Rings – In & Out

By: Thomas J. Tessier

Equipment Used:

1. 10-15 gms of metal clay – I'm using Art Clay Silver 950 (Sterling Silver). Any brand will work.
2. Small amount of Paste Type (you'll need to make)
3. #2 flat artist brush
4. #2 round artist brush
5. Non-stick work surface – Teflon, Tuff Card, Ceramic Tile, or other
6. Roller frames, plastic slates, or playing cards
7. Clay roller of your choice
8. Clay pick for cutting clay
9. Clay cutter
10. Hobby knife
11. Pair of small scissors
12. Ultra Fine Sharpie marker
13. 400-600 grit wet/dry sandpaper
14. Course/Fine sanding sticks
15. Tweezers
16. Heat source to dry clay – food dehydrator, electric grill, or air dry dryer
17. Heat source to sinter the clay – programable kiln
18. Means to burnish project – magnetic burnisher, burnishing tumbler, etc.
19. Ring sizer rings
20. Ring stick
21. Ring Mandrels – Wood or Metal
22. Ring stretcher/reducer

Part I – Fabrication

The purpose of this article is to discuss the fabrication of rings and how to resize them. Two specific rings will be used as examples to illustrate the concepts described. A simple flat band and a textured band with an attached embellishment (figure 1).

Figure 1

I will be using Art Clay Silver 950 to make these rings. Fine silver can be used, but sterling is preferable. Sterling silver is a harder material. It doesn't scratch as easily as fine silver and it can be stretched and compressed easier than fine silver.

Making a ring is relatively easy. The challenge is dealing with the clay shrinkage so the finished ring will be the right size after firing. In this article I will also discuss a technique I developed while researching the properties of metal clay that is ideal for rings.

Working with rings requires some special tools. Like making anything, the right tools make life a lot easier. You can go on the cheap and use alternative ways of making a ring, but for simplicity and the time saved, it's worth getting the right equipment.

Before going any further make up some sterling silver paste. Simply take a pea sized piece of silver clay and combine it with a little water using an eye dropper. Use your small spatula to mix the clay and water together in a small airtight container to a heavy paste consistency (figure 2).

Figure 2

First, you'll need to determine the size of the ring needed. For this article, I will be using United States sizing rings. That is most easily done with a set of ring sizers (figures 3 & 4). Figure 3 is a typical set of 4 & 6 mm ring sizers. Figure 4 is a comfort set, including a ring stick (ring mandrel with the sizes marked on the mandrel).

Figure 3

Figure 4

The ring sizers come in a variety of widths, but all come in a set of sizes. Typical sets have rings from size 1 to 15, including the half sizes. Larger ring sets are available for larger sizes. In the United States, Canada, and Mexico we use numbers to describe the size. These numbers are mathematically related to the diameter and inner circumference of the ring. You can get the mathematical formulas and complete sizing charts on numerous websites (e.g. https://en.wikipedia.org/wiki/Ring_size) In other countries they use different systems. Some use letters of the alphabet and/or a different numbering system.

First find a ring sizer that comfortably fits the finger (or toe) that you are making the ring for. Use the set of sizers that have a width similar to the ring you are going to make (figure 5).

Figure 5

A common ring width is 4mm. If you are going to make a wider ring, then maybe use a 6mm width sizer. So called comfort fit ring sizers are usually 5mm in width. Comfort rings have a cross section of the shank that is an oval shape. This makes putting the ring on & off easier and usually is more comfortable to wear than rings with square or rectangular cross sections.

Once you determine the finished ring size needed you can start making the ring. The next tool you need is a ring mandrel. Ring mandrels made for silver clay come in sets, in either wood or aluminum (figure 6). The numbers on the wooden mandrels are actually sized 1-1/2 to 2 sizes larger. For example, a wooden mandrel marked size 7, is really around an 8-1/2 to 9. This is to account for the clay shrinkage. The metal mandrels are marked with the actual ring size of mandrel. For example, a metal mandrel marked 7, is actually size 7. If you are going to use a metal mandrel, then you need to use a mandrel that is a couple of sizes larger than the ring you want. In this case, if you want a finished ring size 7, then use a size 9 mandrel.

Figure 6

Once you decide which size mandrel to use, then you'll need to prepare a surface for the clay to rest upon. I like using half of a 3 X 3 Post-it. Just take a Post-it and cut it in half, straight up and down, such that you end up with two halves that have a sticky end. Wrap the Post-it around the mandrel starting with the non-sticky end, but have the sticky end facing the mandrel. At the end of the wrap the sticky side will stick to the Post-it. Burnish the end with your thumb nail to help it attach (figures 7 & 8).

