

### **BRONZclay - Getting Started with Bronze Clay**

Adapted to suit Australian conditions – Original Text by Mardel Rein / Updated 28/10/08

Because BRONZclay is such a new and exciting material – new discoveries with technique and firing are being revealed regularly. Please print out and refer to all of the BRONZclay information sheets available – noting especially the **Updated** date.

**BRONZclay** can be worked with nothing more than your fingers, but much more interesting and sophisticated jewellery and sculpture can be created with the addition of a few simple tools. Our list of basic tools (refer to Tips for working with BRONZclay) will serve as your core tool kit. Additional tools can be gathered from every room in your home to texture, form and shape your BRONZclay creations, and nature offers an endless supply of textures and ideas to draw from.

For those who work in silver clay, you'll need a separate set of "dusty" tools for BRONZclay to avoid cross-contamination. Unfired dust and bits of BRONZclay clay must be kept separate from silver clay. Needle files and diamonds files should have a set dedicated to BRONZclay. Brushing the dust off the tools is not good enough. The tools must not mingle. The rule is easy: if the tool creates dust or if dust builds up on it, keep a separate set for BRONZclay.

After the metal is sintered, files, sanding sticks, polishing papers and other metal working tools can be used both on silver and bronze.

*Tip: Keep a sanding tray handy with all your BRONZclay sanding tools in it. Use the tray in your lap or in your sweeps drawer as you work. The entire tray can be moved out of the way when not in use.*

### **BRONZclay Packaging**

BRONZclay comes packaged in blocks of 100 grams and 200 grams. There is no paste, syringe or paper currently available.

### **BRONZclay Storage**

Keep your BRONZclay happy and fresh by storing it in the refrigerator. BRONZclay prefers to be cool and stiffens as it warms, so unopened packages should be stored in the refrigerator. For opened clay, wrap tightly to exclude air, clip, and then place in a plastic bag with a damp sponge (not wet). Place this bag in the refrigerator. A home vacuum sealer is great for air-tight sealing.

### **Ideal Workspace For BRONZclay**

BRONZclay prefers a cool, moist environment. Most basements make great metal clay studios because they offer naturally cool temperatures and high humidity. A cool room (22C or cooler) with good humidity (at least 50%) and indirect natural light is ideal for BRONZclay working. If you do not have perfect BRONZclay conditions in your studio, you can simulate them. Use a humidifier to increase the moisture in the air. Set the temperature to 22C. Avoid warm rooms. BRONZclay stiffens as it warms, so the warmer the room, the harder the clay will be to work with. Do not work outside or in direct sunlight. Drafts or air blowing across your work area or from overhead will accelerate drying of the clay. Air conditioners and heaters both dry the air, so add humidity when running either appliance.

A work space can be anything from a tray on your lap to a dedicated studio designed and built for metal clay work. At the very least, you need a comfortable chair, good lighting, a **work surface** and **magnification**.

Comfort is essential in creating. A chair that puts a hitch in your get-a-long will probably put a hitch in your metal clay productivity and enthusiasm as well. I use an adjustable height chair because my bench needs to be at different heights for different tasks. An adjustable height chair allows me to stay at one workplace with one chair and do multiple tasks. When I'm working in wet metal clay, I want my chair at desk height. When shaping, filing, sanding, drilling, polishing at the bench pin, I want my chair much lower. To determine the correct height for your chair, sit with your back straight. Rest your elbow on the table. Lower your chair until your arm is parallel with the floor. Not all adjustable chairs have the full range of adjustment needed, so try out a chair before you buy it and make sure you have all the travel you need. If you have the luxury of space, you can set up different work stations for different tasks and provide the right chair for each station.

The type of lighting needed depends on the job at hand. Indirect natural lighting is the first choice for general clay working. If artificial lighting is needed and you need to purchase lighting, choose full-spectrum or daylight balanced bulbs. Daylight and full spectrum bulbs offer economical natural-looking light to brighten things up without adding heat to a room. If you have only overhead lighting, you might consider an articulated task light that can be set at any height or angle and use cool, low-wattage bulbs. A graphics or drafting type light is a great choice.

