

SAGGAR FIRING

Fire to 1650-1750 F The firing should take about 3 hours

Saggar firings were first used by the Chinese to keep ash off of their celadon glazed pottery with a wood burning kiln.

Surface Treatments:

Sawdust and salt inside the pot.

Graphite Slurry

2T fine graphite

4 oz lighter fluid

Graphite can be found in a tube in the hardware store

Patinas

1 gerstley borate + 1 colorant as a thin wash over bisqued sigs, applied and rubbed off. **Works well on textured areas.**

Color suggestions added to 1 cup liquid (sig):

white = + 1 tsp. Zircopax or tin.

off white = + 1 tsp. titanium diox.

green = + tsp. chrome oxide

blue = + tsp. cobalt carb.

black = + 1 tsp. black stain

purple = + 1 tsp. crocus martis

- **Spanish moss** soaked in copper sulfate and dried. (will leave patterns from moss) (pine needles)
 - 2T copper sulfate
 - 8 oz water
- Salt soaked hay

Toilet paper over terra sigilatta Rich shiny BLACK

- Mask – using tape, latex etc
- Thin layer of terra sigilatta
- Buff
- Remove mask
- Wrap 1” toilet paper around piece
- Place in saggar (more than on OK)
- Fill empty space with newspaper
- Fire to 1652°

Aluminum Foil Saggars (Aluminum foil starts to melt at about 1100 F)

- Apply terra sigillata to surface of pot, white ^6 body with 5 coats of terra sigillata
- Burnish the terra sigillata, not smooth areas will develop muted colors
- Bisque to cone 06
- Apply chemical solution, brushing is best. Cover entire surface.
- Sprinkle a small amount of salt on various parts of the pot to achieve yellow and white spots. Earlier solutions should be damp to absorb the salt. Apply an additional layer of solution over salted areas to help it stick.
- Placing horse hair in the saggars can produce fine lines
- Brass or steel wool can also result in fine lines. (too much of these will cause a dark spot. Use single strands of hair and for to six strands of the brass or steel)
- Wrap each pot in heavy foil as you would a potato for baking. How tight the foil is around the pot determines the pattern effects.
- Unwrapped areas will be black. Wrap the bottom of a piece, put newspaper inside for a black interior and outside rim.
- Stack in the kiln on top of each other and/or lay shards on top. This helps achieve variations in color wherever the pots are touching and broken pieces are laid.
- FIRING – steadily bring from cold kiln to target temp of 1350 degrees. About 40 minutes. Fiber lined can with propane. Above 1500 degrees the foil begins to disintegrate, and will even stick to the pot
- As soon as temp is reached, turn off and let cool.
- When the kiln is cool enough to handle the pots using gloves, pull out one by one and unwrap, avoid fumes while unwrapping. Minimal clean up needed. Avoid washing, just brush off.
- When completely cooled, apply wax, oil or ceramic sealer to help protect the finish.
- Buff the piece with a soft cloth to further enhance the colors.

From **Judy Nelson-Moore** Handout:

What is a saggars?

A saggars is a container surrounding the ceramic ware as it is being fired in the kiln. Traditionally, saggars are made of clay, as are the ones we will use in this class. These can be either specially made saggars or “found” saggars from flowerpots or other utilitarian pots. I have also used sawed-off oil barrels in a pit. Other materials for saggars can include clay-soaked burlap (called mummy firing), which we will include a demonstration. You can also build a saggars out of bricks inside the kiln. The purpose of the saggars is to provide an environment for fuming. Various materials such as garbage, seaweed, straw, sawdust, wood excelsior, magazine pages, copper or brass wire, salt, copper carbonate, iron oxide, cobalt carbonate are placed in the saggars or tied to the pieces. At the firing temperature, these create a “fuming” atmosphere and the chemicals are transferred to the surface of the clay to form random and serendipitous patterns and designs of color. The color range is black, gray, pink, maroon, orange, blue, green and other colors depending on what chemicals are used in the saggars.

Making Saggars

Make saggars as large round, or oval wastebasket shapes. Make out of well-grogged sculpture clay. Make them fairly thick-walled, but not too thick (no more than ½"). Even thickness is more important. I like to put raised stripes on the bottom to lift the pieces off the bottom of the saggar. If you want lighter, patterned pieces, put holes in the saggar sides (small, spaces irregularly and on opposite sites). The number of holes is up to you. Make a lid that fits well. I like to make a lip that comes down on the outside at least 2 inches. Or, you can use an old kiln shelf as the lid. Fire the saggars empty initially to a fairly high temperature...at least cone 1-3.

