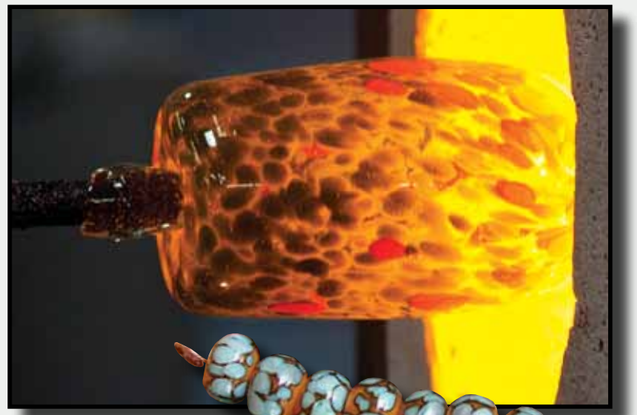
Eco-Friendly Practices in The Crucible's Hot Shop

by Shawn Waggoner



The Crucible in Oakland, California, is the largest nonprofit industrial arts educational facility in the United States, serving 5,000 adult and youth students annually in metal fabrication, blacksmithing, neon, ceramics, welding, kinetics, fire dancing, and glassblowing. Founded on the principle of reusing and repurposing objects, the nonprofit counters its energy-intensive offerings through the use of a solar system on its roof.

Running a hot glass studio presents unique challenges. Reaching the temperatures required to melt the raw materials and produce stable glass requires a lot of energy regardless of the fuel type used. "In the past, fuel efficiency was of interest for economic reasons, but in the last 15 years it has also become an environmental concern. Even the British Crown outlawed wood as a fuel source in the early 1600s due to the deforestation caused from industries such as glass factories," says Kier Lugo, senior studio manager at The Crucible.

Addressing the Issues

According to Lugo, one of the best ways any studio can be more eco-conscious is to build or purchase furnaces and kilns that are very well insulated. "We build our own equipment at The Crucible, and I try to make it as energy efficient as possible within a small budget, something most hot shops are faced with." The Crucible also remelts its clear cullet, requiring less energy to melt than the raw batch. "This is the very least people can do to reduce their overall cost and carbon footprint."

Over the last decade, discussions on more efficient equipment have focused on heat recovery or recuperating exhaust heat from the furnace to preheat the combustion air. "We planned on installing a recuperator on our furnace, so when it was built we plumbed an airline to allow for this. We have built the recuperator, but haven't yet installed it."

Lugo says the next time The Crucible's glory hole is rebuilt it will also include a recuperator. "For a glory hole, it makes the most sense to build it with the recuperator as opposed to a retrofit. A recuperation system will be very costly at first but will usually pay for itself within the first year. I have heard of people reducing their utility bills by as much as 60 percent after adding recuperators to their furnaces."

One of the most recent pieces of equipment Lugo built for The Crucible's hot shop is a combination pipe warmer and garage. The pipe warmer preheats pipes so that the glass will stick to the pipe when gathered onto it. "The garage is a kiln used to preheat color bars and keep glass parts warm for later assembly. Often these are two separate pieces of equipment, but I built the pipe warmer underneath the garage with a passage brick joining the two. This allows the excess heat from the pipe warmer to preheat the garage. I also built the pipe warmer with a heat ring in the front, which is something I don't see commonly. This allows more heat to stay in the pipe warmer and travel up to the garage for preheating."

The running temperature for the garage is about 1000°F, and with the pipe warmer, Lugo is able to preheat the garage to 600°F. Both the garage and pipe warmer have separate Venturi burners that run off of propane or natural gas. There is no forced air with this burner, since the pressure of the fuel will pull in ambient air to create proper combustion.

The casting area is going green in more ways than one. The Crucible uses green sand for casting instead of Petrobondl, which includes petroleum as a binder. "The green sand is just olivine sand, Bentonite, and water. It is infinitely reusable as long as you keep adding water and sifting it."

Raising Awareness

The Crucible helps raise awareness about eco-friendly hot shop practices by hosting guest lecturers such as Hugh Jenkins, builder and designer of veggie oil furnaces, recuperation guru, and owner of Big Island Glass, in Honoka'a, Hawaii. The nonprofit has plans to add even more solar panels to its rooftop to help power kilns and blowers for the furnaces. As funding allows and need increases, its natural gas furnace will be replaced by a much larger electric furnace. GA

Find out more about The Crucible's eco-friendly practices and hot glass offerings in the March/April 2014 issue of Glass Art.

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