Figure 7

Figure 8

Make sure the non-cut edge of the Post-it is in perfect alignment with itself. This will ensure that the Post-it is laying flat, and you have a perfectly straight edge to line your ring up with. An alternative way would be use a paper strip. Maybe a piece cut from a piece of copier paper. Wrap it around the mandrel until about a ¼ inch is laying over itself. Cut the paper and scotch tape it down. Just make sure you're not taping the paper to the mandrel. You should be able to turn the paper on the mandrel. You need to be able to pull the paper and clay off in one piece after it has partially dried in the dehydrator.

Now you are ready to roll out your first band. First determine the length needed. You can simply look at your ring conversion chart or take an actual measurement of the circumference with a cloth measuring tape (figure 9).

Figure 9

Here we can see the approximate circumference is 70 mm. We'll want to add another 20+ mm so that we can overlap the ends on the mandrel. I'm going to make the band approximately 5mm wide, so I'll cut the clay around 7 mm to account for the shrinkage and loss from sanding the sides of the shank flat.

Rolling out the band is simple with the proper tools. I'm arbitrarily picking a rolling spacer of 1.25 mm (5 cards) for my first band thickness. I'm using a rolling frame from Cool Tools (www.cooltools.us). Notice that I rolled a log of clay with my fingers, then use a snake roller to make it uniformly round. On this first ring I'm rolling out the clay on a texture plate. Note that I have a metal metric ruler nearby. I use that to verify the rolled clay is long enough and wide enough to make this band (figure 10 & 11).

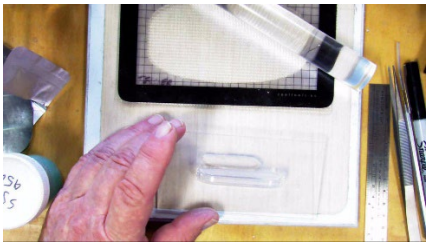

Figure 10

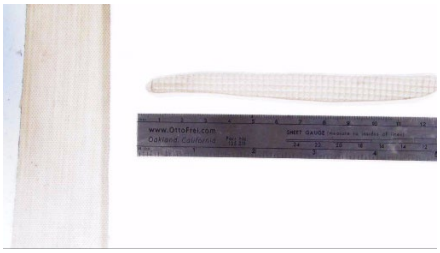

Figure 11

Figure 12

You can use a needle and the ruler to the cut the clay, a rigid cutting blade, or a flexible dual blade cutter (figure 12). I'm using a dual blade cutter set to 7 mm between the blades. I use the steel ruler as a guide to cut two perfectly parallel lines. Any of these methods will work.

Using your flat paint brush, moisten the back of your clay strip and carefully wrap the strip around your prepared ring mandrel. The moisture will help the clay stick to the paper on the mandrel (figure 13).

Figure 13

Now comes the part that is new to you. I'm going to cut the clay with a clay cutter on a diagonal. That probably isn't new to you, but the length of the cut is critical. If the length of the cut equals or exceeds pi (π) times the width of the ring, the join will not break when stretching the ring. Most artists simply cut the clay perpendicular to the side of the ring making a butt join. That's easy, but that join is the weakest join you can make. A butt join and others will fail when the ring gets stretched ¼ to ½ a ring size. With my "pi join" you can easily stretch a fine silver band one whole ring size and sterling silver 3 ring sizes. No typo here, 3 ring sizes. Another good reason to make your rings with sterling silver. I'll demonstrate stretching and reducing the ring size on the second ring. So, what is pi? Pi is the number you get when you divide the circumference of a circle by its diameter. It is approximately 3.14. Instead of trying to remember this number and having to use a calculator, simply make the cut 3-1/2 to 4 times the width of the ring. I usually use 4 because the math is simple. For example, if my ring is 5 mm wide, then the length of the cut needs to be 20 mm (4 X 5mm).

Use a clay cutter to make the diagonal cut. Use a sharpie to mark out the 20 mm on the blade (figures 14 & 15).

Figure 14

Figure 15

After you cut the clay, remove the extra pieces and straighten the clay up. Be sure that one side is perfectly in line with one edge of the paper (figure 16 & 17).

Figure 16

Figure 17

This will ensure that the ring will dry with two nearly perfect parallel sides. Taking the time here to do this right will save a great deal of time later. Use a straight edge to push the clay in alignment, like the side of your snake roller. Apply some sterling silver paste to the join and carefully push the two ends together with a straight edge (snake roller) allowing the extra to squeeze out. Don't remove the excess. The excess can be easily removed later after it's dry. If you remove the excess, the paste will dry and shrink, leaving a small valley where the join is. You'll have to add more paste and start over.

