

getting the most out of ceramic glazes and underglazes



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Ceramic glazes and underglazes are varied and wondrous concoctions. Because they can be complex, as well as for ease of use and time savings, most of us use commercial ceramic glazes to some extent. Chances are, even if you are a ceramic glaze mixing master, you have a few commercial ceramic glazes or underglazes around the studio for specific pottery applications. Maybe you want to rely on commercial glazes for your liner glaze, so you're sure it will be food safe, or perhaps a commercial ceramic glaze provides that hard-to-formulate color you need for details in your surface decoration. **Getting the Most out of Ceramic Glazes and Underglazes: Using Commercial Ceramic Glazes and Underglazes to Achieve Color, Depth, and Complexity** provides several approaches and techniques to successfully identifying, applying and firing commercial ceramic glazes.

Using Ceramic Underglazes

by David L. Gamble

Commercial underglazes are a great way to add color to your work using a variety of application methods. They're formulated to have low drying shrinkage, they can be applied to bone-dry greenware or to bisque-fired surfaces. In addition to being able to change the surface color of your clay body, underglazes can also be used to change the texture of the body.



Creating Depth with Ceramic Glaze

by Lisa Bare-Culp

There are many ceramic glazes that look great all by themselves, but you can really bring your own style and voice forward when you start using techniques like pouring, carving and layering to create depth in the ceramic glaze surface.



Low-Fire Red Glazes

By David L. Gamble

If you have ever tried to formulate a red glaze, you know how difficult it can be. But even if you buy commercial red glazes, you understand that they need a certain amount of attention and precision paid to them during application and firing. This article will help you understand and keep track of all the variable when applying and firing red ceramic glazes.



Using Ceramic Underglaze

by David L. Gamble



"Teapots" by Jim Kemp. Jim uses a low-fire red clay body and airbrushes underglazes onto the greenware. The last color he applies is black, which is sprayed across the piece to highlight the variations in heights of the surface decoration. The pieces are once-fired to cone 02.

Commercial underglazes are basically clay slips containing colorants, and they're a great way to add color to your work using a variety of application methods. And since they're formulated to have low drying shrinkage, they can be applied to bone-dry greenware or to bisque-fired surfaces. In addition to being able to change the surface color of your clay body, underglazes can also be used to change the texture of the body.

When used to add color to surfaces, underglazes have an advantage in that they are composed mostly of clay with very little flux, so they'll stay put and won't run, which makes them ideal for detailed decoration. While most underglazes were originally formulated for use at low-fire temperatures, most, maintain their color in the mid range and some even as high as cone 9 or 10.

Simple Application

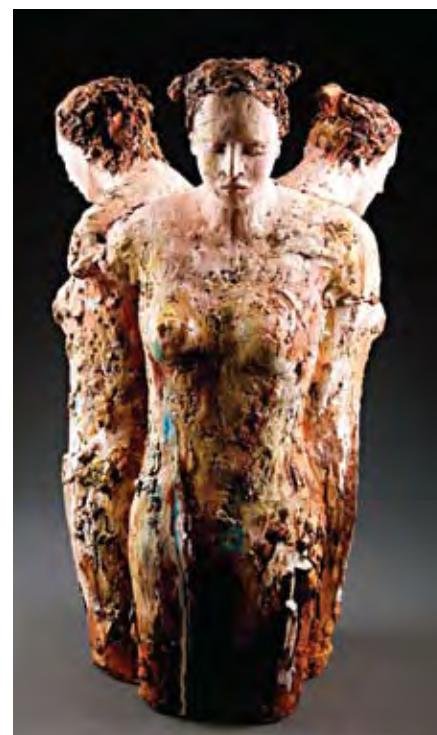
Underglazes can be applied by brushing, pouring, dipping, spraying, sponging—pretty much anything goes. Each application method has different requirements. If an underglaze is too thick for spraying or using as a wash, just add water to thin it down. If it's too thin for silk screening or monoprinting, leave the container exposed to air to evaporate some of the liquid.

