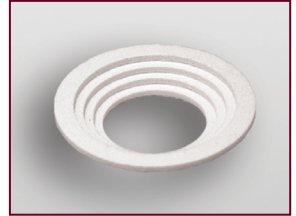


# Instructions and a Footed Bowl Project

- M35 Starfire Drape Mold • C105 Foot Casting Mold •
- F503 Stackable Fusing Foot Rings •



M35 Starfire Drape Mold    C105 Foot Casting Mold    F500 Stackable Foot Rings

All Wardell Products ceramic molds are manufactured in the USA from a high quality ceramic material formulated to endure multiple glass kiln firings. If your molds are prepared with the recommended mold release product and stored safely they will last for many years and scores of firing cycles.

Our Stackable Fusing Foot Rings are precision cut from a patented fiber product that is formulated to retain its thickness and shape throughout the drape firing process. The unique characteristics of that fiber product enables the magic, to create the distinctive V-shaped stemmed foot.

**Register Your Mold and Get a FREE eProject - includes a 20 minute video**



*The Grafitti Bowl is 10 3/4" diameter x 4" high, including the foot (27 x 10 cm).*

Go to the [www.joyoffusing.com](http://www.joyoffusing.com) website then click on Register Your Mold. Fill in the short information form and we'll send you an email with a link to download this Grafitti Bowl eProject. This eProject includes a 28 page PDF eBook with detailed step-by-step instructions, the full-size pattern drawing (that you can print on your desktop printer) and a link to a 20 minute streaming video where you can watch the project fabrication from beginning to end. Registration is easy and the reward is worth it - so what are you waiting for?

# Mold Release Methods & Strategies

When glass is heated to 1150°F - 621°C or above it will begin to stick to almost anything that doesn't burn. The good news is there are a few materials that molten glass does not stick to and those materials are called release separators or barriers.

There are two general categories of release separators suitable for ceramic molds. One of these is boron nitride (our favorite) and the other one is shelf primer (or kiln wash). As you might expect these separators are available in many different formulations and at various price levels. We have tested most of the separator products available on the market today and have settled on 2 brands that have provided consistent success. These are the only 2 release separators that we recommend for all our molds. There are, of course, other separator products that produce satisfactory results when used on ceramic molds so if you are partial to a particular product and are confident in the result then by all means go with your preferred choice.

## Boron Nitride Spray



The only Boron Nitride separator that we recommend is ZYP™ (formerly MR-97). It comes in a convenient spray can (like spray paint) and works fabulously on ceramic molds for casting or shaping glass. You will find other brands of Boron Nitride spray however these have a lower concentration of Boron Nitride solids - usually 1% to 5% by weight, as compared to ZYP™ at 15% to 20% BN. New molds require 2 coats of ZYP™ with only a 20 minute drying time. For subsequent firings simply brush the mold with a soft kitchen (vegetable) brush to remove the loose powder then one light spray coat is all it takes. If you choose to use one of the lower concentration brands of Boron Nitride spray, you would need to apply 8 to 12 coats to a new mold to get a similar coverage and even then the result may still be unsatisfactory.

## Primo Primer™



The only shelf primer (kiln wash) separator that we recommend is Primo Primer™. We mix it according to the manufacturers directions, 1 part powder with 4 parts water, then apply 4 to 5 coats to a new mold using a sponge paintbrush, allowing 5 minutes drying time between coats. The mold must be completely dry before it can be used. Any moisture left in the mold will boil-off and can thermal shock your glass. The best way to dry a freshly coated mold is to fire it in your kiln with a ramp speed of 200°F (108°C) per hour to 550°F (288°C) for a 20 minutes soak. It will take an hour or so to cool to room temperature then it will be ready to use. Primo Primer™ must be reapplied after every use, scrub the surface with a soft kitchen brush to remove the loose powder then apply 2 coats and allow to dry before use.

