



COOL TOOLS

## Sintering Metal Clay

Calibrating Your Kiln

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In my experience, the small handful of customers that have frustrations with metal clay, revolve around firing temperatures and firing schedules. If the clay is not fired properly (time and temperature), the clay will not sinter properly. For those artists that are bending the fired clay (around a mandrel or something similar to making rings and bracelets), there is a possibility of the work breaking. Improperly fired (sintered) metal clay is porous, and will always break when bending. If you are experiencing breakage when attempting to bend the fired metal clay, it is because the firing temperature is inaccurate (too low) or the time in the kiln is too short.

For example, EZ960™ can be fired at various times and temperatures, but most people fire at 1675°F for 2 hours. We have a customer in Russia that fires EZ960 at 1650°F for 4 hours, and is having great success in bending post firing. Firing for 4 hours is called a "soak," and if firing for a longer soak time (4 hours in this case), chances of sintering success goes up dramatically. If the kiln is calibrated correctly, the metal clay will fire perfectly every time, and you will be able to bend the fired metal clay with no issues.

Kilns however, do not always fire at the temperature that they state. This is especially true with older kilns or with kilns that get used a lot (even newer kilns can be "off" on their stated temperatures). There are at least 2 ways to test your kiln. One is to use an external pyrometer (a fancy name for a thermometer designed especially for high firing kilns) and test to determine whether the kiln is firing at the temperature displayed. I tested our Paragon SC2 kiln in the Cool Tools studio when we launched EZ960, and found out that it was firing 30°F cooler than what the display was reading. 30°F less is enough to cause the clay to not sinter properly. Now when firing in that specific kiln, we simply adjust our temperatures by 30°F (1705°F instead of 1675°F for EZ960), and the clay fires perfectly every time. Note that some older Paragon kilns have the heating element in the bottom of the kiln. For this reason, it is important to fire on a raised ceramic kiln shelf.

The other option is to create test strips of the clay you are using to ensure the clay is firing properly. This is done by making a couple of small slabs of clay, 3 cards thick, a quarter or so inches wide, about 1-1.5 inches long, and firing them at several different temperatures. For example, one at each of the following:

- 1675°F for 2 hours
- 1700°F for 1 hour
- 1725°F for 15 minutes.

After firing, test these with the water test by placing a drop of water on the fired clay. The water should not absorb into the metal in the first 30 seconds. If it does, or if the metal acts as a sponge and soaks up the water, this is a sign that the metal is porous and has not sintered properly. If this happens, it is indicative that your time or temperature is too low. If the metal passes the water test, then perform a bend test. Using a mandrel or round nose plier (something about the diameter of a pen or pencil), bend the fired metal into a U-shape, NOT a V-shape. If the metal bends without cracking or breaking, your times and temperatures are correct, and you have found the "sweet spot" for your kiln and the clay body you are using.

Water tests, bend tests and kiln testing is something metal clay artists should routinely do to ensure that their clays are sintering properly and the products coming out of the kiln are the best and strongest (properly sintered) that they can be.

If you are firing at the proper times and temperatures, you will have no issues with any metal clay of any brand.