Underglazes work best with a clear overglaze, although other glazes of varying opacity and color may also be used. I've had success with whites and very light-colored glazes, but darker glazes seem to muddy or absorb the color of the underglaze. The overglaze can be anywhere from matt to glossy. You'll find the clear deepens the value of the colors regardless of application method. If you're sealing the surface of work that will

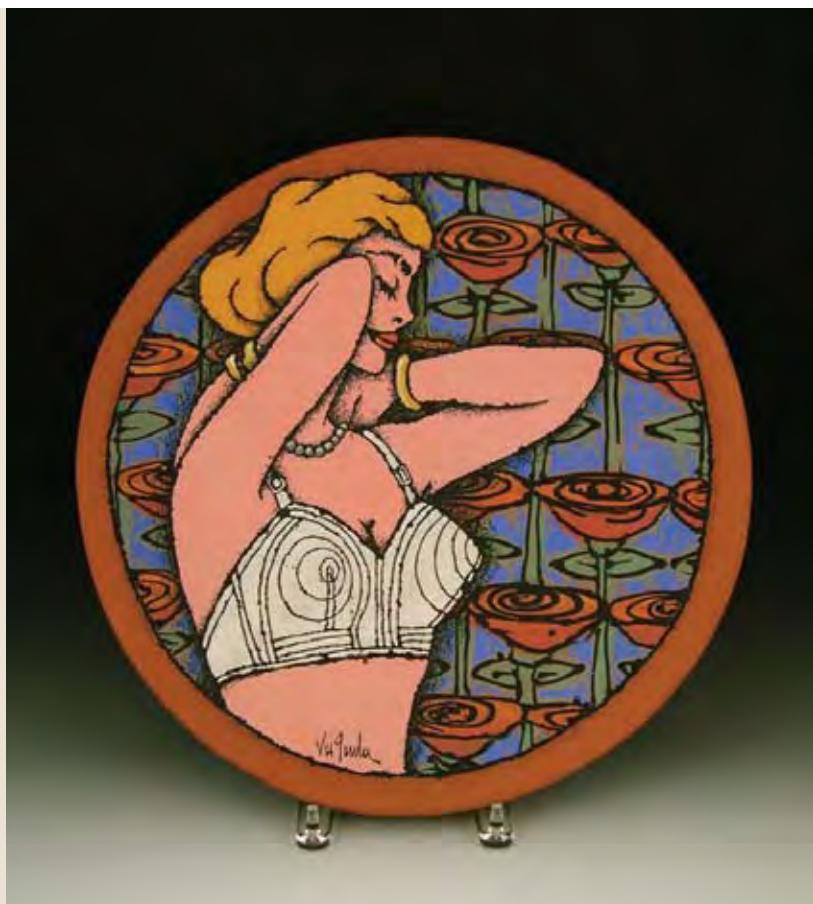
come in contact with food, be sure to use the appropriate food-safe clear that matches your clay body and firing range.

Applying an overglaze can be tricky. If you've applied underglazes on bisque, you'll find that they'll smear when brushing on a clear overglaze because moist glaze moistens the underglaze. Use a fan brush and float the first coat on without going over the same area twice. Wait for the first coat to dry completely before brushing on a second coat.

I've recently used underglazes to create a watercolor effect by thinning them down and painting them onto a semi-white glaze that is layered over



"3 Women Praying" by Debra Fritts. Debra sculpts in terra cotta clay and bisque fires to cone 02. She then covers the piece with black stain and then underglazes are applied, wiped and scraped, then fired to cone 04. She continues with final additions and does a final firing at cone 05.



Rimas VisGirda slab builds his plate forms from a terra cotta body. Following a pencil outline, he brushes on underglazes then applies wax to the entire surface. He redraws the figure and the outer border by scratching through the wax and into the clay surface and then inlays liquid black underglaze into the scratched lines. After bisque firing to cone 05, he waxes the figure portion and outer edge again but leaves the background alone. After sketching in flowers with a pencil, he applies underglazes to the flowers, leaves and stems and further defines them with black underglaze. He applies wax over the flower stems and leaves then sponges blue underglaze onto the background. After firing to cone 5, he adds shading with an underglaze pencil then fire to cone 3.

another colored glaze underneath. The colored glaze (sometimes gloss, sometimes matt) melts through the white and gives it a richer off-white look. The clay body is a red terra cotta that can handle a number of multiple firings if needed. I've been creating pieces from my travel sketches to permanently document places I've traveled to in a sketchbook-like manner.

Testing the Limits

Through their testing, clay artists have been very influential in the increased use and relabeling of underglazes. When they successfully experimented with firing underglazes above the recommended cone 06 to a cone 5 with little or no change in color, manufacturers relabeled their products to reflect the change. The hobby industry also helped promote higher ranges by developing a line of cone 5 casting porcelain, meaning more potters were working at higher temperatures. Even though the ma-

jority of underglazes can survive a cone 5 firing, usually resulting in a more vitreous surface, always test before using them on your artwork.

