to handle, cut them with the side of the stick inside the cup and plop them out.you have to do this in a hurry, because the mold is starting to set. This is because the heat generated by the accent color(s) is setting off a chain reaction in the slower setting base color. Anyway, you are pretty much done with that, leave it off to the side to fully cure. The top of the brick will not be smooth, it will pretty much look like a small mountain range, that's the way it is supposed to look.

Vein

This can be used in conjuction with swirl, splotch, crackel, or pretty much any other effect that you can come up with. All you have to do is mix up ½ ounce of resin, with ¼ teaspoon of pigment and dpm. Do not put any catalyst in. Then while you are layering whatever pattern you are working on, take your mixing

stick and drizzle a couple of thin random lines of the vein color in the mix. Don't worry about it not being catalyzed; the residual heat from the resin around it will cure it. That's about it for that one.

Crackle

This is a time consuming process, and some prep time is required. It consist of a base color, and one to three accent colors, and can take days to make. The effect that it makes is jagged blocks of accent color in a matrix of the base color. I very rarely make crackle now, even though I like it, John Q. Public doesn't seem to, and it does not sell as much as the other patterns. I am putting it in here just in case some adventurous soul wants to try it.

Well here it is. Start out with what is going to be your accent color(s) and make a brick, it does not have to be a full brick, ½ to ¾ of your molds thickness will be sufficient. Make two of them, and let them fully cure. Now for the physical part, got strong arms? You have to break up the bricks, not cut them with a saw (that's a whole different effect). Make sure you have safety glasses on, and on a solid surface, take a cold chisel and a sledge hammer (no, I am not kidding, this stuff is strong when cured in a brick form) and start pounding the crap out of it. The whole idea is to break the bricks apart into jagged chunks, no larger than approximately 3/8" big, and no smaller than, say, ¼". I have found that after you break the brick up into large chunks, end nipping pliers can help, take the edge of the nippers and nip the edge of a large chunk, which will break it up into smaller chunks. This is very time consuming, I have tried different things to do it, even a coffee grinder, but it does not give the desired effect. With this, it is better to have more chunks than not enough; any leftovers can go into that bag of scraps I told ou to collect in the beginning.

Whew, you finally finished breaking apart those *&%@^#! bricks, what are you going to do with it now. Fill your mold with those chunks, as tight and compact as you can. Now mix up your base/matrix color and catalyze with a slow cure, you will need the extra time. Pour the base color in the mold covering the chunks all over, letting the resin seep in. This is where a vibrating table comes in real handy (doesn't every shop have one? I'll discuss this later). Place the mold, with the liquid resin and chunks, on the vibrating table, this does two things, it compacts the chunks tighter, and it releases the air bubbles that are trapped. Vibrate for five to ten minutes, you will find that you have to add more chunks, keep on vibrating, adding more chunks if needed, this should be for a total of about 15 minutes. Now take it off the vibrating table and you can either let it finish curing (hoping you got all the air bubbles out) or put it in a vacuum chamber (ok, smarta*s, who has a vacuum chamber, you ask, again, be patient, I'll tell 'ya later) and suck the air out, then let it cure. That was a royal pain in the a*s, but you are done.

End of day

At this time, you have this big bag of scrap cured resin, leftovers from pours, cutoffs from blanks, failed pours, etc., etc., etc., a mis-mosh of colors. What are you going to do with all this crap? It's not heavy enough to anchor anyone in the nearest lake, and it looks like it will serve no useful purpose. Ah but it will, and you have absolutely nothing to do, so make an end of day mold. All it is, is basically crackle, as mentioned above, but with smaller chips. Use your chisel and hammer, end nippers, coffee grinder, anything you can think of to get the job done. Use clear resin as your base (it's a low cost brick, and sometimes a high dollar sale) and follow the directions for crackle above. That is end of day.

Ribbon

All I can say about this is, read Jay Pickens' article, it is excellent, and he even has pictures (he had a bigger budget). The only thing I can add, is if your ribbons do get too hard to flex in your mold, a heat gun will make them temporarily flexible again.