# Minimum Kiln Size and Kiln Temperature Variations

## Firing Chamber Depth

The M35 Starfire mold is 3 3/4" (9.5 cm) high all by itself. Adding a pre-fused design blank plus the fusing rings and a cast foot disk increases the overall height to 4 7/8" (12.5 cm). This mold must be placed on 1/2" (1.3 cm) kiln supports to promote heat circulation around and under the mold to balance the heat and provide a little wiggle room if the glass blank didn't get perfectly centered. All this means the kiln's firing chamber must be at least 6" (15.2 cm) from the floor to the underside of the lid.

## Firing Chamber Diameter

The M35 Starfire mold is 11 1/2" (29.2 cm) diameter at the widest point and the largest design blank that we recommend is 12" (30.5 cm). Therefore the minimum firing chamber diameter would be 13" (33 cm) to provide 1/2" (1.3 cm) clearance all around. Since most kilns are 6, 7, or 8 sided polygon shapes it can be difficult to determine a kiln's actual inside diameter. The easiest way is to measure the diameter of the kiln shelf. A kiln with a 13" inside diameter and 6" depth would be a perfect fit for this mold.

## IMPORTANT NOTE about Kiln Temperature Variations

Experienced fusers know that pyrometers and digital controllers are calibrated differently for every kiln. The temperatures in the schedules in this booklet (and also in our book *Joy of Fusing*) were carefully researched to be the average temperature for kilns manufactured for glass fusing. The reality is the temperature in your kiln is likely to be 5° to 20° higher or lower than our schedules (and could be as much as 50° or more). That is why it is extremely important for you know your kiln and the best way to do that is to create a Fusing Level Sample Set. The process and schedules to create one of these 6 tile sets is on pages 24-29 in our book *Joy of Fusing*. This book is available in print or download the eBook at: [www.joyoffusing.com](http://www.joyoffusing.com).

Examine this photo (right), this is tile number 4 of 6 in the fusing level tile set. It was fired using the Contour Fuse schedule on page 8 in this booklet with a target temperature of 1370°F (745°C) and a 10 minute soak to achieve this level. Let's say you know that your kiln requires a temperature of 1390°F (755°C) with a 10 minute soak to achieve that same level. That would mean your kiln requires a 20°F (10°C) higher temperature than our printed schedule calls for. Now all you have to do is add 20°F (10°C) to the target temperature in any of our printed schedules. For example, Scrap Casting (page 5) would require a target of 1465°F (795°C) to get the result that you're looking for.



*Contour Fuse Level: The edges and corners are almost fully rounded off while the top surface retains some raised texture of the designs pieces*

# Graffiti Bowl

## Project at a Glance

### Finished Project Size:

- 10 3/4" x 4" (27 x 10 cm)

### Molds:

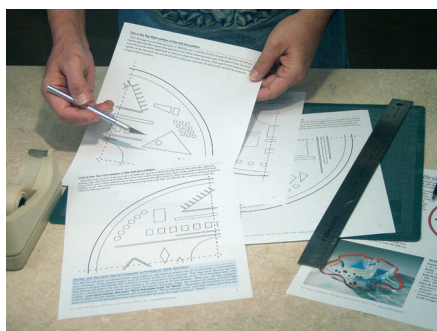
- M35 - Starfire Drape Mold
- C105 - Foot Casting Mold
- F500 - Foot Rings

### Kiln Firings: 3 Total

- CS1 - Foot Disk Casting
- FS4 - Contour Fuse
- MFS - Mold Forming

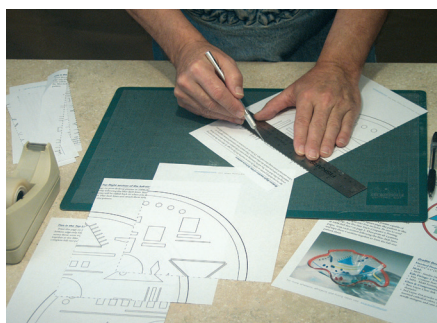


The M35 Starfire Drape Mold enables fusers to create a shape that is very reminiscent of a blown glass vessel. This blown glass effect is enhanced even more by using a clear or light colored cathedral base glass and by adding a “rim-wrap” to give the top edge a strong colorful border. Then take this project to the next level by adding a short-stem cast foot using our C105 Circle Foot Cast Mold and one set of F500 Stackable Fusing Foot Rings to make a spectacular stem footed bowl.