Making and Preparing the Pieces to be Fired

All sizes and shapes of pieces have been fired in saggars. I have fired pieces from 1" to 5' in saggars or mummy firing. Some people claim that rounded, smooth shapes fume best, and certainly some wonderful flame patterns can be seen on well-rounded jar shapes. Certainly large areas of smooth clay tend to show off the fuming patterns better. The pieces should not be too thick. Prepare the pieces by firing in a bisque fire. Some people claim that a low bisque (or no bisque) gives the best results, but the resulting pieces are too fragile for my liking. I have been experimenting with firing the pieces higher initially (I have done up to cone 6) to make the body stronger and have had good results. I have also been experimenting with saggar firing a piece that is subsequently glaze fired (either low or high fire). The glaze bubbles and produces a wonderful texture over the carbon in the saggar-fired piece. I have also refired saggar pieces that didn't turn out well in the first saggar firing with mixed results. If you really hate the results put through an electric firing in-between to burn out as much of the carbon as possible, reapply a thin terra sigillata before the next saggar firing.

Materials for the Saggar

You need the following types of things for the saggar:

Required:

Something to produce carbon

This is the garbage, sawdust, seaweed, straw, wood excelsior, wood chips, charcoal, seeds/feed, dog food, etc, etc, etc. My favorites are seaweed and wood excelsior. If this is all you use, you will most likely get black/gray effects. For totally black with hardly any gray, use a very tight saggar.

Optional:

Something to produce color

I use iron oxide and copper carbonate. These produce yellows, oranges, reds (rust, pink, maroon, and shades in between), green, black, gray, brown. It's the red colors that excite most people. I've used cobalt carbonate, but it is too blue for my taste. Use just a tiny bit. Others can be tried. I've read that sulfates fume well.

Inert Stuff (this is used as spacers, supports, or fillers to thin out the carbon stuff)

- Vermiculite. Mix this with sawdust to cut the black effect of sawdust. Be careful as it is toxic.
- Fire brick pieces can hold things in place.
- Slabs or Shards

Salt

- This volatilizes and carries the chemicals and carbons onto the piece as well as creates interesting patterns.
- I prepare an iron oxide, copper carbonate, salt and water solution and brush on

the inside of the saggars and on shards, as well as dribble around (but not on) the pieces in the saggar. If you put a lot of iron and lots of carbon stuff and salt, you may get black iron crystals. The copper hopefully makes lovely pinks, mauves, reds. The iron can make reds, oranges, browns and black. If the copper makes greens, instead, it's probably because it didn't get reduced.

Pattern Makers

- Copper, brass or other composition wire for black or other color lines
- Grasses or weeds or paper patterns held tightly against the piece by wire or tape or clay slab or shard will hopefully resist the carbon and produce white lines and pattern.
- Custom-shaped slabs to fit the piece or found shards to lean against the piece. Paint the salt/oxide/carbonate solution on the slab/shard, let dry, and place against the piece to produce a pattern. Put grasses in-between for lines in the pattern.

Other things (these are reported to work by others, but I haven't had much luck)

- Colored papers are supposed to fume colors on the piece. These would be high clay-content papers like National Geographic. All I've found is that they produce gray/black. Maybe at a lower temperature, they would work better.
- Various compositions of wire are supposed to produce different color lines. All I've ever gotten is black.
- Tape applied to the piece is supposed to provide a white line...it has produced black smudges for me.

Stacking the Saggar

General

- Decide if you want color, overall light affects, dark effects, patterning.
- For light effects, use less carbon stuff.
- If you want dark effects, put in more carbon stuff.
- For color, use the salt/copper/iron mix described above. Paint on the inside of the saggar walls and on shards laid up next to each piece.
- For lines, wrap the piece in wire. Prepare a slab to fit the piece for white (resist) lines.
- For patterns, put different size/shape of shards, carbon stuff, and salt/copper/iron mix. See special effects below.