The next step is to start the drying process. Put the mandrel & stand into your dehydrator for 5-10 minutes, or just let it air dry until the paste looks dry. Air drying takes longer, but works just as well. The clay needs to be dry enough that you can remove the paper & clay off the mandrel without distorting it.

To remove the clay & paper try gently pulling on the paper with your fingertips. If it doesn't come off easily, wrap your thumb and forefinger all the way around the paper and carefully twist the paper. Once you get it off the mandrel, take a pair of tweezers and remove the paper from the clay. Simply slide the tweezers over the paper that is protruding out of the ring. Squeeze the tweezers over the paper close to the ring, then simply push the paper toward the center. That will pull the paper away from the ring. Continue to do this all the way around the ring until the paper easily pulls out of the ring (figure 18).

Figure 18

Notice that you can see the join inside of the ring. The paste shrunk leaving a small valley. Fill this valley up with a heavy paste leaving an excess stacked up and touch up any other spots that need it. Re-dry the ring thoroughly this time by laying it on its side in the dehydrator directly on the rack (figure 19).

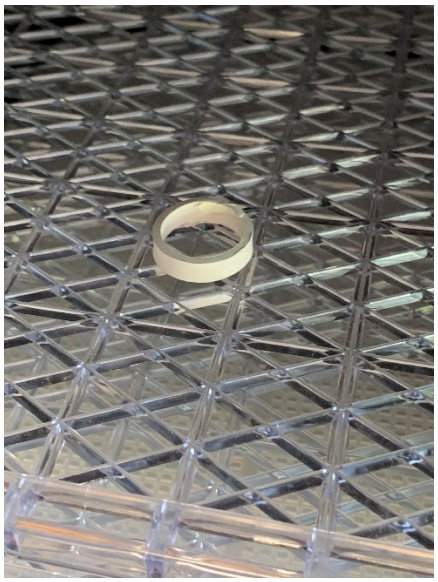

Figure 19

This will allow it to dry uniformly. Dry for at least 30 minutes or more. If air drying, let it dry for 24 hours. Reinspect it for any additional places that might need touching up. Re-dry as necessary. How can you tell if your ring (or any project) is dry enough? Just place it on your clay cutter (or mirror, or piece of glass) and leave it sit for 20-30 seconds. Left if off and if you don't see any moisture on the clay cutter, it's dry. If you do see some moisture, put it back into the dehydrator for more time, then test it again.

Once your ring is dry it's time to clean it up. Flatten both sides of the ring by sanding the sides with some 600 grit wet/dry sandpaper. You can simply lay a sheet of sandpaper on a flat surface. I personally use a 9 X 9 inch piece of plexiglass and glue the sandpaper on with some 3M spray adhesive. I glue a sheet of 600 grit on one side and 400 on the other for more aggressive sanding (figure 20).

Figure 20

You can sand the inside of the ring with 600 grit sandpaper. Just wrap the paper around a dowel or anything round (like a large sharpie pen). You can also just roll the sandpaper into a tube

shape and use it like that. Once all visible imperfections inside the ring are filled and filed you can remove the small scratches by moistening your finger with water, or preferably “Paste Maker” and rub the inside of the ring. The Paste Maker will make the inside perfectly smooth (figure 21)

Figure 21

Once you are happy with the band that you’ve created it’s time to make an embellishment. For this ring I’m going to use a small mold of a butterfly (figure 22).

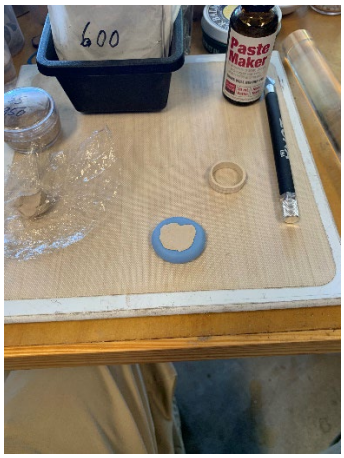

Figure 22

Push some clay into the mold with your thumb, pushing it in firmly. Remove any excess and place the mold into the dehydrator for 5-10 minutes. Take the mold out and remove the butterfly. No resist is required. The clay won’t stick to the mold. Place the clay butterfly back into the dehydrator and thoroughly dry it. Once dry, sand the back flat and clean up the edges with a sharp hobby knife.

Now it's time to attach the butterfly to the ring. Using a sanding stick placed against a rubber block, or piece of wood, sand a flat spot on the ring (figure 23). Hold the ring down with two fingers and move the block and sanding stick together. The block will guarantee that you are sanding a flat spot that is truly flat and at an 90° angle to sides of the ring. When using an embellishment and a textured surface, sometimes it's good to make the flat spot where the join is. Any imperfections in the texture there will be hidden by the embellishment.