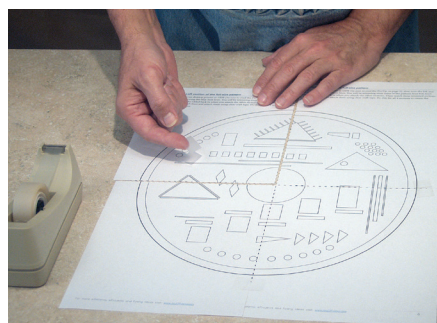


*Print out all 4 pattern pages*

To download the full-size Graffiti Bowl pattern please follow the instruction to “Register your Mold” on page 1 of this booklet. Then print the pattern pages (4 total) using any desktop printer and follow the instructions in the eProject to trim and tape the sections together to make the full-size 12” (30.5 cm) diameter pattern.



*Trim the sections following the dotted lines*



*Tape the sections together to create the pattern*



## Cast Foot Disk

This bowl is gorgeous without the added short-stem foot however the foot is easy to create and attach and it transforms this bowl into a spectacular art piece with only one additional step.

The 3 1/4" (8.5 cm) cast glass disk was created in our C105 Foot Casting Mold using a technique that we have coined 'Scrap Casting' This technique provides an opportunity to make use of leftover fusing glass. Use a pair of mosaic nippers and a catcher box to break small scrap glass pieces into even smaller glass shards. Try to make the shards around 1/4" to 3/4" (6mm to 20mm); exact size is not critical. The four 'left over' corners gleaned from cutting the 12" (30.5 cm) circle base for this bowl made more than enough glass shards to cast the foot disk.

**ProTip:** Keep a small supply of glass shards cleaned and ready for use. When you have finished a project and your ready to clean up, take a few minutes to break your smaller leftover pieces into shards rather than store them. Wash, dry and place ready to use shards into zip-lock bags. Be sure to mark the COE on the bag.

Prepare the C105 Foot Mold for casting by following the instructions on page 2 - it is critical to use only the recommended mold release products. Place the prepared mold on a digital kitchen scale and zero the tare weight. Then carefully pour the shards into the center of the mold until it weighs 100 to 120 grams (depending on how thick you want it to be). Allow the shards to pile up in the center to reduce the formation of edge spikes & points.

Place the glass shard filled Foot Casting Mold into the kiln (or several casting molds, if you have them) then set the kiln controller to fire the CS1 - Casting Schedule, shown at right. Please read the IMPORTANT NOTE about Kiln Temperature Variations on page 3.



Cast glass created in a C105 Foot Casting Mold



Creating glass shards with mosaic nippers

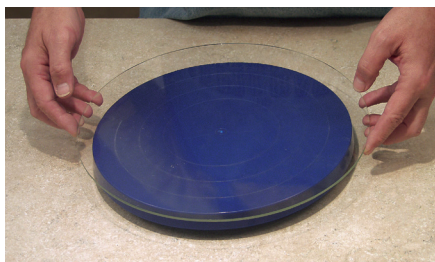


Filling the casting mold using a digital scale

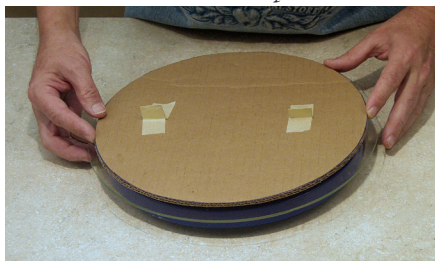


Casting molds in the kiln ready to fire

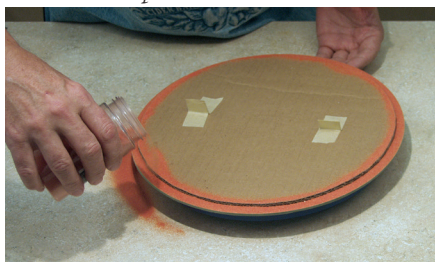
CS1 - Scrap Casting Schedule				
Segment	#	Degree/Hour	Target Temp	Minutes
Primary Heat	1	300°F - 165°C	1250°F - 675°C	30
Intention Heat	2	300°F - 165°C	1445°F - 785°C	30
Drop to Anneal	3	Full/AFAP	950°F - 510°C	90
Slow Cool	4	125°F - 67°C	200°F - 95°C	0
Power Off	5	Kiln Off	Room Temp	~



