# Cast Shell Box using ZYP Boron Nitride

***This project sheet illustrates how to use ZYP Boron Nitride primer in conjunction with Colour de Verre's box molds. The ZYP speeds mold preparation and clean-up, but a few guidelines should be observed to get optimum results.***

This box and its ornamentation are created in three firings. The first firing casts the basic box. The second; the sea shells. In a third firing, the sea shells are tack fused to the box's lid.

## Getting Started

Always start the same way: Clean your Colour de Verre molds with a stiff, nylon brush to remove any old kiln wash. (This step can be skipped if the mold is brand new.)

Here, one of the advantages of ZYP becomes apparent. Removing fired boron nitride from a mold requires far less "elbow grease" than removing a traditional kiln wash. This doesn't come without a tradeoff: Once a ceramic mold has been sprayed with boron nitride, the user must continue to use boron nitride as traditional kiln wash can no longer be evenly absorbed by the mold. For additional information on using ZYP, consult the manufacturer's labels and our Project Idea sheet, "Priming Colour de Verre Molds Using BN Spray."

*Make sure to shake the can thoroughly for at least 30 seconds after you start hearing the ball freely rattling inside the can. Like all fine particle products, it is important to wear a dust mask. Also, because of the propellents, it is important to apply it and remove it outside or in a well ventilated area.*

The first time ZYP is used on a mold, it is necessary to apply two coats of the product. Hold the can 8 to 10 inches from the mold. *Hold both the can and the mold upright.* Apply the first, light coat using a three to four-second burst of spray in a sweeping pattern across the mold's cavities making sure to cover the deepest recesses. Set the mold aside for five minutes so it can dry. Once dry, reapply a second coat using another three to four-second burst of spray. Let the mold dry for ten to fifteen minutes. The mold is now ready to fill.

Again, if the mold has been previously treated with boron nitride, only one coat need be applied.

## Casting Box

The fill weight is the amount of glass frit necessary to create the perfect casting in a particular mold. The fill weight of the box base is 375 grams. For the lid; 180 grams. We will mix enough of a 10% mixture of fine Sky Blue and Clear frit to fill both the lid and base molds.

## Tools

- ✓ Elliptical Box mold
- ✓ Beach Shell molds, Sea Horse and Starfish mold, and/or Tropical Fish mold
- ✓ Digital scale
- ✓ Lidded container
- ✓ Fine-screen sifter

## Supplies

- ✓ ZYP BN Lubricoat (formerly MR-97)
- ✓ Fine Clear frit
- ✓ Fine Sky Blue frit

Into a large, lidded container put 410 grams of fine Clear frit. Add to the container 45 grams of fine Sky Blue frit. Put the lid on the container and shake it to completely mix the two frit colors. Wearing a dust mask, open the container and measure 180 grams of the mixture and pour it into the box lid mold. Measure out 375 grams of the mixture and transfer it to the box base mold. In both cases, slightly mound the frit. This will reduce glass spurs and cold work.

Place the two molds into the kiln and fire the kiln according to the Casting Schedule shown below. Using fine frit and ZYP results in few or no glass spurs. If, in the odd case, your casting has a spur or two, remove the spurs with a diamond pad or grinder. If the piece needs to be fire polished, see "Box Basics" on our website.

## Making the Components

Our box uses castings from the Sea Horses and Starfish mold, Small Beach Shells mold, and the Medium Beach Shells mold. It is not necessary, however, to follow our design to the letter. We suggesting making extra components so that you might experiment with various layouts.

Remove any existing kiln wash using a stiff, nylon brush. Spray the mold with ZYP as described above, but using a two to three-second blast since the mold is smaller. Just as before, spray the mold twice if this is the first time the mold has been treated with boron nitride.

Created enough of a 20% mixture of fine Sky Blue and fine Clear frit to fill the molds you have selected. An easy way to do this is to use two measures (a teaspoon works fine) of Sky Blue to four measures of Clear.

Before filling the mold, highlight the design's details by "dusting" the mold surfaces with a little Black powder using a fine-screen sifter. The powder collects in the

### Fill Weights

| Design | Fill Weights |
|---|---|
| Sea Horse and Starfish | Sea horses, 7 to 9 grams each; starfish 12 to 18 grams |
| Tropical Fish | Large fish, 32 to 36 grams; small fish 12 to 15 grams each |
| Beach Shell-Small | Starfish, 8 grams; scallop, 18 grams; clam, 10 grams; whelk, 7 grams |
| Beach Shell-Medium | Conch, 18 grams; spiral whelk, 10 grams; scallop, 32 grams |

### Casting Schedule*

| Segment | Ramp | Temperature | Hold |
|---|---|---|---|
| 1 | 300ºF/165ºC | 1250ºF/675ºC | 30 minutes |
| 2 | 300ºF/165ºC | 1410-1430ºF/765-775ºC | 30-60 minutes |
| 3 | AFAP | 960ºF/515ºC | 90 minutes |
| 4 | 50ºF/30ºC | 800ºF/425ºC | None |
| 5 | 100ºF/60ºC | 600ºF/315ºC | Off. No venting |

*Schedule for COE 96. For COE 90, increase casting temperature by 25ºF/15ºC. AFAP means "As Fast As Possible", no venting.

### Component Casting Schedule

| Segment | Ramp | Temperature | Hold |
|---|---|---|---|
| 1 | 300ºF/165ºC | 1290-1310ºF/700-710ºC | 20 to 30 minutes |
| 2 | AFAP | 960ºF/515ºC | 30 minutes. Off. No venting. |

*Schedule for COE 96. For COE 90, increase casting temperature by 25ºF/15ºC. AFAP means "As Fast As Possible", no venting.

crevasses and highlights the detail. (It is always best to wear a dusk mask when working with frits and aerosols.)


Fill the molds according to the Fill Weight table. Use an art brush or finger tip to level the frit.

Fire the molds according to the Component Casting Schedule. The low temperatures of this schedule will preserve the designs' delicate edge detail and keep the glass from "balling up" due to surface tension.

## Embellishing the Lid

Wash the cast components and lid in warm water with a bit of dishwashing liquid. Any residual boron nitride – including that transferred from your hands – can prevent the components from tacking to the lid.

Arrange the components on the box lid and temporarily attach them with a few dabs of simple, white glue. (This will burn off during firing.)

Clean and re-prime the lid mold. Place the embellished lid casting back into the mold as this will prevent the lid from collapsing during the tack fire.

Re-fire the lid according to the Tack Fuse Schedule shown below.

## Base Feet

Give cast boxes a professional finish with the addition of feet. Use peel-and-stick, silicon cabinet bumpers, e.g. 3M Bumpon™, available from most hardware stores. This will also protect tabletops.

## Notes

The combination of fine frit and ZYP almost insures that no cold work will have to be done to the box or the embellishments. In our testing, we discovered that using opal glass with ZYP in large casting may result in surface cloudiness or veiling. One may be able to mitigate this effect by reducing the target temperature and increasing hold times. This cloudiness can also be reduced by mixing opals with at least 50% clear or transparent frits.

Tack Fuse Schedule*

| Segment | Ramp | Temperature | Hold |
|---|---|---|---|
| 1 | 200ºF/110ºC | 1250ºF/675ºC | 10 minutes |
| 2 | AFAP | 960ºF/515ºC | 90 minutes |
| 3 | 50ºF/30ºC | 800ºF/425ºC | None |
| 4 | 100ºF/60ºC | 600ºF/315ºC | Off. No venting |

*Schedule for COE 96. For COE 90, increase casting temperature by 25ºF/15ºC. AFAP means "As Fast As Possible", no venting.