Figure 23

Now moisten the back of the butterfly and the flat spot on the ring with a flat brush and water. Place the butterfly face down on your work surface and add some paste to the flat spot on the ring. Push the ring down on to the butterfly and center it. Use a small paint brush to clean up any excess paste (figure 24).

Figure 24

Place your ring back into the dehydrator and dry it thoroughly. Once dry it's time to fire it. Let's assume this is going to be a size 8 ring after it gets fired. Remember, the wooden mandrels are approximately 1-1/2 to 2 sizes larger than the number on the mandrel. Let's check the size of our greenware with a ring stick (figure 25).

Figure 25

A size 10 in greenware. Sterling silver rings shrink about three sizes from greenware to post firing. If we fire this ring as it is, it will certainly be smaller than our target size of eight. There are four solutions to this dilemma:

1. fire it as is, then stretch it back to a size 8
2. use a size 8 ring pellet to stop it shrinking at size 8
3. sand the inside of the ring until the greenware is size 11
4. fire it as is, then then use a traditional ring sizing technique of cutting the ring with a jeweler's saw, adding a piece of silver and soldering it back together.

By far the easiest way is to use a ring pellet. You can make your own ring pellets or buy them premade. The cost of pre-made pellets runs about $2 each. If you make them the cost is around $0.18. Simple choice. To make ring pellets you need a couple of ring pellet molds, some investment, a container to mix the investment in, and some measuring cups/spoons (figure 26).

Figure 26

The ring molds and investment are available from Cooltools (www.cooltools.us) The molds come in whole sizes and half sizes. They also sell molds that are all one size. To make the ring pellets you mix up the investment with water as per their instructions, then pour the investment into the molds. They recommend letting them set up for at least 2 hours, but I leave them in for 6-8 hours, then remove them and let them air dry overnight (figure 27 & 28).

Figure 27

Figure 28

The molds have numbers in each hole. When you pop the ring pellets out, the ring sizes are imprinted on the end of the pellet for easy reference.

We want our ring to be a size 8, so pick out a size 8 pellet. Remember the hole size in our greenware is a size 10, so the pellet will easily drop loosely into the hole. Use some masking tape and wrap it around the pellet to take up the slack. We don't want the ring to shrink on to the pellet at an angle. The pellet and tape should comfortably slip into the greenware (figure 29 & 30).

Figure 29

Figure 30

We're now ready to fire. You could simply lay the butterfly down on a kiln self and support it with kiln furniture or place it in some vermiculite or some alumina hydrate (figure 31 - 33)

Figure 31

Figure 32 - Vermiculite

Figure 33 – Alumina Hydrate

It's a personal preference. Fire the ring in your kiln following the manufacturer's recommended firing schedule.

After firing let the kiln cool naturally. When cool, remove the ring and pellet. The ring will be tight against the pellet. Place your fired ring into a container of water and let it set for 10 minutes. The pellet will fall apart and come out of the ring in pieces. You can help it along with your fingernail (figure 34).

Figure 34

You're now ready to finish your ring as any project. You can simply wire brush it or tumble it. I tumbled this one (figure 35). Notice the finished size (a perfect size 8).

Figure 35

Part II – Resizing Rings

As mentioned in Part I, sterling silver rings are preferable to fine silver. Their hardness is resistant to scratching and they stretch and compress more.

The first thing that I will do is to make another ring, but this time without a ring pellet to stop the shrinkage. This ring will be made like the first, except I'll make the shank arbitrarily 2mm (8 cards) thick. The shank will also be around 5mm wide and I won't use any texture on this ring.

I'm going to use a size 8 wooden mandrel. After drying and finishing the greenware, I will check its inside diameter (figure 36).

Figure 36

Notice that the size 8 mandrel, this time, yields a size 9-1/2 greenware shank. This pre-fire ring size will vary, depending upon how much you sand the inside of the ring. After firing, note the ring size (figure 37).

Figure 37

The shank went from a size 9-1/2 to a size 6-1/2, three whole ring sizes. Sterling silver typical shrinks 3 ring sizes. Fine silver 1-1/2 ring sizes. Now for the magic. This ring also has a pi join in it. That means no matter how much we stretch it, the join won't break. The ring will fail at some other point on the shank when stretched too far, but never on the join.

