Cheap 'n Easy Fermentation Chiller

I like to brew a lot of kölsch (let me re-emphasize 'a lot') and a bit of alt - only problem is the basement temps climb closer to 70º in the summer. I started looking at all kinds of temperature control (Son of Fermentation Chiller, extra fridge, cooling cabinet, etc), only problem is I don't have space for another unmovable object between the beer cellar, kegerator, brewing equipment and tools. That, and I'm a cheapskate. I remembered hearing about Igloo Ice Cube coolers on a homebrew forum, but he had used the 'Ice Cube Extreme' with the domed lid (~$80 each- ouch) and drilled a hole for the carboy neck to go thru. That seemed a waste if you ever wanted to use the cooler for it's original purpose, and just too expensive. Therefore I devised this plan, take a $20 50 qt. Ice Cube cooler and build an inexpensive insulated lid, remove the old lid (easily done) and save for when I need a cooler (provided I'm not fermenting, of course). Total coast is about $25 and takes about 30-45 minutes to make. It holds a 6.5 gallon carboy, and of course can be used for 5 and 3 gallon ones.

Basically, I build a lid out of styrofoam sheet insulation (you can use hard foam insulation if you can get some, this stuff is just cheaper) - a 1" thick 4x8 sheet runs $20 at Home Depot, and it will make 4 lids. If you know someone else who's going to build one, you can buy it together. I put the carboy in the cooler, add some water (3 gallons or so) and rotate in frozen 16 oz soda bottles filled with water and pop the lid on, how many bottles and how often I swap out depends on how it's maintaining temp, and what I'm trying to accomplish. Lately I have been able to add 1 bottle in the AM and one at night and maintain an even 60º. During high krausen I needed to add more due to the heat thrown off. I find it helpful to put a little bleach in the water bath, since I've had some funk grow over the 3 weeks I ferment. Most likely helped by wort that got on the carboy during the racking from the kettle. The water bath is important as it provides more cooling contact area with the carboy. It also slows the temperature fluctuation.

I monitor the temp using a floating thermometer (leftover from the extract days) and a fermometer on the carboy, attached above the water line. When I decide to start to crash-cool my beer, I just start swapping out more bottles (3-4) more often, I can get down to the low-mid 30's in maybe 2 or so days. I also recommend using 'S-type' airlocks, since the 3-piece tend to get a lot of suck-back during the chilling.

This device can also be used as a **fermentation warmer** by using an aquarium heater in the water. Be careful, tho - electricity and water definitely don't mix! You might need to make some sort of rig to hold the heater inside the cooler.

This system is pretty simple, and you can maintain fermentation temperatures within a few degrees of your target. You can actually get down to lagering temps and then maintain them with 1 ice addition daily (your mileage may vary, of course). The great thing about these is they don't have a permanent footprint and can be easily stashed anywhere when not in use. Re-attach the lid and they're ready to go as a cooler again. You could also use them for equipment storage, icing kegs at a BBQ, or hold an ice bath for a pre-chiller.

Here's the 50qt Ice Cube cooler. It was actually on sale for $18 at Targét

The lid comes off pretty easily, just open it up and apply a little pressure. Pop, it's off!

This is a 4' x 32" sheet of 1" thick styro insulation, marked in 16" squares, you can get 4 lids out of 1 4'x8' sheet. 16" fits perfectly on the cooler.

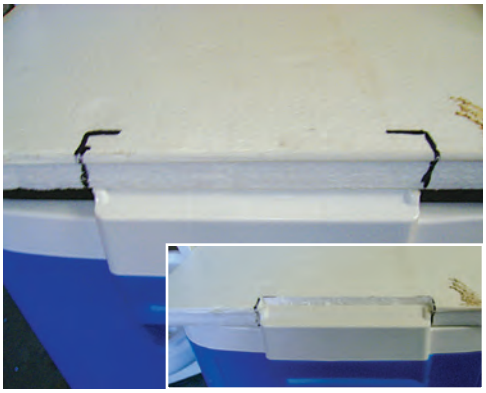
Using a straight edge and a sharp knife, cut everything out. You'll just need 4 squares for this project. Styro makes a big mess, so cut somewhere that's easy to clean after.

