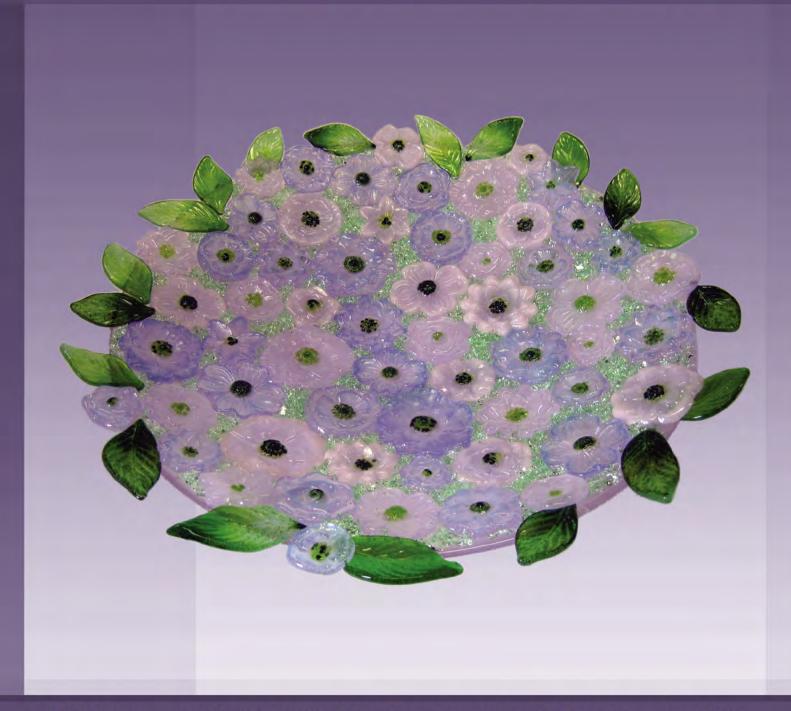
Jayne Persico presents... Class Kilm Casting with Colour de Verre



A Quintessential Guide to Kiln Casting with Project Instructions Featuring Glass Frit, Sheet Glass And Re-Useable Casting Molds

Jayne Persico presents...

Class Kilm Casting with Colour de Verre





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Pâte de Verre 'Pansies' created by the author at The Studio of The Corning Museum of Glass, under the direction of Kimiake and Shinichi Higuchi.



'Floral Vessel #1' created by the author at The Studio of The Corning Museum of Glass

A Message from the Author

have to admit, when I first started working with frit I was not all that pleased with the results. But I was so drawn to Pâte de Verre casting (French for 'Paste of Glass') that I was determined to learn everything I could about frit. As luck would have it, I came across a wonderful opportunity to study with Kimiake and Shinichi Higuchi at The Studio of The Corning Museum of Glass, and that was exactly what I needed. Kimiake and Shinichi Higuchi are world-renowned masters of Pâte de Verre. Their art pieces have won many international awards and are included in many significant glass collections such as the Corning Museum of Glass and the Kitazawa Museum of Art. My time with Kimiake and Shinichi was well spent as I gained a new respect for frit and my work improved immediately. Three of the objects I created in this workshop are shown on this page.

I have been casting glass for many years using traditional techniques including the complex but rewarding 'lost wax' process to create glass

sculptures. However my favorite technique is 'component casting', when several design elements (components) are assembled in some way to make one complete sculptural object. This 'assembly' can be accomplished in two ways. One method involves the creation of a series of flexible silicone components that are mounted onto a clay base then a refractory mold is created from this design to use for glass casting. The other method - the one I will expand on in this book - involves casting each glass component individually then attach them to a base of glass by tack fusing in the kiln. I call my style of component casting 'Glass Kiln Casting' where I use commercially available molds created specifically for this purpose by 'Colour de Verre'.

When Craig Smith & I formed Colour de Verre (see page 6 & 7 for the 'Colour de Verre' story) I knew immediately that this incredible format of reusable casting molds would be

an excellent introduction to Glass Kiln Casting for all glass artists. I am delighted to share my expertise with you in this book, to enable all glass artists to benefit from Glass Kiln Casting with Colour de Verre molds.

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Kiln Formed Bracelet by the author, executed in the Pâte de Verre method under the direction of Kimiake and Shinichi Higuchi.





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'Positive Energy Waves' by the author using the Glass Damming technique shown in chapter 9 on pages 60 - 63.