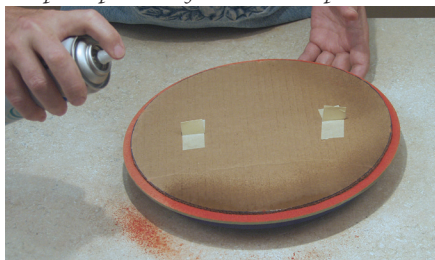
*Place the base disk on a sculptor's turntable*



*Cut and position the cardboard disk*



*Spread powdered frit around the perimeter*



*Use hair spray to secure the powdered frit*



*Clear any stray frit from the inside area*

## Create a 'Rim Wrap' Border

I prefer to use clear or pastel glass for the base to maximize the blown glass look of this bowl. Cut a 12" (30.5 cm) diameter disk, then clean and place it on 3 kiln risers to lift it off your bench.

**ProTip:** I like to place my base glass on a sculptor's turntable (available from most craft stores) to lift my work off the bench. The turntable simplifies the process of adding a powdered frit border and enables me to easily turn my work as I'm adding my design details later.

Next cut an 11 1/4" (28.5 cm) disk from a flat piece of corrugated cardboard, then create 2 pull-tabs by folding over 2 pieces of masking tape. Place the cardboard disk in the center of the base glass, leaving 3/8" (1 cm) of perimeter glass exposed all around.

Now spread a thick, even layer of powdered frit to cover the exposed glass all around the rim. I prefer to use an opal frit powder to give the rim an intense solid color. If you're using a sculptor's turntable, pour the frit while slowly turning your work, loading the powder until it falls off the edge. Use a small paintbrush to sweep the excess frit powder off the cardboard and back onto the border. Then collect the excess frit and put it back into the frit container.

Spray the frit with a generous amount of extra-hold hair spray to put a stiff crust on the surface. Hold the hair spray container far enough away to minimize blowing the frit powder around.

Now remove the cardboard disk by grasping the tabs and lifting it straight up. The center of the glass should be almost clear of any frit. Use a small artist's brush to sweep any stray powder toward the edge. Spray the frit once again with hair spray, concentrating on the inside edge, to ensure the frit doesn't move.



## Add the Design Components

The design components for this project are mostly cathedral colors, to convey a light and vibrant quality but opal colors would be just as effective. Start by placing the 2 1/2" (6.5 cm) circle in the center of the pattern. That double thick glass area will offer extra reinforcement when the short-stem cast foot is attached.

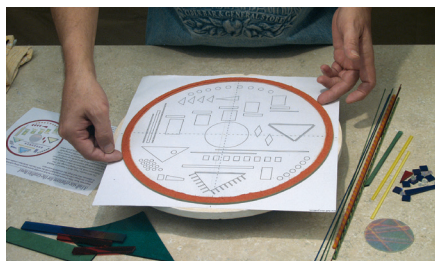
Place all larger elements on first then use a quick setting 'capillary action' assembly glue to secure all these pieces. Next add the smaller elements, such as the spaghetti stringers, slices of patterned cane, fragments of dichroic, etc.

When the assembly is exactly the way you want it, apply the glue then give it sufficient time to harden completely.

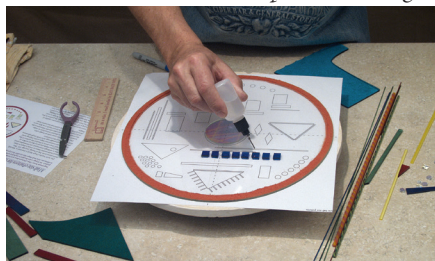
**ProTip:** Wait until you are sure the glue has dried and set completely before placing the assembly into your kiln. Moisture that remains under any glass pieces will boil-off during the initial firing and the resulting vapors can move and shift your design elements out of their alignment.