Place the lid on one square and draw a line around it with a sharpie.

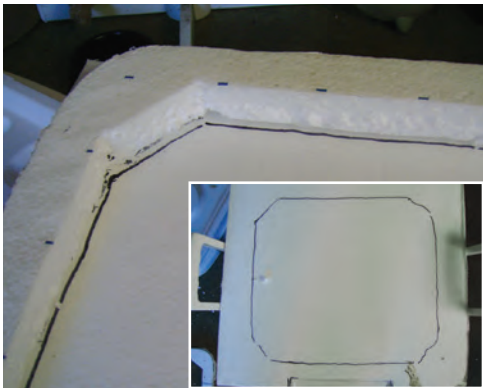
Here's the lid outline, this will rest inside the cooler creating the seal. Cut just inside your marked line.

Check the fit and cut more if necessary. This piece will be slightly rectangular, so mark it directionally, I mark it where the notch (back) side is.

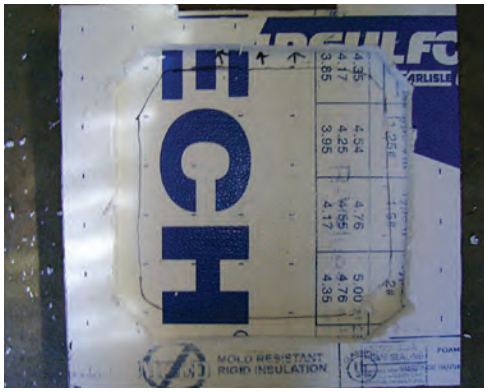
Cut a square out of the middle, about 1"-1.25" from the edge. Save the cutout for later. Notice the directional markings on the left.



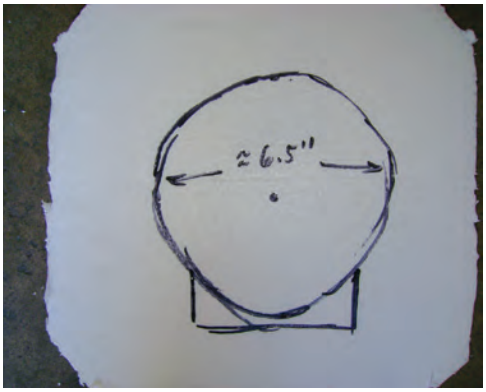
Take another square and mark it where it fits around the lid hinge. Cut the notch and check the fit.



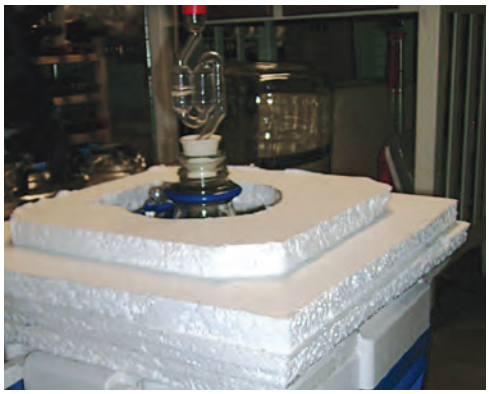
Center the 'seal' on the notched lid. It should be evenly inset on all side. Draw a line inside the 'seal' to get a same-size cutout. Save the cutout for later.



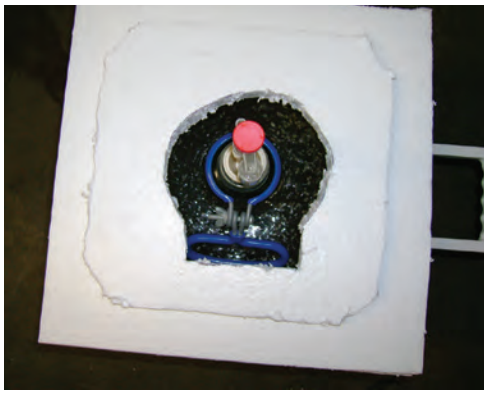
Now lay the notched lid over another square and draw a cut line about 1"-1.5" inside and cut. Cut a hole the same size in last square and save one of the cutouts for later.



