

The Honeycomb Mold: A Revolutionary Casting Option

by Helen Stokes

“The honeycomb mold enables intricate glass forms to be cast successfully without sprues.”

Necessity is the mother of invention and that is certainly the case with the honeycomb mold. The basis of the honeycomb mold is a hand-built, layered mold made with a plaster/silica mix. In the mid 1990s I was casting several bamboo sticks that shared a common base. I needed a flexible mold to allow the glass base to contract without breaking the sticks, so I began placing scrunched fiberglass between the sticks with the plaster/silica mix drizzled over it. The fiberglass structure was refined until it resembled walls with chambers within them, and this became the honeycomb mold.

Advantages of the Mold

The mold is lighter and stronger than the block mold, gives support to the molten glass, and is flexible during the cooling process. Air can disperse through the porous structure of the mold enabling intricate glass forms to be cast without sprues. Drying is accelerated because of less mold mass and the fiberglass strands that provide drainage channels.

Details of the Technique

Prepare a 50/50 mix of dental plaster and silica flour sufficient for the particular mold. Fiberglass is cut into approximately 2” squares and divided in two or three layers. Splitting the fiber glass breaks down the emulsion enabling the plaster/silica mix to penetrate the fabric. For mixing, I use a square plastic container so that I can pour water out of the corner. Combine the dry ingredients and sprinkle over the entire surface of the water until small peaks of dry ingredients remain visible. By tapping at the base of the sides of the container any lumps of dry mix will disperse sending bubbles to the surface. Pour off the excess water and then stir the mixture gently to a smooth creamy consistency. Do not stir the mix until after the water has been poured off. The strength of the plaster is determined by the ratio of water to dry mix. Dental plaster sets within five to ten minutes. To achieve the maximum working time it is better to use small quantities.

Invest the wax by brushing plaster/silica mix over the wax to increase the surface adhesion, and then pour the remainder of the mix over the model leaving a collar of plaster around the base. The collar should have a clean edge that will become a guide to the final thickness at the base of the mold. The first layer should be hardened before the next layer is applied. Place prepared fiberglass squares within easy reach on the table before mixing a new batch of plaster/silica. Take each piece and dip it into the plaster/silica mix. Starting at the base, work up and around the form taking care to overlap every piece because this will constitute the strength of the mold. Before the mix sets (even if the mold is not completely covered), gently squeeze the moisture from the fiberglass towards the base ensuring that the fiberglass pieces sit close together without thick plaster being left between the pieces. This second layer can be applied using several mixes; ensure that the plaster is squeezed out after every application.

The honeycomb is made with fiberglass squares dipped into the plaster/silica mix. Holding opposite corners, the squares are twisted and the center pushed upwards and then set side-by-side loosely around the mold working from the bottom to the top. Any interior spaces can be entirely filled with the honeycomb. A layer of fiberglass is placed over the outside of the honeycomb to prevent plaster from the next layer filling the honeycomb chambers. The size of the mold will determine how many supporting layers are needed. One more layer should be applied, and if the mold is large, several layers may be necessary to support the additional volume of glass. The inclusion of grog in the outer layer of the mold mix will provide extra strength in the mold.

Firing the Mold

The firing is similar to a regular casting schedule except that the time allowed at top temperature should be increased to allow the air sufficient time to escape through the walls of the mold. Thus, this layered mold does not need air vents. The layers within the mold function independently. The first layer defines the form and detail of the glass; the second, being made of fiberglass of soft consistency, will not crack. The honeycomb remains structurally sound throughout the firing and supports the inner first and second layers and it is supported by the outer layers.

Helen Stokes (www.stokesglass.com.au) lives in Melbourne, Australia, and has worked with glass since 1978. At that time she made Tiffany-style lampshades and three-dimensional panels using the copper foil technique. In 1995, Helen graduated from Monash University (Melbourne) with a Post Graduate Diploma of Ceramic Design majoring in Glass. Casting glass became her passion, and she developed the honeycomb mold that she has taught to students at workshops in Switzerland, Australia, and the United States.

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