This is a great time to begin your fusing log (you have to wait for the glue to set anyway). The fusing log form that we're filling out here is available for purchase in a convenient tear-off pad of 25. You can purchase this pad from your local fusing supply store or find it in The Fusing Store on [www.joyoffusing.com](http://www.joyoffusing.com) website. The firing schedule section on this form was designed specifically to help you program your digital controller.

When you think the glue has set, it's always a good idea to test one or two pieces to make sure they are secure before moving your glass. Then carefully lift the glass disk off the full-size drawing and place the assembly on a prepared kiln shelf. A sheet of thin resist paper (e.g. Papyros™ or Thinfire™) was used to cover the kiln shelf for this project.



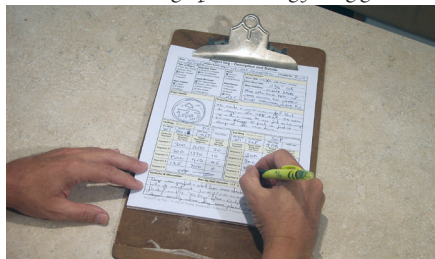
*Place the base disk over the pattern drawing*



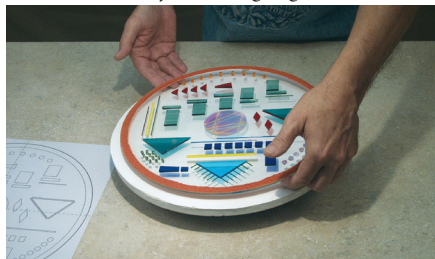
*Cut and position the design elements*



*Secure the design pieces using fusing glue*



*Fill out your Fusing Log Form*



*Lift the glass to remove the pattern drawing*



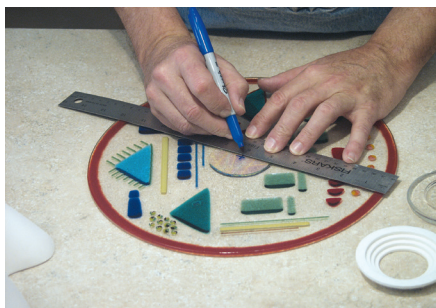
The base disk on a prepared kiln shelf



Flat glass disk still in the kiln after fuse firing



Creating the tapered cone foot assembly



Mark the center of the pre-fused disk with an X

## Load and Fire the Kiln

Place the shelf with your glass design into your kiln and fire it using the FS4 - Contour Fuse Schedule below (see Note on page 3). The design components will be raised slightly using this FS4 schedule. If you would prefer a smooth flat surface for your bowl, fire it using the FS5 - Full Fuse Schedule also below.

### FS4 - Contour Fuse Schedule

Segment	#	Degree/Hour	Target Temp	Minutes
Primary Heat	1	350°F - 190°C	1150°F - 635°C	30
Intention Heat	2	600°F - 325°C	1370°F - 745°C	10
Drop to Anneal	3	Full/AFAP	950°F - 510°C	60
Slow Cool	4	200°F - 110°C	200°F - 95°C	0
Power Off	5	Kiln Off	Room Temp	~

### FS5 - Full Fuse Schedule

Segment	#	Degree/Hour	Target Temp	Minutes
Primary Heat	1	350°F - 190°C	1150°F - 635°C	30
Intention Heat	2	600°F - 325°C	1425°F - 775°C	10
Drop to Anneal	3	Full/AFAP	950°F - 510°C	60
Slow Cool	4	200°F - 110°C	200°F - 95°C	0
Power Off	5	Kiln Off	Room Temp	~

## Preparing the Foot Ring Assembly

Create the tapered cone ring assembly using one set of F500 Stackable Fusing Foot Rings. Remove the pre-cut rings from the F500 fiber rectangle. Place the largest ring on your bench and put 3 drops of craft glue around the inside edge then center the 2nd largest ring on top. Now glue the inside edge of this 2nd ring and place the next smaller ring on top. Then glue the 4th and final ring to the top to create a 4-step tapered cone shape.

