

DESIGNING YOUR OWN ART GLASS

BY MARY KAY NITCHIE



Figure 1: Fused and slumped plate with sgraffito surface, 1.5" x 9.375" x 9.375" (3.8 x 23.8 x 23.8 cm).

Working with a palette of glass frit, powder, and stringers, you can create unique sheets of art glass to use in stained glass or fusing projects.

Using the materials and techniques described in this TipSheet, you will no longer be dependent on the selection of sheet glass offered by dealers or manufacturers. Rather than searching the globe for a sheet of glass with perfect color transitions, you can create sheet glass to meet the exact requirements of your artwork.

This TipSheet describes how to make a series of sample tiles using the classic elements of design, line, dot, shading, shape, and pattern. Use the same techniques to make larger sheets that can be cut into parts for use in larger projects. As you practice these simple techniques, you will probably be flooded with ideas for unique patterns, colors, and textures of your own.

Skill Level

You will need basic kilnforming skills: familiarity with basic equipment, firing, and annealing of glass. To learn more about basic kilnforming, visit bullseyeglass.com to watch instructional videos, download free articles, and locate classes worldwide.

Glass

The base glass for these tiles can be any Bullseye tested compatible sheet. We have specified Clear double-rolled fusible 3 mm sheet (001101-0030-F) for most of the tiles here, but other Bullseye clear sheet glass will work, especially:

- Tekta Clear 3 mm (001100-0380)
- Tekta Clear 4 mm (001100-0480)
- Tekta Clear 6 mm (001100-0680)
- Clear fusible 6 mm (001101-0060)

At Bullseye, we call the following smaller scale non-sheet forms of our glass “accessory glasses.”

- **Stringers** are thin threads of colored glass.
- **Frit** is made up of granules of crushed glass. Each color of frit is available in five different grain sizes:
 - *Powder* is the finest size and is easy to sift.
 - *Fine* is the size of sugar grains.
 - *Medium* is the size of very coarse sand grains.
 - *Coarse* is the size of the colored gravel that people put in the bottom of their fish tanks.
 - *Extra Large Frit* comes in diameters of anywhere between 5 mm–30 mm and is currently only available in clear and the streaky styles.
- **Confetti** is eggshell-thin, coin-size shards of glass. Imagine a toy balloon made of glass, broken to bits.
- **Ribbons** are fettucine-like organic strips, approximately 1 x 4 mm and 45 cm long.

Kilns and Temperature Control

The thickness of the base glass and the intended process temperature will determine which shelf separator you select. Firing 2–3 mm glasses to temperatures above 1425°F (774°C) is best performed on fiber paper to help avoid large bubbles from forming between the shelf and the glass.

More information on this phenomenon can be found in **TechNote 5: Volume & Bubble Control** (see bullseyeglass.com). You can fire 4–6 mm sheets on ThinFire, fiber paper, or on a shelf prepared with Bullseye Shelf Primer.

Each kiln has its own heating and cooling characteristics. The important thing is to keep records of the firing schedules you try and to make adjustments based on your observations. One firing schedule may produce different results in different kilns. The firing schedule chosen will need to accommodate the thickness of the sheet glass selected.

The “process temperature” is the highest temperature, or peak, of the fusing cycle. The hold time is the amount of time the kiln is kept at the process temperature. If the heating stages and hold time are the same for each of your projects, the surface and texture of each piece can be manipulated by choosing a particular process temperature. The process temperatures typically used for the sample tile projects that follow range from approximately 1300°F to 1500°F (704°C to 816°C). At about 1300°F,

fine frits dusted on the sheet will maintain a matte surface and have a sandpapery texture. At about 1500°F, those same fine frits will fire to a smooth, glossy shine. Firing to very low temperatures may make the color appear less saturated.

Many of our sample tiles have been fired to relatively low temperatures and, as a result, have bumpy textures. If your ultimate goal is to incorporate them into other works during subsequent firings, you may want to fire them to higher temperatures to reduce the likelihood of trapping unwanted air bubbles.

