

# GLASS

Glass is an art medium with seemingly endless technical versatility and a rich, long history. Basic elements of sand and soda lime are combined with coloring agents, then melted together to produce the raw material. The raw (soft) glass prepared in Murano, Italy, has a great reputation anchored in centuries of appreciation for its high quality. Although this well deserved reputation persists today, good quality glass is produced elsewhere, particularly in the United States (Corning, Bull's Eye and Schott glass).



Afro Celotto - Blown Murano Glass

**Glass Blowing** goes few millenniums back, at least to the early Egyptian Civilization. Although glass blowing has reached a high sophistication level, very little about the technique itself has changed. Basic elements of sand, soda lime, are combined with coloring agents, and melted together to produce the raw material.



Newman/Ciancibelli - Blown Glass

To create a blown glass object, the molten glass is "gathered" from the furnace on the end of a long hollow metal "blowpipe". At this stage the glass is typically around 2100 degrees (Fahrenheit), and has the consistency of honey (it "freezes" at around 900 degrees). The glassblower introduces air into the center of the gather through the blowpipe. A variety of tools are then used to shape the glass to form. As the glass cools it begins to stiffen and must be reheated to allow continuous shaping and reshaping. The glassblower uses a smaller furnace, the "glory hole" (because of its bright glow) for the re-heats. These re-heats allow the artist to work on a piece for a long period of time, shaping and blowing until the desired result is achieved.

When the piece is finished, it is placed in an oven (kiln) for annealing. Annealing is the process of slowly cooling the glass to room temperature to stabilize its delicate crystalline structure. If the piece is heated or frozen quickly, it will crack. Annealing is not only used for blown glass, but is done for the pieces produced from most of the other techniques described below.

**Hot Sculpting** denotes a technique in which glass is gathered from the furnace on the end of a solid metal rod (puntil) and shaped with tools into a Sculpture. Although the set up is essentially similar to that for blown glass, no actual blowing takes place.



Gartner/Blade - Blown and Hot Sculpted Glass



Scott Schroeder - Kiln Cast Glass

**Cast Glass** may predate blown glass. There are examples of Ancient Egyptians experiments with this technique. They used "cold core casting" in which the glass was applied to the outside of a mold. A variety of techniques for casting glass are widely used today. Pate de Verre, (French for paste of glass) and Kiln Casting are essentially similar. Both involve filling a mold with cold glass heated it in a kiln till the glass fuses together at the melting point. In **Pate de Verre** the glass is crushed into a fine paste before it is put in the mold; for **Kiln Casting**, larger chunks of glass are used.

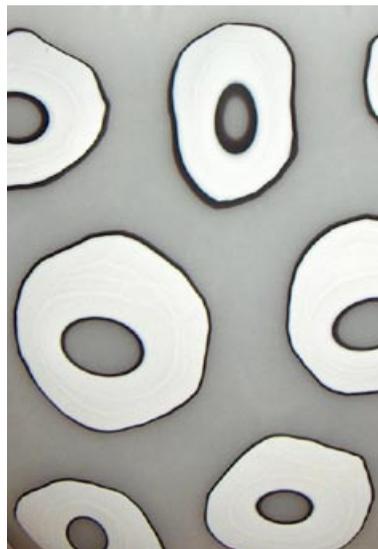


Abbott/Leva - Pate de verre

In **Hot Casting**, glass is heated at a temperature higher than for Glass Blowing (2350 degrees Fahrenheit). It is scooped out of the furnace with large ladles and poured directly into the mold. Intricate molds are made of ceramic and silica, materials that will withstand the heat.

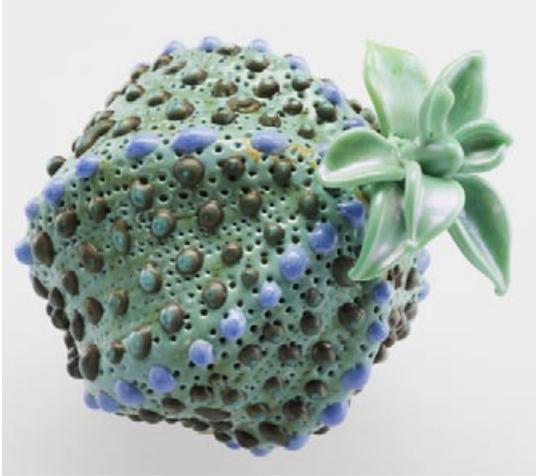
**Sand Casting** is an ancient technique still in use. It involves creating a mold by depressing objects into silica sand, (which is mixed with a binder and or injected with CO2 to make it hard). Molten glass is poured into the mold.

**Cold Working** refer to methods that are work glass in it's "frozen state". It includes Sandblasting, Engraving, Cutting, Grinding, and Polishing. Bonding the glass together with specialized glues is also part of Cold Working. Each of these techniques allows by itself an array of possibilities in Art Glass. Cold Work often results in pure geometric forms. Some artists consider the cold work as an extension of their "hot work". But most Cold Work artists use glass that was produced for their needs in specialized places in the US and in Europe. Dichroic glass is often used in Cold Work sculptures.



Ethan Stern - Blown & engraved / cold worked glass

Amy Lemaire - clay bead with lampworked accents & sprout



**Lamp working** is a method of manipulating small rods and tubes of glass in the flame of a torch. Its origin is vague and disputed, but experts agree that initially the glass was heated over small oil burning 'lamps', hence the name Lamp working.

In the fifteenth century soft glass was developed by A. Moretti to melt at lower temperatures in order

to accommodate this technique. It was used to make small-scale sculptures, and glassware without the overhead expense of traditional glassblowing. Soft glass is still produced by the same Muranese family. Today, Lamp workers use it to create unique works of art with torches that burn gas and propane and can produce a much higher temperature, and a larger flame.

Some artists as well as glassblowers of scientific glassware, use a glass made of a borosilicate base, which was developed in the US in the 20th century by Corning. It can withstand higher and more drastic temperature changes without cracking or boiling.



Mark Vandenberg - Lampworked glass

**Slumping and Fusing** techniques use flat pieces of (usually stained) glass. In the Fusing technique, multiple glass pieces are arranged in a pattern and heated in a kiln to be fused as one piece. In Slumping, the glass is laid into, or on top of a mold and heated just to the point where it "slumps" to fit the form of the mold. Once the glass reaches the desired form it must be cooled quickly enough to stop the movement that will result in cracking. Although these methods sound simple, the objects created are quite often very intricate in their design, and hours of painstaking labor may go into the arrangement of the glass. In many examples the glass has been fused into a pattern and then slumped to fit a particular form.

Doug Randall - kilnformed, fused, cast, dropped formed glass



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