'Bowl with Flower Rim' by the author, accomplish using the 'Multiple Component' casting technique covered in chapter 6 on pages 38 - 41.

(hapter 1 - An Introduction to Glass Frit Casting

lass Frit Casting is not exactly new. In fact a similar process called Pâte de Verre (French for 'Paste of Glass') has been around for thousands of years. Some of the techniques in this book are new but the most important new development is the ceramic casting molds that have enabled us to create glass art in ways that were either difficult to achieve (i.e. using one-off molds) or totally unavailable to the average glass artisan.

This first chapter provides background into the 'Colour de Verre' molds. Plus it has important information on the Preparation and Care of the molds (pg 8), a review of the Tools, Materials & Equipment (pg 10), and an uncloaking of the mysteries behind the Digital Kiln Controller (pg 12). So what are you waiting for - let's do some 'Glass Kiln Casting'!

The 'Colour de Verre' Molds Story

by Craig Smith - mold maker

Jayne and I met in 2003. It was an early spring evening and she had just finished teaching a class in kiln casting. I had been working all day in my studio. I had only been out once that day - to run down to the store, catch lunch, and pick up some wine and snacks to offer my guests.

A mutual friend had arranged to meet Jayne after her class and together they would swing by my house and studio. It would be our opportunity to meet and my opportunity to show Jayne the mold technology and product prototypes I had developed.

Let me give you some background. I am a classically trained traditional ceramicist. I designed and created functional and decorative pieces that I sold at craft shows, in galleries, and through high-end department stores. Around 1990 I realized that the mold-making skills I had developed in order to execute my own work were in high demand. My career and business transitioned to working with artists and companies to creating molds and mold systems based on their work and designs. My molds permitted them to generate artwork and products in a more economical and efficient manner.



A selection of the 'Glass Frit Casting' molds that we will be using to create the projects presented in this book.

So, back to Jayne. She arrived at my house and, since the evening had turned too cool for us to sit outside, we sat around my dinning room table snacking on black, salt-cured olives and sipping wine. Sitting in the middle of the table was one of my first frit mold prototypes; a dragonfly. I explained how the mold was reusable; how its' design permitted uniform heating and cooling; and how it could be mass-produced without sacrificing quality, design or detail.

Jayne was very excited. She said that she had produced one-off Hydroperm* and silica molds for her own artwork. She knew her students were very interested in learning this process so they could create complex designs in glass. However, she discovered that students were often overwhelmed and intimidated by the mold making process.

While I knew a bit about the mechanics of glass from my ceramics background, I freely admitted that I knew little - actually nothing - about introducing glass artists to this new technology. Additionally, I knew Jayne's teaching and market experience would be invaluable in choosing designs and formats that would appeal to the rapidly growing art glass market. So, there, in our dinning room, we toasted to the formation of our new company, Colour de Verre.

I am often asked how a new mold design is created. Well, there are about six steps in the progression to the final product. It starts with an actual size model of what the final glass piece is to look like. This form is sculpted either by Jayne or myself or sometimes as a collaboration between the two of us. When we are satisfied with the prototype sculpture, I carefully refine it then add a 'collection reservoir' to the backside. This model is encased in a high-tech plaster. After it has hardened it is trimmed, carved and refined again. After much work the model mold should look just like the Colour de Verre product that it will become - except it is solid. This is called the 'master model.' I won't bore you with all the details but there are three more steps before the final production 'investment' mold is ready.

These production molds are made from a soft, porous plaster designed to absorb water. The molds are filled with liquid clay that is specially formulated for Colour de Verre molds, designed to withstand thermal stresses. The water content of the liquid clay will be absorbed by the soft production mold, leaving behind a hollow shell. This hollow shell is extracted, cleaned and fired to become the typical hard shell Colour de Verre mold that you can buy and use.

So, why do we go to all this trouble to make the Colour de Verre molds hollow? It is all about heat transfer. Solid form molds generally have thick and thin sections that heat unevenly. The thicker areas will slow the heat transfer to the glass while the thinner areas will heat more quickly. In addition the top surface of the glass would heat much more rapidly than the bottom surface particularly those areas in contact with the dense, solid mold. As any aspiring glass artist knows, stable, consistent heating and cooling is essential to avoid unwanted breaking and cracking.

Jayne is my friend, but I truly believe that I am being impartial when I tell you that she is a wonderful teacher. This book will provide a guide to help you create some spectacular pieces and it will inspire you to develop new and interesting techniques of your own.