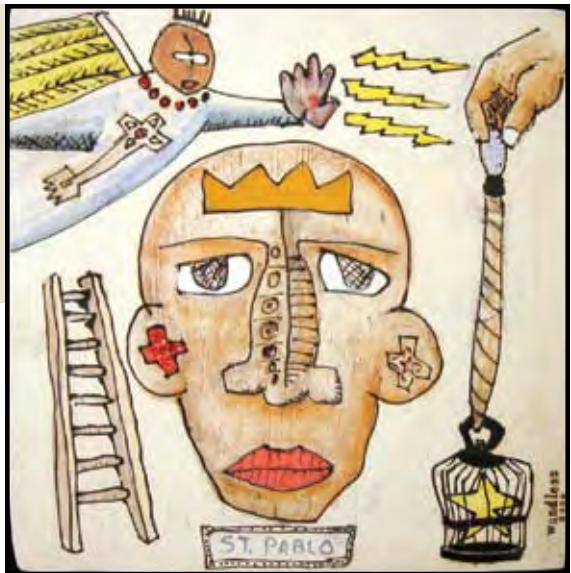
Through the years, my friends and I have done many tests, taking underglazes to cone 10 in different atmospheres. Many of the underglazes change color and most become very vitreous, even glossy, without a clear glaze over top. I've even fired some underglazes at cone 11 and 12 in Europe with nice results.

At the University of Indianapolis, Dee Schaad mixed some of the new bright red and yellow underglazes into a cone 10 clear glaze in a ratio of three parts clear to 1 part liquid underglaze. He then brushed the mixture on top of various cone 10 reduction glazes, including a temmoku, with great results—the bright colors stayed bright. When potters told me that the new bright reds that fire to cone 10 blush out to white, it made me wonder if mixing them in a clear glaze would help protect them from the salt when salt firing. Experiment-



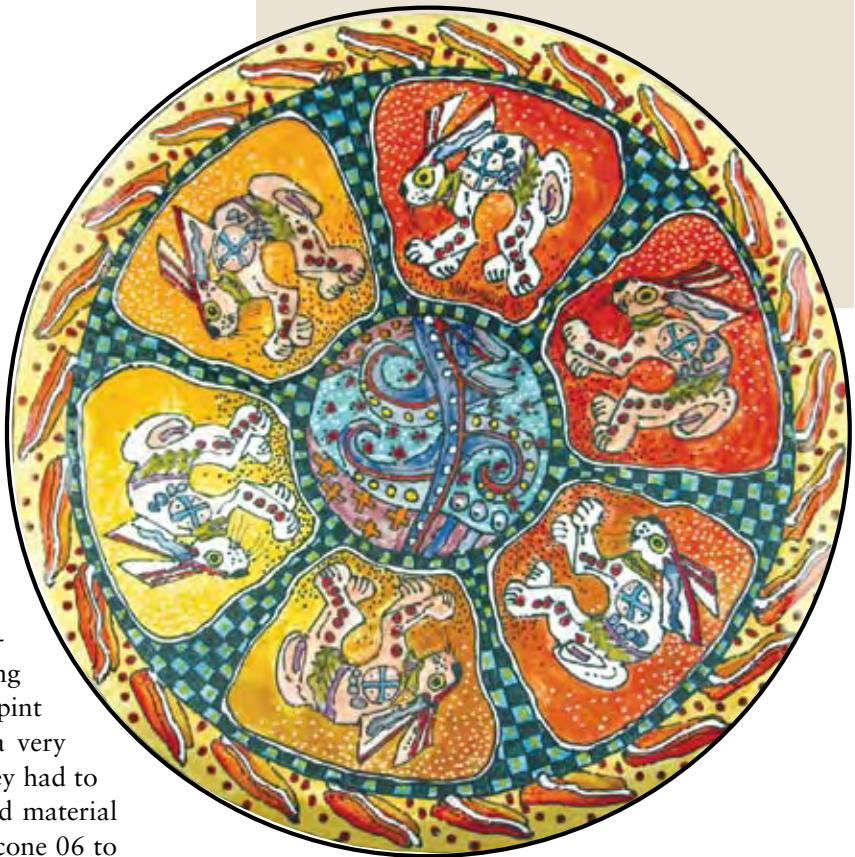
In this example from my "Sketch Book Travels," series, I bisque fired a clay slab to cone 03 then layered base glazes—3 coats of key lime with white, and 3 coats of low-fire white on top. The sketch is then executed with thinned out underglaze washes and fired to cone 04.