Next place your fused disk face-down on your bench then measure and mark the center with a small X. If you use a Sharpie pen (or similar marker) the ink will burn off during the drape firing and should not leave a stain.



Prepare the M35 Starfire mold (see page 2 for mold release details) then place it in your kiln resting on 3 kiln risers to lift it at least 1/2" (12 mm) off the floor.

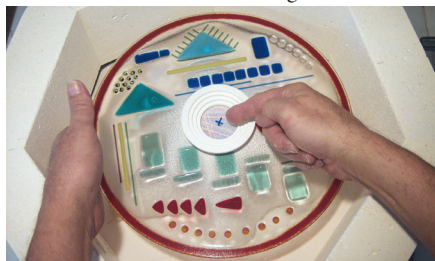
Place your fused disk face-down on the mold and carefully center it by positioning the X directly over the center hole in the top of the mold.

Now place the 4-step tapered cone assembly in the center of your fused disk with the smallest ring down (largest ring at top), to create a funnel shape. Make sure the cone is centered over the X.

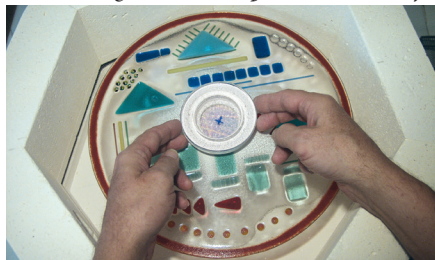
The final step is to carefully place the cast-glass foot, recessed side facing up, on top of the tapered cone. Check to ensure everything is centered then gently close the kiln lid.



Place the mold in the kiln resting on 3 kiln risers



Center the glass and the tapered cone assembly



Center the cast glass foot disk

**IMPORTANT:** It is critical to follow the DFS - Drape Forming Schedule listed below to shape fire this project. The extra slow primary heat ramp speed is ABSOLUTELY ESSENTIAL to prevent setting up a thermal shock incident that will shatter your pre-fused glass design disk.

If your kiln is a 'top elements only' model (without side elements) we recommend an even slower primary heat ramp of 75°F - 40°C to ensure an even and balanced heat through the critical zone.

Do not risk a faster ramp speed!

#### DFS - Starfire Drape Forming Schedule

Segment	#	Degree/Hour	Target Temp	Minutes
Primary Heat	1	150°F - 81°C	500°F - 260°C	20
Primary Heat	2	300°F - 165°C	1150°F - 621°C	10
Intention Heat	3	390°F - 200°C	1230°F - 665°C	10
Drop to Anneal	4	Full/AFAP	950°F - 510°C	60
Slow Cool	5	200°F - 110°C	200°F - 95°C	0
Power Off	6	Kiln Off	Room Temp	~

After the drape firing is complete and the kiln has cooled, you may open the kiln to admire your masterpiece.



Program the digital kiln controller



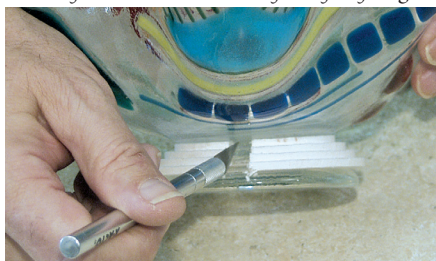
The finished bowl in the kiln after mold forming



Carefully separate the bowl from the mold



The fiber collar around the foot after firing



Use a craft knife to cut the fiber collar

## We Have Lift Off

You could reach down into the kiln to lift the glass bowl off the mold, however it is much better to extract both the mold and glass together and place the whole assembly on your bench. You'll have better access to safely remove the glass from the mold.

Separate the bowl from the mold by lifting up gently on the rim of the bowl, move around from area to area until you feel the bowl begin to loosen up. Then lift it straight up and off the mold.

Note: If the glass blank was oversized and/or the drape was overfired it is possible for the glass to capture the mold. If this happens **DO NOT** try to force it off and **do not panic**. You will find a simple and insightful solution to this issue in the FAQ section on our website [www.joyoffusing.com](http://www.joyoffusing.com)

Use a craft knife to slice through the soft fiber cone assembly from the top to the bottom then use the knife to spread the sections apart until the whole assembly falls off onto the bench.