The Colour de Verre 'Pendant Mold' at the top was used to cast the glass cabochon mounted in this sterling silver pendant frame. This mold is featured in the second half of chapter 11 on page 72



The mold above is one of several Colour de Verre 'Bracelet' molds that can be used to cast a glass blank to create a kiln formed bracelet.



The 'Kiln Formed' bracelets above were cast in the mold shown at left then formed on a bracelet mandrel. See chapter 12 on page 74 for details on how it's done.

Digital Kiln Controller: Programming Basics

A Need To Know Basis

I am going to show you step-bystep how I program one of my kilns (on pages 14 & 15). First we need to know the firing schedule segment details. Fortunately (for you every project in this book has its own 'Firing Schedule Chart' that lists every segment for that firing. What is important for you to know is that each segment has 3 distinct pieces of information.

- Ramp Rate how fast the kiln should go from it's current temperature to the target temperature - usually listed in degrees per hour, (sometimes in degrees per minute)
- Target Temperature the temperature the kiln must reach for this particular segment
- Hold Time how long the kiln should hold (soak) at the Target Temperature during this segment.

Get Your Pointer Finger Ready

- 1. The first entry that the controller will require is a program number. This is a number that you assign to the firing schedule that will enable you to store it and recall it when you want to repeat the firing.
- **2**. The next entry the controller needs is the number of segments in the firing schedule.
- **3**. Next you'll enter the segment details; the Ramp Rate, Target Temperature and Hold Time for each segment of the firing schedule.
- 4. After the entries for each segment is programmed into the controller the final task is to set a safety alarm to alert you if for some reason the kiln goes above the highest 'action point' temperature. I usually set an alarm for 20°F (10°C) above the action point so if something goes wrong I will hear the alarm in time to save the firing (hopefully).

I will use the firing schedule from Chapter 4 as the programming example. There are four segments in this firing schedule designed for casting fine frit.

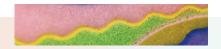
| Firing Schedule for Flower Casting | | | | |
|------------------------------------|--------------------------|----------------------------------|------------------------|-----------------------------|
| Controller Segment | Ramp Rate (Per Hour) | Target Temperature | Heat Soak Hold Time | Interaction |
| Segment 1 | 300°F / 165°C | 1250°F / 675°C | 15 min | None |
| Segment 2 | AFAP - Up | 1420°F - 1440°F 670°C - 782°C | 20 min | Observe to Confirm Final |
| Segment 3 | AFAP - Down | 960°F / 515°C | 90 min | Don't Vent |
| Segment 4 | 60°F / 33°C ramp down | 700°F / 370°C | 1 min | Kiln Off |

Kiln off cool down - Do not vent - Cool to room temperature before opening

- Segment 1; is a slow ramp up to 1250°F (675°C) and will be held at this temperature for 15 minutes. This segment allows the glass to heat evenly, the frit to settle and the air to escape.
- Segment 2; will ramp up to casting temperature AFAP - As Fast As Possible - we'll set the kiln to its' highest speed. Notice the temperature range listed in the chart (above) for this segment. Use the temperature that you have determined to be optimum for your kiln to cast fine frit - it should be somewhere in this range. If you don't know the optimum for your kiln then use this firing to find out - set the Target Temperature at the bottom of the range, then be in the studio to observe the casting when it gets to this temperature. Add a few degrees if necessary (most controllers have a button for that) then when the casting is perfect, record that temperature number. The kiln I am programming casts fine frit at 1420°F (770°C) so that is the temperature I will input. The hold time is 20 minutes at the casting temperature.
- Segment 3; is AFAP (As Fast As Possible) down to the annealing temperature and will be held at this temperature for 90 minutes.
- Segment 4; is a slow cool down to 700°F (370°C) with a 1 minute hold time. There is absolutely no venting during cool down.
- That's all there is to it. Now let's punch those 'Firing Schedule' numbers into the controller.