The machine in Figure 38 is known in the jewelry repair business as a ring stretcher/reducer. This particular one is high end and is manufactured in England by Durston. The cost is around $500. Less expensive ones are available. Note the tapered ring mandrel that is pointing up. Also note the I have placed the size 6-1/2 ring on it. When the handle on the right is pushed

forward, a second mandrel inside the first moves up. The outer ring mandrel has slits in it. When the inner mandrel moves up the outer one expands, stretching the ring. When that handle is pulled backward the inner mandrel moves down. On the very lower end you can see a s black steel plate. If the handle is pulled all the way back the steel plate will touch the reducing plate. The reducing plate is that heavy steel plate with a lot of holes in it. Those holes are slightly tapered. We'll come back to this reducing plate shortly. First, let's stretch our ring.

Figure 38

To stretch a ring, simply hold the ring down on the mandrel with your fingers and slowly push the handle forward. I usually pull the handle completely back to start, so the steel plate on the bottom touches the reducing plate before I start, that gives me a reference point. Then while holding the ring down, I push forward on the handle until it is pointing straight up. Then remove the ring and flip it over and repeat the process. If you don't the ring will be tapered because the stretching mandrel is tapered (figure 39).

Figure 39

After the first stretch, the ring stretches to a size 7 (figure 40). On the second pass it stretches to a size 7-1/2 (figure 41). On the third pass it stretches to a size 8 (figure 42) and on the forth pass it stretches to a size 8-1/2 (figure 43). That is two whole ring sizes larger.

Figure 40 – Size 7

Figure 41 – Size 7-1/2

Figure 42- Size 8

Figure 43 – Size 8-1/2

Recall that we originally used a size 8 mandrel to make this ring. If we really wanted a size 8, we could have stopped at size 8. Now for the real magic. How do we reduce the size of this ring? That's where the reducing plate comes into play. Remember the reducing plate has a set of tapered holes. I'm going to place this size 8-1/2 ring on the plate and find a hole that the ring can drop into, but not all the way. The rings need to sit so that part of it is above the surface of the plate (figure 44).

Figure 44

Now we simply turn the reducing plate counter-clockwise so the ring is directly under the steel plate above it. Then pull the handle and the inner mandrel will come down and make contact

with the ring. Pull more and the mandrel will force the ring into the reducing plate hole, which has a taper. Once completely down, push forward on the handle and the mandrel plate will rise. Remove the ring and flip it over because it will have a slight taper. Repeat the process. The ring will now come out perfectly straight (figure 45) and amazingly it's a size 6-1/2. If we wanted to reduce it to only a size 7, simply don't force the ring all the way down into the hole (or use a bigger hole). But do flip it over and repeat with the same amount of pressure.

Figure 45


Figure 46

Once the ring is the size we want, we simply need to finish it. With this ring I put it into a rotary tumbler for 1-1/2 hours (figure 46). Now you know how to easily make a ring go in and out with a ring stretcher/reducer. Also note that the ring was never annealed during this process. It's not necessary. In my research I also found that tumbling the ring does not work harden the ring. It has no effect upon stretching and reducing the ring afterward.

Also note that we are using a plain band for this demonstration. This would not have worked on the first ring because of the embellishment. This also would not work if we had a stone setting. How can we reduce the shank size in these cases? If the ring only needs to be reduced by a small amount, say ¼ to ½ ring size, then you could re-fire the piece at a higher temperature for an hour or two. Sterling silver melts at 1640°F, so it would have to be cooler than this. I typically use 1550-1600°F for an hour or two. If it happens to shrink a little too much, you now know how to stretch it. If this doesn't work, you can use the conventional method of removing a small section

of the shank with a jeweler's saw and soldering it back together. If you don't have this skill, you can have a jeweler do it for you.

In summary, you now have the basics of fabricating a ring and resizing it. You are also the first ones to read about the "Pi Join" that came out of my research and how to make it. Have fun!

Author:

Tom studied jewelry art at the Revere Academy of Jewelry Art in San Francisco, California in 2017 and graduated as a "Graduate Jeweler. Subsequent classes were taken at Silvera Jewelry School in Berkeley, California. One of those classes was an introduction to Art Clay, taught by Master Instructor Arlene Mornick. Additional Art Clay classes were taken with Arlene as well. In 2018, Tom received his Level One Certification and Senior Level Certifications. Tom teaches primarily in the Sonoma County area of California, one of the great grape growing areas in northern California. Tom's website and contact information is at: www.tessierjewelry.com

Artist Philosophy:

Discovering metal clay has been one of the greatest joys in my life. I'm just amazed at how easy it is to work with and what beautiful pieces can be created in a relatively short amount of time compared to traditional jewelry. It's like magic. I'm so looking forward to taking more art classes that can be combined with metal clay and teaching what I've learned to others.