These are not the end all to end all formulas, there are more, only your experimentation and imagination can find them. So don't be afraid to try something new, it might fail and go into the scrap bag (I have a very large bag) or it might be the greatest thing since sliced bread and you can't make enough of it (i had that with a cobalt blue and metallic gold splotch, I got so tired of making it, I do not make it anymore). Anyway, have fun with it.

Heating and additional curing:

Hopefully by now, after what started as a little 2 to 3 page article and now turning into a major compendium (I'm seeking a publisher, anyone know one?), you now know that the resin is cured by heat generated by a chemical catalyst, kind of like those new fangled hand warmers. The chemical cure can be assisted by physical heat, the simple act of placing a work lamp with a 100 watt light bulb close to the top of the mold with speed up the curing process, but it will not take the place of the chemical cure.

You can cure the resin, without the catalyst, with physical heat. Heat sources can be 500 watt halogen lights (i used two), a toaster oven, the kitchen oven (although, I think your spouse might have a few objections on that one) and if your lucky enough, a kiln. It will take longer than if you used the catalyst, and unlike baking a cake, it will stink to high heaven, and linger there to boot. I am just mentioning this for informative purposes, since it takes longer to cure than normal, stinks up the place, and will ruin any appliance that you will do it in. But you never know when you run out of catalyst.

Additional curing

There is a purpose for using physical heat in the curing of casting resin. Although I am incapable of scientific proof, I stumbled across this, like some of 3m's products, by accident. I had a poorly cured brick of resin, which was just too tacky to work with, so I threw it in my kiln and baked it. The result that came out was a hard brick, in fact, harder than a normally cured brick, it felt different, and it sounded different when I tapped a tool against it. So what would anybody do with something like that? I tried to break it up. This was a brick that was about 1" thick, like all my bricks at that time, well to make a long story short, I gave up trying to break it with a chisel and sledge hammer (I did finally break it, later). I believe that this process not only hardens the plastic, but also tempers it. It also allows the blank to be turned at high speeds, which also assists in a high polish. As I said, it is not scientifically proven, but it works for me, so here it is for anyone to use.

First off, be lucky enough to own a kiln. Load your bricks in disposable aluminium baking pans, stacking them one on top of each other, making sure you have clearance at the top of the kiln (a hot spot). Make sure you cover the top brick with another pan, or you will have problems with that brick. Put your stack of bricks (in their pans) in a cold kiln, and set your kiln to 450 to 500 degrees. Do not go over 500 degrees, 475 degrees is just about right, and leave it on for one hour. After the one hour has passed, turn off the kiln, and leave the bricks in the kiln, come back 12-24 hours later and remove the cooled down bricks. Take them to the band saw and cut them up to your normal blanks, and you are done. If by chance, you forgot to cover the top brick, and have heat cracks, there is a way to repair them, email me, and I will explain it to you. Oh, and by the way, this process still stinks, and I guarantee that your spouse will say something to you, but hey, she gets a nice pen out of it.

You say tomayto, they say tomahto, and I say cumquats-tips:

Just a few tips that may or may not help.

Voids are going to happen, no matter how much you try to get rid of the air bubbles; you might run across one or two that will ruin your blank. But there is a way to repair them, while they are motionless on your lathe. If it is a pinpoint size void, mix up some five minute epoxy, you don't even have to color it, use the toothpick that you used to mix it with and with the point work it into the void. Let it fully cure, or else when you put your tool to it, it will just rip out and you have to start all over again. Larger voids, you basically do the same thing, but you must color it to match the area it's in, or it will just look funny and like a repair, then it will be a give-a-way pen instead of a sale. You can even try a fast cure resin patch to match, but it will take longer to set up than the epoxy, and your lathe will be dead for that amount of time.

Machine lathes are a wonderful thing, a little more complicated than a wood lathe, a little more expensive, a whole ‘nother set of tools, but still a wonderful thing. Commercial bushings can be trued up (in production, they to become worn, out of round, and they won’t match with components of the kits), and you can even make your own bushings, for your own designs. (whoops, this had nothing to do with casting resins, but I thought I would throw this in anyway, just a random thought, sorry).