Paul Wandless paints underglazes on plaster in reverse, painting the foreground first and the background last. He then pours a low-fire white slip on the plaster. This picks up the underglaze image and inlays it into the clay. After bisque firing to cone 02, he applies a thin clear glaze then glaze fires to cone 04.



Tom Meunick uses white stoneware or porcelain then bisque fires to cone 06. He then uses underglaze pencils to draw on the surface. After drawing, he atomizes it lightly with water then applies a glaze by dipping or spraying.

Ron Korczyski bisque fires a white low-fire clay to cone 04 then applies underglaze by brush on the bisque piece. He uses many underglaze colors in different size applicators that he can squirt out and draw line details and dots of color. The final piece is fired to cone 05.



ing with all these colors allows you to find new and unexpected results when testing in, on and under anything you have on the glaze shelf.

One thing to remember, however, is that if you're using underglazes at a higher temperature than recommended, things can change. One clay artist using a black underglaze at cone 10 noticed that the next pint she opened looked the same in the jar but had a very greenish cast when fired. The company told her they had to reformulate because of government regulations and material availability and reformulated the color to fit their cone 06 to 5 suggested firing temperatures. The higher cone 10 temperature was overlooked and not taken into consideration.

Creating Depth with Ceramic Glazes

by Lisa Bare-Culp

As a potter and in-home instructor for many years, I've always mixed my own glazes, or relied on other professionals who mix dry glazes to my specifications. Recently, an idea for a single pot challenged me to experiment with commercially-made glazes. The outcome has been successful with vibrant new color selections, time savings and the convenience of readily available glazes screened for toxicity—all this without compromising my workspace or my standards.

What changed my thinking on commercially prepared glazes was my desire to introduce bold new colors into my work. I envisioned a piece with contrasting matt black-and-white slip surfaces offset against a single area glazed in vibrant red. My local supplier recommended a food-safe, nontoxic red glaze, Mayco's Stroke & Coat Cone 06.

Early Experiments

Early tests resulted in pieces with dramatic and beautiful contrasts between my porcelain slips and the red glaze. In one test, I used Stroke & Coat SC-73 Candy Apple Red, to highlight areas of bisqueware. In another, I used SC-74 Hot Tamale. Sometimes I applied the glaze with a big brush in a single, expressive stroke. Other times, I squeezed the colors from a slip trailer and a turkey baster.



"Fish Bowl," matt white glaze over commercial glazes, fired to cone 6.

After these loose applications, I dipped the entire piece in my usual cone 6 glazes. Because of their gum content, the commercial glazes resisted my glazes slightly, making the bold strokes of color come through vividly. Stroke edges were blended and their colors softly striking against the cone 6 palette. The outcome was as satisfying technically as it was aesthetically; I was satisfied with the melt (Stroke & Coat is a glaze, not an underglaze), the color and the absence of pinholing or other major flaws at cone 6.

A New Tool

Further experiments with sgraffito, layering, mixing with slip and stone-ware glazes, and multiple firings have opened up commercial glazes as a new artistic tool—albeit an unexpected one—to share with students. They have learned the importance of experimenting with new surfaces, new materials, combining techniques and achieving balance with different kinds of material.

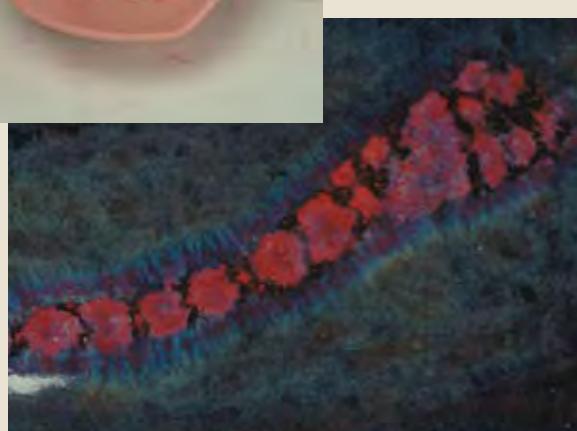
Pouring

Squeeze a large amount of Stroke & Coat SC-73 Candy Apple Red across the interior of a bisque-fired bowl. Use a 2-inch brush to apply a thin coat of Mayco's Elements Chunkies EL 203 Coal Dust (this is a low-fire effect glaze with crystals) over the Candy Apple Red.