Chapter 4 - Summer Floral Bowl





Tools & Equipment:

- Kiln: Medium capacity fusing kiln with digital controller, kiln posts (assorted heights)
- Frit Measuring & Setting: Weigh scale, small plastic bowls, measuring pitcher (with pour spout), measuring cup, measuring spoons, small funnel, kitchen sieves & strainers (with assorted mesh sizes), applicator spoons
- **Mold Preparation:** Primo Primer™, applicator brush (soft, round), hairdryer, wood 'shishkebab' skewer
- Safety: Dust mask, safety glasses, kiln gloves
- Glass Cutting and Shaping: glass grinder with standard bit, diamond polishing pad

Materials:

- Glass Supplies: All glass for this project must have the same COE
- Fine Frit; clear, clear dichroic, blue, light green, dark green

Forming Molds:

- 'Colour de Verre' summer floral mold
- 'Colour de Verre' 12" (30 cm) bowl slumping mold or 10" (25.5 cm) plate slumping mold

Filling a Large Colour de Verre Mold

olour de Verre currently has three floral plate designs, Rose, Summer Floral and Plain Floral. The Summer Floral is a very popular design with a flower that is approximately 9" (23 cm) in diameter. For this project we will make a bowl however the Summer Flower can also be slumped into a shallow plate form that would work together with the bowl as a set. When the Plain Floral design is made into a green leaf plate it is the perfect compliment under a colorful Rose or Summer Floral bowl. This project requires a total of 500 grams of frit and can be filled many ways. We will be creating a blue flower with a dichroic center and green leaves. I am using this color suggestion so that you can see how to divide the flower (500 grams) into three sections; center (50 grams), flower (300 grams) and leaves (150 grams). The color for the flower and leaves will be further divided with decorative shading.

How It's Done

- **1**. Prepare the summer floral casting mold with primer following the process on page 8 & 9. Primer separates quickly and will settle and thicken on the bottom of the container so each time you dip your brush into the container be sure to give it a stir.
- 2. Dry the primer with a hair dryer between each coat. You can tell the primer is dry when it becomes lighter in color. Apply a total of four to five thin coats of primer on a new mold. A previously coated and used mold needs to be cleaned then have three thin coats of primer applied











{Click for Table of Contents}









- 16. Now fill the space around the outside edge between the copper circle and the inside wall of the mold. I like to use a small tapered spoon to fill this section up to the fill line with frit. You'll notice that I matched the frit color in this outside space with the color that is on the inside of the ring. I wanted the color to extend all the way to the outside edge of my plate, however you could put a contrasting color in this outside space (black for instance) to create a black frame around the perimeter of the plate. Fill this area with frit up to the fill line and pack it down to make it level and tight.
- 17. Now the real magic happens. Remove both bungee cords. Grasp the copper ring with both hands and slowly, carefully lift the copper template straight up. Voila your frit design is born.
- 18. This next step is very important. If you look carefully you will see a slight space at the seams where the frit colors meet this is the space left by the copper template. Use your finger to press down along these seams to bring the frit together tightly. This is a very important step if this is not done the glass will separate along these seams when it is heated. This is especially true when a dark color and a light color are next to each other. The darker color will absorb the heat a little quicker, causing it to shrink and pull away, opening a slit in the glass. Sometimes I'll even go one step further I turn a frit jar upside down and use the top of the lid to tamp down and tightly pack the frit.

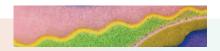


The palm tree above, plus the river and the wave motif on the next page, are alternate designs that would work very well with this copper damming system.

(hapter 10 - Billet (asting

Embedding a Design in Thick Glass

Por this project we are going to create a thick cast plate with a design that appears to be floating within the glass. The floating design is accomplished by casting a billet of glass over a composition of plaster forms. When the billet plate has cooled the plaster forms are removed to reveal the negative space in the bottom of the casting that produces the effect. A billet is a thick slab of glass that is approximately 6" x 9" x 3/4" (15 x 23 x 2 cm), formulated especially for glass casting with a very low bubble-count designed to produce a clear and glossy finish. The finished flat plate will be 10" (25.5 cm) in diameter by 1/2" (1.3 cm) thick.