Download this Graffiti Bowl ePattern for FREE from our website: [www.joyoffusing.com](http://www.joyoffusing.com)



# Starfire Bowl Gallery - by Randy & Carole Wardell

## Hot Fritage Bowl with Black Split-ring Border Wrap



Finished bowl size: 9" x 4" (23 x 10 cm)

Cut a 10 5/8" (27 cm) dia. black split ring border that is 3/8" (1 cm) wide. Then create and fire a Fritage design inside the split ring using red, orange & yellow frit & stringers. Next, contour Fuse the Fritage ring to a 10 1/2" (26.7 cm) clear disk following the FS4 schedule (on pg 8). Finally drape the fused glass disk over the M35 mold using the DFS schedule (pg 9).

## Crossbuck Striped Bowl with Cherry Blossom Frit Border & Stemmed Foot



Finished bowl size: 10 5/8" x 4 3/4" (27 x 12 cm)

Start with an 11 3/8" (29 cm) dia. clear split ring border that is 1/2" (1.3 cm) wide. Prepare an assortment of cathedral colors and clear glass strips that are 3/8" (1 cm) wide, you will need approximately 85 strips, 12" (30 cm) long. Fill the inside of the split ring using the 'strips on-edge' construction method (the example bowl has a criss-crossbuck design). Edge wrap is cherry blossom opal frit powder placed on the clear split ring border.

## Blocks and Threads Hammock Bowl with Dashed Blue Iridized Border



Bowl size: 10 5/8" x 7 1/2" x 4" (27 x 19 x 10 cm)

The base glass is a 12" x 8" (30.5 x 20.5 cm) clear oval. Create the border by cutting several 3/8" (1 cm) wide blue strips then dice these into squares and place them around the perimeter. The central design consists of a few simple shapes (mostly scraps) cut from pastel opal & dichroic glass that were outlined and connected using dark purple spaghetti stringers.

Visit [www.joyoffusing.com](http://www.joyoffusing.com) for information on these and other fusing projects.

## Anatomy of a Fused Bowl with Blown Glass Characteristics

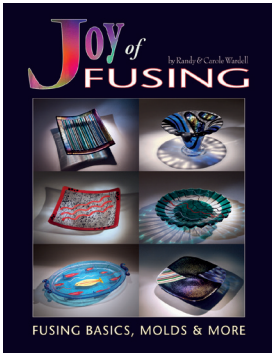
1. Foot Disk Cast using scrap glass in a C105 Circle Foot Casting Mold

2. Bowl Draped on the M35 Starfire Ceramic Mold

3. Stem-Foot Shaped using one set of F500 Stackable Fusing Foot Rings (Refill Packs Sold Separately)



### Joy of Fusing - Fusing Basics, Molds & More



Joy of Fusing is a lavishly illustrated book with how-to color photographs and easy to follow instructions to show readers everything they need to know to be successful fusing artists. 27 exciting projects are included, with an emphasis on design composition, pre-fuse assembly and a shrewdly simplified kiln-firing strategy. Dozens of 'ProTips' are integrated with the step-by-step photos providing page after page of fusing instruction and inspiration for fusers of every skill level to discover. Available as a printed book or download the digital eBook at: [www.joyoffusing.com](http://www.joyoffusing.com)

### Register Your Mold and Get a FREE eProject - includes a 20 minute video



The Grafitti Bowl is 10 3/4" diameter x 4" high (27 x 10 cm)

Go to the [www.joyoffusing.com](http://www.joyoffusing.com) website then click on Register Your Mold. Fill in the short information form and we'll send you an email with a link to download the Grafitti Bowl eProject. An eProject includes a PDF eBook with detailed step-by-step instructions, the full-size pattern drawing (that you can print on your desktop printer) and a link to the online Webcast video where you can watch the project fabrication from beginning to end. Registration is easy and the reward is worth it - so what are you waiting for?