A nice feathered edge is created when the piece is dipped into a cone 6 black glossy glaze.



Asparagus Tray

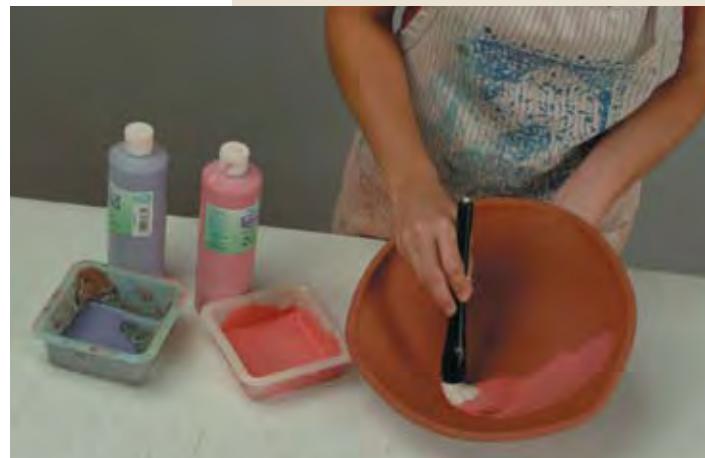


If you'd like to experiment with commercially prepared glazes, I've included three of my projects for you to try. Mixing my own recipes will always be an important part of understanding the science behind the art of pottery making. But successfully integrating commercial glazes in the mix is just one more way to pursue the function and beauty of ceramics.

Carving

Apply a thick coat of Mayco Stroke & Coat SC-71 Purple-Licious and SC-74 Hot Tamale with a large brush to the interior surface of a leather-hard bowl. Once the colors are slightly dry, the design is carved through the glaze with a loop tool, then bisque fired to cone 08. Dip the entire piece twice in a cone 6 matt white glaze and fire to cone 6 in oxidation. The commercial colors show well through the white matt.

Note: If the carved lines are too fine they may fill in when the glaze melts.



Fish Bowl



Gear Dish



"Gear Dish," slab-built stoneware.

Layering

On a heavily textured, bisque-fired piece, apply a cone 6 porcelain black slip as a stain, wiping off the high spots with a damp sponge.

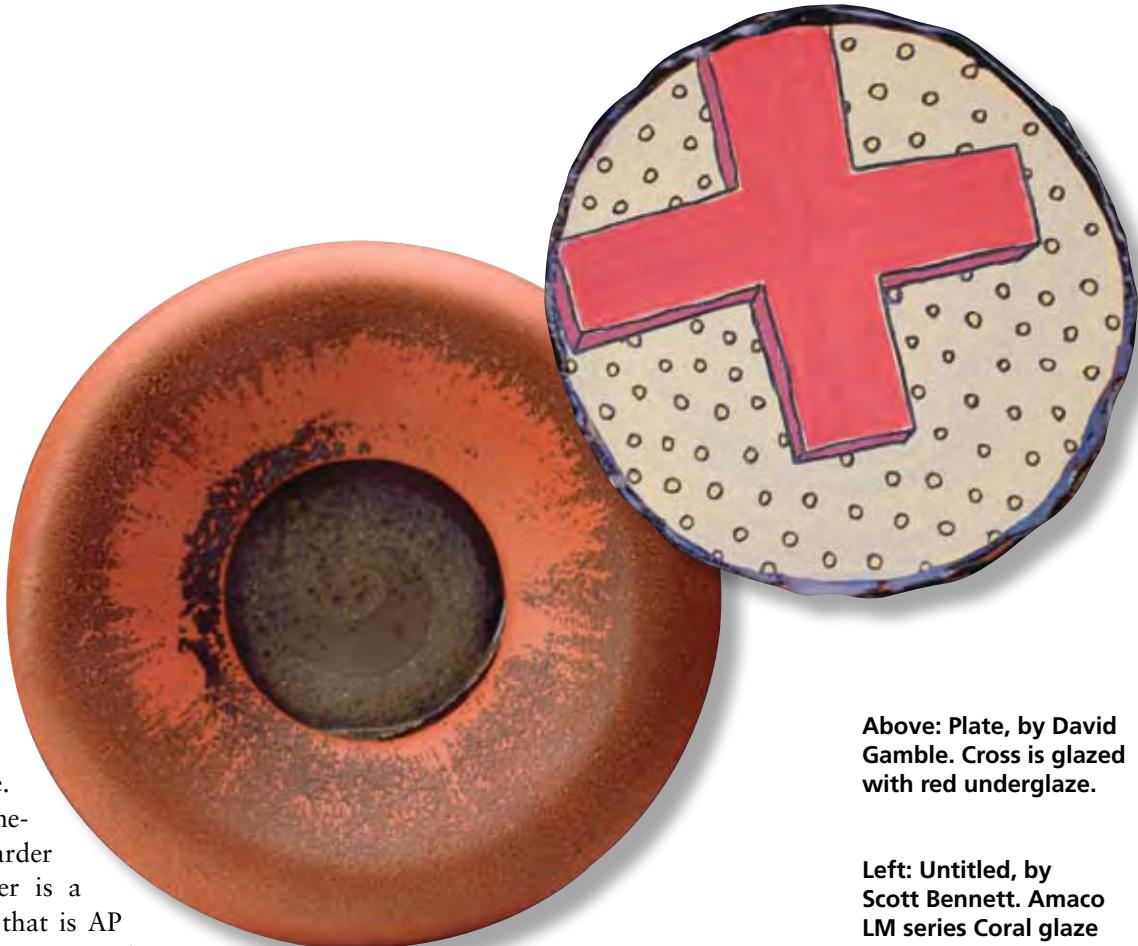
Use a 2-inch brush to apply Stroke & Coat SC-71 Purple-Licious to the high spots with a dry brush technique. Next, dry brush Mayco's Stroke & Coat Red SC-74 Hot Tamale and SC-27 Sour Apple onto the interior. Apply a thick coat of the red glaze in isolated areas to obtain a bright color.

