

Oh, Yes You Can!

Smoke Firing in an Electric Kiln

by Russel Fouts

I started experimenting with smoking pots in aluminum foil saggars in 1995 after Jane Waller mentioned the possibility in her handbuilding book. Just as many people first looked at soda firing as an alternative to salt firing, I first looked at using foil saggars as a replacement for sawdust or pit firing, but it soon revealed its own aesthetic, in the same way soda firing has.

The limits of aluminum foil sagger firing suited my own aesthetic perfectly. I like to work simply, within very narrow constraints using a minimum of materials and techniques. To make my work, I use one clay body, a white terra sigillata made from a high-fire ball clay, an orange terra sigillata made from my clay body, aluminum foil, black and white newspaper and an electric kiln. This focus forces me to use my own creativity and ingenuity.

Preparation

Because smoke doesn't move in the aluminum foil sagger, you can't rely on it to help randomly pattern the surface. Instead, I use various decorating techniques and bisque fire pieces first to harden the terra sigillata and decoration so that it acts as a resist against the smoke during the smoke firing. In preparation for the smoke firing, various materials can be used to create patterns. Experiment to see what works for your situation.

Above: Plate with crackle slip and smoke stenciled decoration, 14 in. (36 cm) in diameter, earthenware.

Left: Plate made from applied torn slabs, 14 in. (36 cm) in diameter, earthenware, electric fired in aluminum foil sagger.



1
Lay a piece of newsprint or your paper pattern onto the aluminum foil.



2
Place your piece in the middle of the foil.



3
Lay a few pieces of newsprint on top.



4
Fold one side up to the center of your piece and crease it at this center line.

For my work, I normally bisque three or more times to 1650°F (900°C) or to about cone 010. After the first bisque, I apply white terra sigillata, then I bisque again to harden it. I bisque one more time after decorating the pot to harden an orange decorating terra sigillata and any other smoke resistant decoration.

I've recently begun experimenting with bisque firing only once before the smoke firing. The bone dry pot is dipped in a terra sigillata, then it's decorated and finally bisque fired. I didn't do this before because my work was very thin and my breakage rate was high. I now make my work much heavier and it can withstand the bone dry dipping.

Tip

Bisque again to harden on any additional decoration. If you don't bisque the decoration before the smoke firing, it can't resist the smoke and everything will just turn black.

Wrapping

Start with two lengths of foil that are three times the diameter of the piece you want to wrap and lay them on top of each other. Fold one long edge over about 1½ inches and press flat, then repeat this twice to lock the two sheets together. Take the two 'pages' and open the sheets like a book, lay them flat and wrap normally. More sheets can be joined on either side as needed until you have a sheet large enough.

Place the newspaper for smoking in the center of the sheet (*figure 1*). Place the bowl over the newspaper, making sure that you have at least 1½ inches on the short sides (*figure 2*). Place another piece of newspaper on the back of the bowl, if desired. I tore it in half for better coverage (*figure 3*). Bring up one of the long ends and crease it at the half-way point on the bottom of the bowl (*figure 4*), then fold up the other side to meet it and crease it as well. Do the same with the other long end. Bring the two long ends together and fold in half (*figure 5*), then continue to fold this flap in half until it touches the top of the piece.

Flatten the foil so it conforms to the piece's contour (*figure 6*). Fold up the two sides (*figure 7*) following the same steps as with the top. You can leave the corners sticking out or fold them out of the way. This allows the foil to expand a bit, like Jiffy Pop. Or, you can roll the edges down close to the rim to keep the foil really close to the pot and further limit the movement of the smoke.

Note: If you puncture or tear the foil as you wrap the piece, start over. I've never found an easy way to repair a tear or hole.

Smoke Firing

By now I know you're asking, "Won't the smoke damage the elements?" I'm still using the original elements that were in my kiln when I bought it back in 1995 and it fires just fine. Under normal conditions, the amount of smoke

Aluminum Foil Basics

The aluminum foil saggar not only keeps the smoke in, but also keeps the air out, which creates a reduction atmosphere. If you have a hole in the saggar, air will get in and you won't have as much smoke—you'll have fire, which is not what you want.

Aluminum foil from a restaurant supplier works best for making the saggar. It comes in wider rolls, is a bit heavier than foil for household use and it's cheap. In the U.S., there are heavier weights of aluminum foil available. Be careful, as some of the really heavy foil might be difficult to seal properly.

If the foil you're using tears and punctures easily, use a double layer. When you're ready to wrap a piece, cover your work area with a couple layers of newsprint to protect the foil from snagging on any rough surfaces while you wrap. You still need to be careful that you don't stretch the foil too much, especially around sharp edges or points. For angular pieces, try fixing a 'pad' of newspaper on the points to protect the foil. It will leave a trace of smoke but that could be useful.

escaping the tightly sealed foil saggar is minimal, if any at all, especially if you're only firing a few pots at a time. In addition, if you bisque often, this cleans up and re-oxidizes the elements. That said, your kiln must be ventilated. I have an Orton downdraft kiln vent, which is very good at removing the smoke from the kiln.

In a conventional saggar firing, the smoke moves in waves around the pot, leaving traces of the smoke and combustibles. The smoke in an aluminum foil saggar hardly moves at all, so it's even possible to stencil with sheets of paper or other combustibles. In the photos, you can see the surfaces resulting from using very simple materials that double as stencils and as the sole combustibles in the foil saggar, such as paper cut into a repeated pattern (*figures 8 and 9*), masking tape and string. Even pencil drawings—which look the same as before the firing, become permanent after firing (*figure 10*).