### **BRONZclay Handling**

BRONZclay is very stiff right out of the package and must be kneaded to make it soft and pliable before it can be worked. Fresh BRONZclay can also be somewhat sticky, so you will need to condition your hands with something the clay will not stick to.

BRONZclay contains water, so a water-repellent coating is needed to keep the clay from sticking to your hands - use straight olive oil or others use balms made from olive oil such as Badger Balm.

Try what you have on hand and see how it works for you

### **Petroleum Products**

**Do not use any type of petroleum-based product** with BRONZclay (or any other metal clay). Vaseline is a petroleum jelly, so it cannot be used as a release. Do not use industrial lubricants such as WD-40 or silicone spray lubricants.

### **Clay Cooler**

To keep BRONZclay cool at my bench, I've made a little cooler out plastic storage containers. When I'm not working with the clay ball, I put it inside the cooling well. This cools the clay very quickly and makes it very workable.

To make a clay cooler use 2 nesting containers, one larger than the other. I fill the bottom container with ice, nest the smaller one inside (photo near right) and cover the unit with aluminium foil, as shown in the photo on the far right.

The lid to the larger container is used under the unit to catch water as it condensates, avoiding a puddle on the workbench. The lid to the smaller container is used to cover the cooling well.

The ice well (the larger container) can be filled with ice cubes, or the whole unit can be frozen. Ice cubes lasted about 3 hours in my studio. In the photo at the right, I have filled the container partly with water and froze the smaller container in place. This will last much longer than ice. Add weight inside of the smaller container so it buoys about 25mm from the bottom of the container. This way you will end up with the smaller container sunk deep in the ice.



## **BRONZclay Conditioning**

I start by testing the clay surface for stickiness. I press my finger lightly on the clay. If any clay sticks, I let the clay sit for 30 seconds or so to allow some of the moisture to evaporate from the surface. Test again, and when my finger comes away clean, I turn the lump over and let the other side evaporate a little so it's not so sticky.

A 100 gram package contains a single bar of clay. A 200 gram package contains two 100 gram bars that are scored in the middle for easy separation. I work with 100 grams at a time. If I have a 200 gram pack, I wrap one of the 100 gram bars in cling wrap and set aside while I knead the other one.

I break a 100 gram bar in half and stack the two halves. I use my thumbs to press lightly from the centre outward to form a patty about 6mm thick. I avoid touching the outside edges of the clay which are very moist and sticky. I also go very lightly so I don't break through the "crust" of the surface.

Once I've formed a rough patty, I fold the sticky outer edges to the centre of the patty and then continue folding the edges in until I have a nice ball.

Now all the wet sticky parts of the clay have been worked in and I can freely touch the clay without any staining on my fingers. I knead the clay until pliable and smooth and then roll it into a ball and place in the centre of a 30cm x 30cm sheet of cling wrap. Twist the plastic around the ball and wrap the excess plastic around that. I hold the plastic in place with a strong clothes peg or some other large-sized clip or rubber band and set it aside to rest.

It's important to allow the clay to rest after kneading because working it with my hands heats up the clay. BRONZclay stiffens as it warms, and even body heat is enough to stiffen the clay. Keep in mind that the binders in BRONZclay are different than those in silver clay, so this is a property unique to BRONZclay. I like to keep 2 balls of clay so one can rest and cool while I use the other.

### **Lavender Water**

Put a drop of **pure lavender essential oil** in your water dish at a rate of 1 or 2 drops per 1/4 cup of distilled water. Lavender oil slows the oxidation of copper.

Use lavender water to re-hydrate, make paste and moisten BRONZclay. I've kept a dish of lavender water on my bench for several days with no signs of oxidation. If the bits that settle at the bottom of your water container become dark, discard the water, clean out your water dish and make a fresh batch.

### **Distilled Water**

Use only distilled water when working with BRONZclay to avoid contaminating the clay with impurities from well or city water supplies.

## **Re-hydrating Clay**

BRONZclay can be rehydrated to add moisture to a working lump or to make clay or paste from totally dried bits and filings.