Apply wax resist to the interior surface of the piece and allow to dry. Dip the entire piece in a cone 6 blue glaze.



Low-Fire Red Glazes

by David L. Gamble



I'll start by explaining there are two different types of commercial red glazes that I normally use. One type is an extremely bright color and harder to achieve and the other is a newer tomato red color that is AP (Approved Product of the Arts and Creative Materials Institute) non-toxic and dinnerware safe. The latter is formulated with inclusion stains, which are continuing to be improved. The color is encased in zircon, which makes them safe to use even in the classroom.

The AP nontoxic reds are extremely stable and were used to create red velvet underglazes that can be fired from cone 05 to as high as cone 10—only salt seems to blush them out.

The success of underglazes has allowed the development of gloss and matt red glazes that have been formulated to work well at the low-fire cone 05 range and other glazes formulated for the cone 4–6 range. These are extremely reliable. Three brushed coats will usually be enough of an application and you get nice tomato color reds at both temperatures.

Bright reds are not dinnerware safe and are extremely sensitive to variations in firing conditions. There have been many times that an art teacher has asked me about the use of these types of red glazes. I understand the space and time challenges that teachers face, but you cannot put these glazes in with your normal glaze firings and expect good results. They are affected by how tight the load is stacked, other glazes (mostly copper greens), and temperature. If you're firing to cone 05, I can almost guarantee there will be problems. The glaze will most likely have variations from clear to gray to black, and if you're lucky, a spot or two of red.

Note: Amaco glazes were used in the pieces shown here, however, many companies produce similar glazes.