Air bubbles and how to get rid of them:

The casting resin is a thixotropic material (big college word for thick as molassas), if a bubble is there, it will rise to the top … eventually. Unfortunately, the stuff will cure before that happens. Now comes the great debate on how to get rid of them before the stuff locks them in forever. There are four schools of thought on the subject: virbrating, vacuum, pressure, and prayer (2 v’s and 2 p’s, oh well, I thought it was funny, by saying prayer, I meant do nothing, and pray what little air bubbles will rise to the top).

For this, I performed a little experiment in my little lab. I took five (yea, five, but there are only four things listed above, just read on) small four ounce molds, and for each. I poured three ounces of clear resin in a mixing cup. I then whipped up the resin, by hand, so that there were enough air bubbles in it to make it opaque, put in 15 drops of catalyst, then whipped it up some more and poured it into their molds (each the same size). The room was a chilly 69 air conditioned degrees, and each sample was allowed one hour of time to gel in what ever aparatus the condition of that test was.

The equipment used in this experiment was: for prayer (nothing), my workbench; vibrating, a piece of plywood, some blocks of wood hot glued on the plywood, 2 each, battery opereated vibrators that I made from stuff at Radio Shack, and the bottom of a rubbermaid cake plate (a flat table surface): vacuum #1, a vacuum chamber made from a rubbermaid cake plate, weatherstripping, clear vinyl hose, some hose fittings, and as a source for a vacuum, my shop vac (every shop has a shop vac of some kind); vacuum #2, the same vacuum chamber from vacuum #1, an air compressor (a lot of shops have them, but not everyone), and for lack of a better word, an vacuum inverter (takes the air from your air compressor hose and converts it to a vacuum, Harbor Freight, $10.00 on sale); and pressure, an air compressor, and the infamous pressure pot (2 ½ gal. Paint pressure pot, Harbor Freight $80.00, gee I love that store), 3/8” brass end cap, and ¼” brass gas valve (fittings to stop and control air from escaping the pot).

Prayer (nothing) - resin just poured into the mold and left on the bench to harden. As I have stated earlier, the physical act of pouring breaks apart some air bubbles. The finished sample had obvious bubbled on the top with some bubbles on the sides and some micro bubbles in the field.

Vibrating – resin poured in the mold, and then placed on top of the vibrating table, then vibrators turned on. Some bubbles on the bottom, sides and the center of the top, a few micro bubbles in the field.

Vacuum #1 – no large bubbles, micro bubbles on the sides and top edges, with some micro bubbles in the field.

Vacuum #2 – a couple of large bubbles on the top, and micro bubbles throughout.

Pressure – after resin was pour, placed in pressure pot at 50psi. Some micro bubbles on sides and top edges, very few micro bubbles in the field.

After all is said and done the ranking for clarity, from best to worst is: pressure, vibrating, vacuum #1, nothing, and vacuum #2. Mind you, that this test was done with thousands of air bubbles induced into the resin, a scenario that should not occur when mixing normally. Doing nothing will probably be alright doing your typical mix, but for the utmost clarity when doing transparents, the pressure pot is you best bet. But if you do not want to go through the expense of that, or the hassle of building a vibrating table, everyone who has a lathe, probably has a shop vac, and can build an inexpensive vacuum chamber.

This is not the end all to end all guides to casting polyester resins for the purpose of making pens. This is just a compilation of some of my expierences of casting this stuff over the years I have been doing it. Polyester resin, is relatively inexpensive, as compared with other resins, and safer to make than some (i tried making Lexan, with some limited results, but it is too dangerous and better left to the professionals). I tried to be as entertaining as I could be while writing about a boring subject, and if my writing style has offended anyone, I do offer my apologies. Please feel free to email me your comments or questions at penmaker56@yahoo.com (whether I respond to them, well that's a whole 'nother question). I hope this will help the beginner, and maybe there might have been just a little tid bit of info for a pro. Thank you for your time. – r.l.g.

Next: casein, cheese in a pen,
Or a pen made of cheese.