Carefully observing and recording the behavior of glass at different temperatures will give you access to a wide range of surface effects. **Below is an example of a firing schedule for the tiles in this TipSheet.**

Basic Fuse Firing			
SEGMENT	RATE (DPH)*	TEMPERATURE	HOLD
1	400°F (222°C)	1000°F (538°C)	:10
2	600°F (333°C)	Process temp.	:10
3	AFAP**	900°F (482°C)	1:00
4	100°F (56°C)	700°F (371°C)	:01
5	AFAP**	70°F (21°C)	:01

* DPH = degrees per hour
**AFAP = as fast as possible (without opening the kiln)
Note: This firing cycle was used for our example pieces, which all have thin, even applications of frit and/or powder. If your project includes application of uneven piles of frit and/or powder, you should slow the rate of heat in Segment 1 to prevent breakage from thermal shock. For instance, try 100°F/hr (56°C/hr).

Safety
Good housekeeping and common sense go a long way to ensuring safety in the glass-forming studio.

To keep glass out of your eyes, always wear safety glasses when using frits, powders, sheet glass, and stringers. To keep glass dust from irritating your lungs, always wear a respirator when using frits and powders. To keep your studio clean, use moist sponges, cloths or mops whenever possible for wiping up counters and floors. For any dry cleanup, use a vacuum with a HEPA filter.

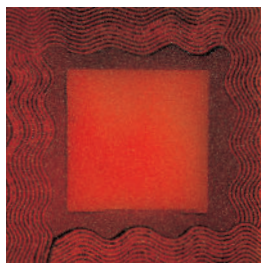
See your local safety supply company for a selection of safety glasses and respirators. For more information, see Bullseye’s information sheet titled **Safety in the Kiln-glass Studio.**

Setting Up
To minimize waste, use a large, clean piece of paper under the tile to collect any spilled frit or powder. After the tile is removed, the paper can be lifted and used to pour the excess frits or powders into a reclaim jar. To make the tile easy to carry to the kiln shelf, use inverted paper or plastic cups as posts under the corners of the tile. This makes it easier to lift the piece for transport and also allows some light through, for a better view while you are working.

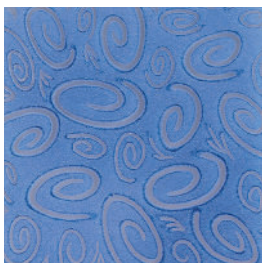
Additional Resources
TipNote 4: Heat & Glass



Figure 2: A proper work setup can help minimize waste and prevent accidental spills.



1. Red Sgraffito Square



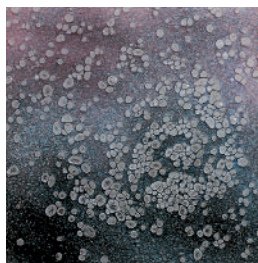
2. Blue Powder Spiral



3. Yellow Coarse Fading Color Field



4. Blue Powder and Stringer Bits



5. Starry Sky

1. Red Sgraffito Square

Materials

- Red powder (001122-0008)
- Black powder (000100-0008)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Powder sifter or tea strainer
- 4" (10.2 cm) square template (cardboard or glass square)
- Rubber wood-graining tool

Lay-up

Center the template on the tile. Sift a layer of black powder evenly over tile. Use wood-graining tool to make wavy lines. Remove template. Sift a thick layer of red-orange powder evenly over entire tile (including the black areas).

Firing

Try a process temperature of 1315°F (713°C). Hold for 10 minutes.

2. Blue Powder Spiral

Materials

- Deep Cobalt Blue Opal powder (000147-0008)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Powder sifter or tea strainer
- Pencil with an eraser

Lay-up

Sift frit evenly on the tile, holding your sifter at least a foot from the glass. Using the eraser or the pencil point as a stylus, draw spirals (or other designs).

Firing

Try a process temperature of 1325°F (718°C). Hold for 10 minutes.

3. Yellow Coarse Fading Color Field

Materials

- Sunflower Yellow Opal coarse frit (000220-0003)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Paper cup
- Tweezers

Lay-up:

Sprinkle frit in a single even layer across half the tile. Arrange the frit with tweezers to be densely fitted together at one end of the tile, gradually spacing out in the middle, and spaced sparsely at the other end.

Firing

Try a process temperature of 1400°F (760°C). Hold for 10 minutes.

4. Blue Powder and Stringer Bits

Materials

- Deep Cobalt Blue Opal powder (000147-0008)
- Clear stringers 1mm (001101-0107)
- Black stringers 1mm (000100-0107)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Tea strainer
- Tweezers

Lay-up

Break stringers into 1"–2" (2.5–5 cm) bits. Sprinkle stringer bits on the tile. Use tweezers to arrange any stray bits. Sift a substantial layer of blue powder evenly over the tile.

Firing

Try a process temperature of 1350°F (732°C). Hold for 10 minutes.