Special Effects

- Black lines. Wrap with copper or brass wire. Thin for thin lines (too thin and it disappears). Thick for big, thick black stuff on your piece. No plastic on the wire, please...that produces unpleasant black sticky stuff.
- Resist effects. Create a shaped slab. Be careful that the slab around the piece will not break your piece as it shrinks and contracts around the shape. Put grass, wire, paper patterns, tape, or other items next to the piece. Paint the shard inside with salt/copper/iron mixture and LET DRY. Carefully place slab next to the piece in the saggar. If the slab is not quite dry, probably OK for the workshop as the firing will not commence immediately and they will have time to dry out after loading. Don't use plastic stuff...it makes a gummy black mess.
- White lines. Put grass next to piece and shard or shaped slab next to the piece.
- All black: If you don't want color, stack the piece totally smothered with lots of carbon stuff (see list above) in a very tight saggar (no holes, tight lid). Sawdust is best for this.

- Colors. Use salt and oxides or sulfates.
- Specific patterns. Cut pattern out of paper, tape, form in wire. See resist effects. Wrap wire or shape wire and hold next to piece. Slip resist. Paint entire piece with thick slip. When it cracks, the fuming will go into the cracks and where the slip was solid will resist the fuming. Scrape off the slip after firing to reveal the pattern underneath

Mummy Firing

How to prepare a mummy

- Prepare a slip of any clay. Add paper-pulp for a stronger mummy.
- Put a big plastic sheet on the tabletop.
- Dip a piece of burlap big enough to wrap around the piece into the slip (completely saturate) and lay out on the table. Alternately, butter the slip onto the burlap.
- Cover the burlap with paper to keep slip off the piece.
- Put carbon stuff, chemicals on the paper.
- If desired, put shaped slab or shard around piece as described above.
- Put the piece in the middle of the pile. Cover with stuff to fume the top and paper to keep the slip from getting on the piece.
- Pull the burlap up around...make sure stuff is on all sides.
- Wrap with string.
- Let set until firm enough to load into kiln without getting slip on the other stuff in the kiln. If not completely dry when loaded, wait until dry before firing.
- Stack into kiln carefully. The mummy will partially fall off during the firing, depending on how much slip you use, the composition of the slip, and how well it is wrapped.

Temperature

I usually saggar fire to cone 08. I have tried as low as cone 010 and as high as cone 10. Higher temperatures (above about cone 01) are a totally different look, more burnt, less color. Terra sigillata becomes matt above about cone 01.

firing not from this article.

I fire my saggars quickly in oxidation through cone 010, then reduce the kiln and fire it through cone 08. I then soak the kiln in heavy reduction for 1-2 hours. I have found this to get the best colors and not burn out too much of the deep black carbonization which covers the bottoms of the pots buried in the sawdust.

Opening the kiln

Unlike raku, leave the pieces in the kiln until they are totally cooled. In this workshop, we will open the saggars together (no peeking before!!!) so we can see the results from the placement of the pieces, talk to the people who stacked the pieces, and evaluate the results. Evaluating the results when opening the saggars is your best learning tool. I recommend taking notes about how you loaded your piece, and provide a notes page with this handout.

Post-Firing Treatment

- **Wash.** Wash the piece in water, even using a soft scrub pad (like dish washing pad) to clean off the stuff that is stuck on there. Use gloves as the chemicals in the firing are on the piece.
- **Seal.** If desired, seal with ½ white glue or matt acrylic medium or Dorland's wax (oil painter's wax) or floor wax or butcher's wax (these are some of the things I

have heard of people using or used myself). I like the matt acrylic medium or Dorland's wax best. These will help to bring out the colors and patterns, sometimes amazingly so. I have had pieces that I thought had no fuming, only to have them turn a wonderful orangey with the medium applied. However, these surface preparations may alter the colors and patterns...so if you really, really love it, leave it alone.

- **Refires.** If you don't like it, try refiring. You can put in as is, apply terra-sigillata and refire, or bisque it again and then reapply terra sigillata. Try firing to a higher or lower temperature. If too light, for example, try a very low fire paper fuming outside the kiln just on bricks to get some more color. Or, refire in a regular glaze firing, either low or high fire, with or without a glaze. You will get something more interesting than the effect that you don't like using any refire method.

Green plant transfer

1. Fill saggar 5" with sawdust
2. lay the pot sideways and make impression of piece in sawdust, remove
3. place fresh vegetation in the depression
4. put the pot back into depression
5. place more fresh vegetation over the piece
6. place 5' sawdust over piece
7. cover and fire
8. loose lid can cause white areas