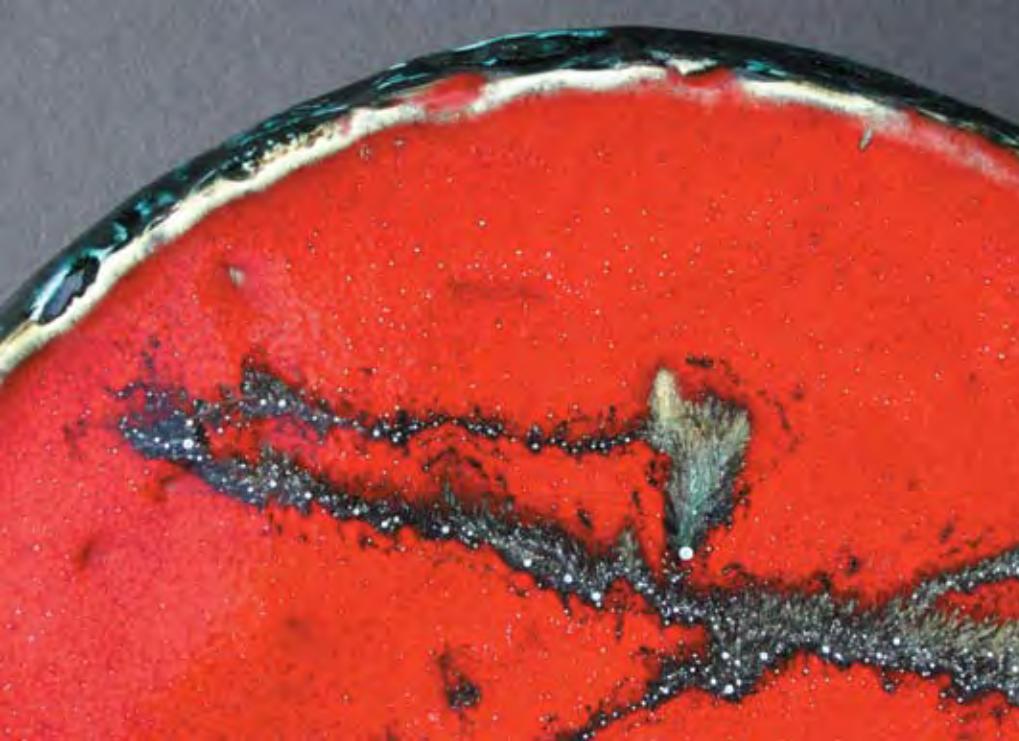
Above: Plate, by David Gamble. Cross is glazed with red underglaze.

Left: Untitled, by Scott Bennett. Amaco LM series Coral glaze with wax and Black overspray. As the wax melts in the kiln, the black moves.

Process

Here are my suggestions of what you need to know and do to achieve the bright reds!

Bisque your clay body slowly to cone 04 (12 hours to get all the gases out). Although these glazes are not considered translucent, the clay body color does affect them slightly. White bodies will make the glaze appear brighter in color than darker bodies.



Platter, by David Gamble, glazed with red glaze, blue brush strokes and one coat of gold used for accents.

Using a brush, apply the glaze thicker than the normal three coats. Four coats will usually work, but too heavy an application may cause the glaze to run. Glaze application may need experimentation and practice.

Load the kiln very loosely. There is a need for lots of space between the pieces for air circulation. I leave the peephole plugs out during the firing, thus allowing extra oxygen to enter the kiln chamber.

Do not fire above cone 06 (1828°F), preferably using witness cones for observation. I have been firing at cone 07 (1789°F) with great results. These glazes seem to like the cooler temperatures.

Fire as quickly as you can, four hours is ideal. If your pieces are larger, an example being my 22-inch platters, take them up slowly to about 1200°F. This may help to eliminate cracking problems. Then turn the kiln on high to fast fire to the end of the firing.

More Observations

If your kiln is vented through the bottom with a system that draws air through the top of the kiln, this will help give you more oxygen in the kiln and better red results. Remember that

kilns, depending on how they are stacked, may not fire that evenly. This can cause cold spots and hot spots. There can be a difference in temperature equal to a couple of cones from top to bottom—depending where the kiln sitter or thermocouple is located. This variability can really affect bright red glazes. Newer kilns with zone control and multiple thermocouples tend to fire more evenly. If you have an older kiln, place cones in the top, middle and bottom of the kiln so you can keep a record of what happens in the firing. They can help provide answers if problems do occur.

"Redhot Chilli Pepper Diner," by Jerry Berta. Glazed with red underglazes.



Now that you know the process, I will describe my experimentation with red glazes. I've been placing them on different color clay bodies, layering over glazed fired pieces and layering one coat of gold glaze over the top.

I then place the pieces next to peep holes to brighten the color or place shelves over the edges to deepen and take away the color. This is what is exciting to me—not getting it perfect, but having the surface color change and vary while having some control over what the changes will be. I am an extreme advocate of using commercial glazes the way a painter would use his tubes of paint. Experiment, test to the "max" and make them your own. Years ago, I was asked to be a glaze doctor at the National Council on Education for the Ceramic Arts (NCECA) in Las Vegas. I agreed, but told them to label me a glaze deviate instead of a glaze doctor.

Don't be afraid to experiment. Don't be afraid to sacrifice a few pieces on the way to discovering something more exciting.