Tools & Equipment:

- Kiln: Medium capacity fusing kiln with digital controller, kiln posts (assorted heights)
- Measuring & Setting: Weigh scale, small plastic bowls, measuring pitcher (with pour spout)
- Mold Preparation: Primo Primer™, applicator brush (soft, round), hairdryer
- Safety: Dust mask, safety glasses, kiln gloves

Materials:

- Glass Supplies: All glass for this project must have the same COE
- Glass billet 6" x 9" x 3/4" (15 x 23 x 2 cm), urobium pink transparent

Forming Mold:

- 'Colour de Verre' 10" (25.5 cm) disc fuser mold
- Plate slumping mold 10" (25.5 cm) optional
- Hydroperm gypsum cement used to produce permeable plaster molds for casting
- RTV (Room Temperature Vulcanization) a silicone molding compound

(Note: Hydroperm & RTV are available from most glass fusing supply centers)



How It's Done

This project requires a number of shallow plaster forms that will be placed in the bottom of the 'Colour de Verre' 10" disc plate mold. I decided to arrange 9 simple flower designs in a circular pattern. These plaster forms are created by pouring a casting material called Hydroperm into a flexible silicone mold. So the first step for this project is to create the flexible silicone mold.

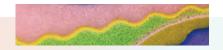
1. I used a cast glass flower that I already had in my collection of glass objects as the model to form the RTV flexible silicone mold as shown in the photo on the next page (3rd photo down). See ProTip below for more options on models & forms.

ProTip: Finding a Good Model

The model I used here is one that I cast in glass several years ago, but the model does not have to be a cast glass form. It could be almost anything from a child's toy to a shape you make yourself from wax, clay or even plasticine. The only precaution is it must be shallow - no more than 3/8" (9.5 mm) thick and the sides should slant outward slightly (so the shape is wider at the bottom). Also try to avoid 'undercuts' within the design, these can prove to be problematic when you're removing the plaster form from the glass after casting.

Chapter 12 - Kiln Formed Bracelets





Tools & Equipment:

- Kiln: Small 'table-top' fusing kiln with digital controller, kiln posts (assorted heights)
- Frit Measuring & Setting: Weigh scale, small plastic bowls, small funnel, plastic applicator bottle with fine tip, applicator spoons
- Mold Preparation: Primo Primer™, applicator brush (soft, round), hairdryer
- Safety: Dust mask, safety glasses, kiln gloves
- Glass Cutting and Shaping: Glasscutter, breaking pliers, glass grinder with standard bit, diamond polishing pad
- Bracelet Forming Tools & Equipment: bracelet forming mandrel, graphite forming tongs, fiber paper, hi-temperature Nichrome wire, minute timer, leather welding gloves
- Bracelet Sizing Equipment: steel ruler, marking pen, fabric measuring tape, digital calipers, sizing chart calculator (found in 'Kiln Formed Bracelets' book on pages 10 & 11)

Materials:

- Glass Supplies: All glass for this project must have the same COE
- Powdered Frit; urobium pink, cherry red, moss green, dark green
- Clear dichroic sheet Thin (1.5 mm)
- Pale gold transparent sheet Std thick (3 mm)

Forming Mold:

- 'Colour de Verre' French Border mold
- 'Colour de Verre' Leaves & Berries mold

Kiln formed bracelets have been a prominent element in my glass career. Developing the process and designing the specialized tools for this technique was very gratifying. But the most rewarding aspect is teaching the process to thousands of fusers either at one of my personal workshops or through my book 'Kiln Formed Bracelets.' I truly feel this new book would not be complete without a chapter on bracelets.

I have designed several Colour de Verre molds to take advantage of the frit casting technique and my bracelet forming technique. I will feature two bracelets in this chapter, they are; Leaves and Berries and French Border. For the Leaves and Berries bracelet we will use the 'Pâte de Verre' coloring technique, filling in all the details with several colors of powder frit. The French Border bracelet will use a strip casting technique featuring dichroic sheet glass.



Jayne Persico presents... Glass Kilm Casting with Colour de Verre

Jayne Persico brings her fresh and timeless style to the art of 'Glass Kiln Casting'. This inspirational yet thoroughly practical guide presents lush photographs of beautifully finished pieces that will capture the imagination. The clear and simple instructions will enable fusers of any skill level to achieve amazing creations.

This 80-page book offers more than 260 color photographs in 12 chapters that will inspire dozens of exceptional projects. The opening chapter features invaluable information covering frit casting molds, tools, equipment and kilns, and most importantly an in-depth look at digital kiln controllers. The 'Controller Programming' section was written in a 'take you by the hand' style that makes this sometimes intimidating task very easy to understand. This book is sure to become a studio favorite that fusers of all levels will refer to time and again.







This book will be valued by:

- · Art Glass Fusers
- Glass Collectors
- Interior Designers
- Commercial Decorators

This book provides:

- Over 260 Color Photographs
- Alternative Design Galleries
- · Step-by-Step Instructions

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