If you want to completely cover a piece with smoke markings, you have to cover the entire piece with paper. However, I tend not to do this because I like the variety of having smoked and unsmoked areas rather than an evenly black pot.

In a conventional saggar firing, you can use all kinds of oxides, soluble salts and organic materials to make different kinds of marks on the pot. Aluminum foil starts to break up and become flaky between 1200°F (650°C) and 1290°F (700°C). This means that most coloring oxides cannot be used because they have little effect below these temperatures. In addition, salts can attack the aluminum foil, breaking it down.

In a conventional saggar firing, temperature can be important to obtain certain effects. This is not so in aluminum foil saggars. Since paper burns at 451°F (223°C), you only



5 Press the two long ends together and fold them in half.



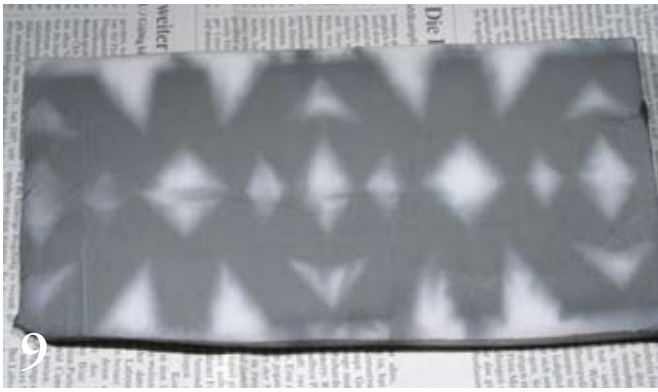
6 Press the folded edges flat and press the foil down all around the pot.



7 Fold the short ends in half multiple times and press flat around the pot.



8 Paper pattern laid on top of a clay slab before being wrapped in foil and smoke fired.



9 Paper pattern after the firing. The paper used to make the stencil was the only combustible used.

need to keep the kiln just above this temperature to have smoke. I have known people to use this method in their kitchen oven.

As with other saggar firings, the longer you leave a piece in the smoke, the stronger the smoke effect. If you have a computer controller on your kiln, you can set it to a temperature just above 451°F to get the paper burning and leave it for as long as you like.

Because the foil saggar is tightly sealed and I prefer to press the foil close against the body of the pot to exclude as much air as possible, the smoke is very concentrated. You really need very little newspaper in the saggar to get a good effect. I'm finding that the less I use, the better I like it. I'm currently using about ¼-page of newspaper on each side to smoke a 14-inch diameter plate.

The orientation of the pot during the firing can be important. If, for instance, you're firing an open bowl, you have a large air space in the interior volume of the bowl and where the foil covers the mouth of the bowl so you have several possibilities to play with. Fire the bowl

Tip

To get a completely black surface, use a fairly porous terra sigillata or none at all, completely cover the pot in newspaper inside the saggar, and set your kiln to soak at 482°F (250°C) for a few hours. When you come back, you'll have a uniformly black pot. If you use a paper clay body, it'll be even blacker. Leave the studio if you do this because even with a kiln vent, a large amount of paper generates some external smoke.

right-side-up, and any paper sheets you lay in the bowl will leave a mark shaped like the paper. If you don't want any specific stencil patterning from the smoke in the interior of the bowl, then use loose wads of newspaper. I like to dip the wads in water, shake out the excess water (keeping the paper loose) and place them in the bowl. The steam formed as they burn away will push the foil up over the mouth of the bowl, ensuring that the lip gets some smoke.



10 Grease pencil or china marker drawing, after firing. Some residue will be left but what doesn't brush off is permanent.

Alternately, if you fire the bowl upside down, the paper won't touch the surface of the pot at all, leaving an overall smoky effect rather than distinct markings or patterns. In addition, because the foil stays pressed against the lip of the bowl, it acts as a resist, keeping smoke away from the lip.

Conclusion

I love the unexpected effects made possible by this technique because you can never be certain that things will work out as planned. The results can disappoint but more often, they surprise. I recommend you keep going after the first smoke firing. Let the piece sit awhile and go back to it. If you decide you can't live with it, you can always bisque fire it again to re-oxidize it, maybe add some more decoration and smoke it again.

Please be aware that nothing here is truly set in stone. If you want to experiment with other materials, combustibles, temperatures, oxides, salts, etc. I'd be very interested to see your results, so please contact me. ■

Russel Fouts is a potter and workshop presenter living in Brussels, Belgium. He specializes in electric kiln smoke firing and is founder of "Pot Fondlers Anonymous." For comments or more information visit his website at www.mypots.com.

For more information . . .

Read a PDF version of the *PMI* companion article, "Pièce de Résistance," at www.pottery-making.org.

The article also appears in the book *Surface Decoration: Finishing Techniques* available through the Ceramic Arts Daily Bookstore at www.ceramicartsdaily.org/bookstore.

For additional formulas related to that article, visit Fouts' website: www.MyPots.com/Files/Piece_de_la_Resistance.txt.

Fouts' "Terra Sigillata Primer," which contains basic guidelines for making and applying terra sigillata, is available on his website at the following link: www.MyPots.com/Files/Terra-Sig%20Primer.txt.