Lump clay is re-hydrated regularly during a working session as needed. I re-hydrate lump clay several times over a work period, and it's very easy to do. One caution, though, trying to re-hydrate too large a lump at once can lead to a muddy mess. I can rehydrate about 50 grams at a time. First make a patty about 4 cards thick. Use your fingers and your calibrated eye; it doesn't have to be exact. Paint water over the clay patty, avoiding the very edges. The patty should just be moistened, not dripping. Fold the edges into the centre, being very gentle and watching for water that might want to ooze up in the centre. If you have the right amount of water, there will be no oozing. If some water oozes out the middle, blot it off so you don't end up with mud. Keep your fingers on the dry clay, folding in the sides of the patty, pressing them down and working into the middle of the ball. Then knead until smooth and pliable. At this point, I wrap the clay and let it rest so the binders can fully absorb the moisture. If you add water and the clay still feels too dry, add more.

Dried bits and filing can be re-hydrated to make paste or lump clay. The filings must be clean and free of foreign particles. Some sandpapers and salon boards shed abrasive particles as they are used, so you may wish to use only the bits from filing and carving. I use a mortar and pestle to grind the clay bits into powder, then add in distilled water a few drops at a time (I use a dropper). Stir with the palette knife. Add in more water as needed to form dough. Once dough is formed, use a mini bowl scraper to turn the clay out onto a piece of cling wrap, wrap tightly and allow to rest.

*Tip: Make a drilling block from BRONZclay. When you want to drill a clean hole in dry clay, you need to drill all the way through the clay and out the other side. If you drill into a block of the same material, you will create dust of the same material, which means no contamination of a foreign material. Here's how to make a drilling block: Form a slab of BRONZclay 12mm thick and cut into a square or circle. Air dry for the first hour, turning the piece every 15 minutes for even drying. Then place in dehydrator and dry as normal or, leave to air dry. A 12mm thick piece will take about 6 hours to dry in a dehydrator and several days to air-dry completely.*

### **Paste Consistency**

BRONZclay does not sinter well when too much water has been added, so I aim for the consistency of peanut butter when I make paste. I mix paste on a flat surface using a palette knife. I use a flat acrylic disc that I hold in the palm of my hand. The disc is a really handy way to make and use the paste. I use the palette knife to cut a small bit of clay off the lump and wipe it onto the disc. I paint the clay with lavender water (lavender water keeps the clay from oxidizing) and mix into the clay with the palette knife. I make up just what I want for the moment and always have fresh paste that is the exact consistency I need. I like the acrylic disc because the paste stays put when it's wet and slides right off when dry. The paste can be allowed to dry and re-hydrated for use later.

### **Burnable Forms**

Burnable forms give support during creation and drying. When you fire pieces formed over **cork clay**, **paper clay** or any other combustible form, be sure it is properly supported during firing. The burnable forms offer no support during firing. Be aware that cork clay does not completely burn out in a BRONZclay firing. Creative Paper Clay leaves a residue of volcanic ash.

Place your pieces in the firing pan so that gravity has the least chance of collapsing the form. Use an appropriate thickness for the item to support itself. A head for physics will help, but whatever item you make, keep in mind that it needs to have integral strength in the design and thickness to maintain its shape during firing. Larger pieces need to be thicker than smaller pieces, but too thick will cause a collapse from the weight. Here are some thickness suggestions for support using a domed disc as an example:

<b>Disc Size</b>	<b>Minimum Card Thickness</b>
6mm	2
12mm	3
18-25mm	4
30-38mm	5
50m	6

Arrange pieces in the firing pan so that they do not have the pressure of gravity working against them. A domed disc should be placed so the dome side is down in the carbon, horizontally. Lentils, on the other hand, are two domes put together. They should be oriented vertically to counteract gravity. Round beads only need to be thick enough to support the span of their circumference.

### **Attachments**

If you want pieces to bond, attach the parts with lump clay or very thick paste made from lump clay. Pieces can be added when wet, or when dry. To paste dried pieces together, first moisten the areas to be attached with a damp brush, apply the clay-paste to one or both of the parts and press the parts together so they "seat", but do not use excessive pressure. If you used a generous amount of clay/paste, some of it may squeeze out from the joint. You can use a **clay shaper** to rub this in now or file it smooth later.