5. Starry Sky

Materials

- Midnight Blue powder (001118-0008)
- Cranberry Pink powder (001311-0008)
- Black powder (000100-0008)
- Crystal Clear coarse frit (001401-0003)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Powder sifter or tea strainer

Prep

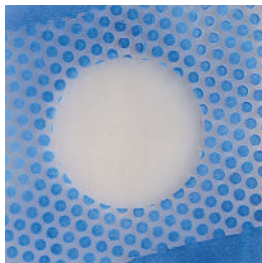
Create round clear frit balls by sprinkling Crystal Clear coarse frit directly on a primed kiln shelf. Space the grains so that none touches another. Fire the frit grains as fast as your kiln will fire, up to about 1500°F (816°C). Turn off the kiln. Open the door/lid wide. The grains should have formed into little balls. Leave the door/lid open to allow the balls to cool as quickly as possible to room temperature. Remove the balls from the shelf, rinse, and allow the balls to dry.

Lay-up

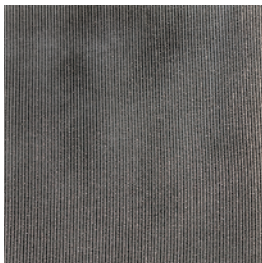
Arrange clear frit balls on the tile. Sift pink powder on the top third of the tile, over the frit balls. Sift blue powder on the rest of the tile, fading into the pink field. Sift a thin fading layer of black powder over the color fields and frit balls.

Firing

Try a process temperature of 1350°F (732°C). Hold for 10 minutes.



6. Blue Powder Dot Template



7. Black Reeded Texture



8. Yellow and Blue Coarse Spiral



9. Yellow Fine Spiral



10. Orange Powder Fading Color Field

6. Blue Powder Dot Template

Materials

- Deep Cobalt Blue Opal powder (000147-0008)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Powder sifter or tea strainer
- Paper or cardboard dot template
- Jar lid

Lay-up

Place the dot template on the sheet. Use the jar lid as a circle template, placing that on top of the dot template. Sift a substantial layer of blue powder evenly over the tile. Carefully remove the circle template. Carefully remove the dot template.

Firing

Try a process temperature of 1325°F (718°C). Hold for 10 minutes.

7. Black Reeded Texture

Materials

- Black powder (000100-0008)
- Clear reeded sheet glass (001101-0043) cut into an 8" (20.3 cm) tile

Tools

- Powder sifter or tea strainer
- Light box (optional)

Lay-up

Sift a substantial even layer of powder over the entire tile. Check that the layer is even by viewing the tile over a light box.

Firing

Try a process temperature of 1325°F (718°C). Hold for 10 minutes.

8. Yellow and Blue Coarse Spiral

Materials

- Yellow Opal coarse frit (000120-0003)
- Deep Cobalt Blue Opal powder (000147-0008)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Paper cup
- Powder sifter or tea strainer
- Pencil with an eraser
- Tweezers

Lay-up

Pour the yellow frit evenly on the tile from the paper cup. Using the pencil eraser as a stylus, draw a big spiral. Use the tweezers to rearrange any stray frits. Sift a thick layer of blue powder evenly over the sheet.

Firing

Try a process temperature of 1400°F (760°C). Hold for 10 minutes.

9. Yellow Fine Spiral

Materials

- Yellow Opal fine frit (000120-0001)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Paper cup
- Pencil with an eraser

Lay-up

Pour frit evenly on the tile from the paper cup. Using the pencil eraser as a stylus, draw spirals and dots.

Firing

Try a process temperature of 1350°F (732°C). Hold for 10 minutes.

10. Orange Powder Fading Color Field

Materials

- Orange Opal powder (000125-0008)
- Clear double-rolled sheet glass (001101-0030) cut into an 8" (20.3 cm) tile

Tools

- Powder sifter or tea strainer
- Light box (optional)

Lay-up

Sift a thin layer of orange powder evenly over the tile. Sift a second thin layer of orange powder evenly over $\frac{3}{4}$ of the tile. Sift a third thin layer of orange powder evenly over $\frac{1}{2}$ of the tile. Sift a fourth thin layer over $\frac{1}{4}$ of the tile. Repeat steps from the beginning until the powder blends evenly from a thin layer at one end of the tile to a thick layer at the other end. Check that the fade is even by viewing the tile over a light box before firing.

Firing

Try a process temperature of 1325°F (718°C). Hold for 10 minutes.