### **Extruders & Syringes**

BRONZclay extrudes beautifully through syringes and **extruders**. The clay should be freshly conditioned and have a soft, pliable texture before loading into the extruder or syringe. Extruding through a syringe can be a challenge to those with weak hands or wrists. As a test, I extruded BRONZclay from a syringe onto a pre-formed ring. No attempt was made to adhere the syringed clay. It was just extruded, dried and fired on the ring. All of the syringed clay fused to the ring.

### **Embedding and Co-Firing**

Most **cubic zirconia and lab created gemstones** can be fired in place in BRONZclay. In fact, most stones are relieved of their time and temperature limitations when fired in activated carbon. This is very interesting and fortunate because now we can use those gorgeous tanzanite cubic zirconia stones that we

all love, but burn in silver clay at very low temperatures. Glass cannot be co-fired with BRONZclay. The firings are too long and too hot.

- Sterling silver and fine silver **cannot** be co-fired with the BRONZclay. The metals will attempt to alloy (mix) with each other in an unattractive way.
- Precious Metal Clay and Art Clay Silver **cannot** be co-fired with BRONZclay. These two clays can be combined, but not during the sintering phase of BRONZclay.
- Copper, Brass and Bronze can be embedded in BRONZclay and co-fired.

### **Findings**

Sterling and fine silver findings **cannot** be fired in place in BRONZclay. As the bronze sinters, the silver will try to alloy with it. The result is rather ugly. Brass, bronze and copper can be fired in place with bronze clay. Brass finding can be fired in place with BRONZclay.

I do not recommend using brass, bronze or copper for ear wires because the high-copper content in these metals can cause piercings to become sore and infected. Use sterling silver, fine silver or karat gold wires for earrings and posts.

### **Carbon Crumbs**

Carbon crumbs can get in between a gemstone and the edge of the setting. A small piece of **fibre paper** can be laid on top of the stone to protect it from carbon dust. Use a small piece to avoid creating air pockets in the carbon.

### **Sanding & Refining**

BRONZclay is very easy to sand, file, shape and carve when dry, and much more difficult in the fired stage. Do all the work you possibly can before the clay is fired. Smooth out with sandpaper. The clay can even be "pre-polished" and burnished.

### **Carving**

BRONZclay is wonderful to carve. Use miniature **carving tools**, wax carving tools, **ball burnishers**, needle tools, etc. I like using **diamond tips** of various shapes to "rub" away areas. They can be used to carve by rubbing. Use them in a hand-chuck rather than a rotary tool. BRONZclay is so soft that no power is needed to "power carve" it. Save the chips from carving to rehydrate or use as embellishments.

### **Soldering**

Bronze clay is easy to solder, however, pickling will dissolve the tin from the surface, making it look like copper. Be prepared for a copper coloured surface if you pickle. In this way you can end up with both copper and bronze clay from one material.

### **Polishing and Patina**

BRONZclay can be worn right out of the kiln with no polishing or finishing at all and people love the look. The beautiful peacock colours that come from the activated carbon are stunning and surprisingly durable, but BRONZclay is a true bronze when fired. It can be polished and patinated just like any other bronze. It can be oxidized by heat (gas torch) or by chemical. It can be coloured with a wide variety of patinas and polished to look like gold, adding almost limitless possibilities for creating. BRONZclay can also be made to look like copper just by pickling. The mild acid of a pickling solution dissolves the tin from the surface of the metal; similar to when silver is pickled, leaving an enriched copper surface.

### **Copper and the Green Finger**

Copper is famous for it's beautiful green patina, but most of us prefer that patina on architecture and sculpture, not our fingers. BRONZclay is composed of 85% copper. Most peoples' skin oils will react copper and oxidize very quickly, leaving a green stain around the finger (or wrist if it's a cuff bracelet). Where there is sweat, there will be oxidation. There are a few approaches to this problem. You can either avoid making rings, accept the patina on your skin, wear bronze rings and cuffs only long enough that they don't cause a reaction, use a sterling silver, silver or gold insert to keep skin from contacting the bronze, or silver plate the item. For a cuff bracelet, leather or Ultra suede could be used as a liner.

### **Black Scum**

If your clay starts to show mouldy looking green/black patches or spots, this is oxidation. Scrape any black patches off. Do not mix any of the oxidized clay into the ball. The oxidized clay inhibits the copper and tin particles from sintering. Use Lavender water and keep your clay tightly wrapped to avoid oxidation.