Here's where the cutouts come in, you'll use them to make a 'dome'. Take one of the 2 larger ones, mark the center and draw a circle 6.5" or so. I also mark the cutout to account for a carboy handle.

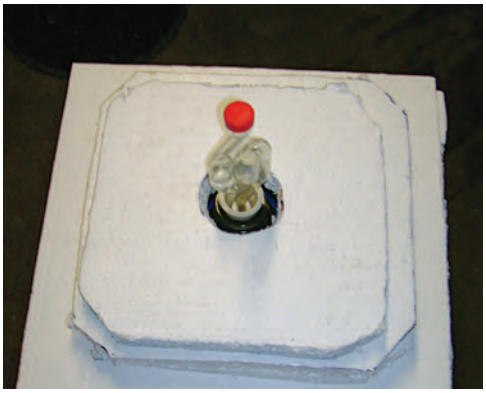


Put a carboy (preferably 6.5 gal) in the cooler and check the fit by stacking the 3 large squares and placing this one on top.



Looks good. On to the next step.

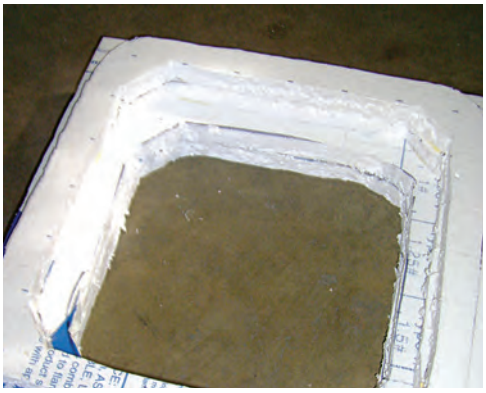
Place it over the other large cutout and draw an inset version of the hole and cut away. Check the fit and adjust if needed.



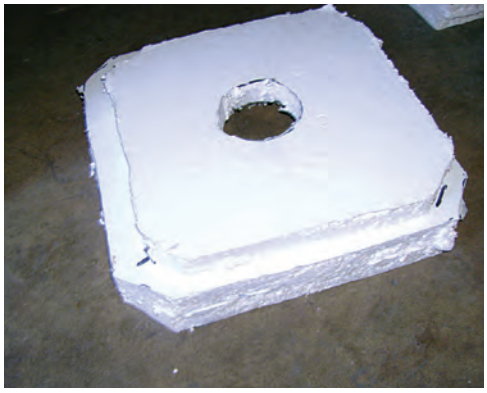
Take one of the small cutouts and cut a hole in the center that's big enough to go over the carboy neck and airlock.

Here's a side view of the stack. As you can see, it goes to just over the top of a 6.5 gal carboy.

Make sure you have enough overlap between the first large cutout and the big square and everything is kind of centered. Mark the position of the top cutout and get ready for some gluing.

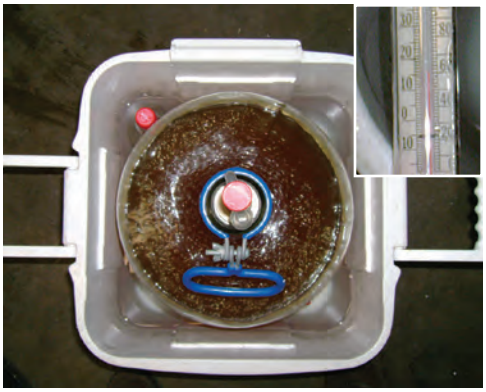


Glue up the bottom stack (lg squares) and seal. I like to use wood glue due to its moisture resistance and easy cleanup (plus I had some around). Some adhesives will melt styro, so test on a scrap piece first if you consider another glue.

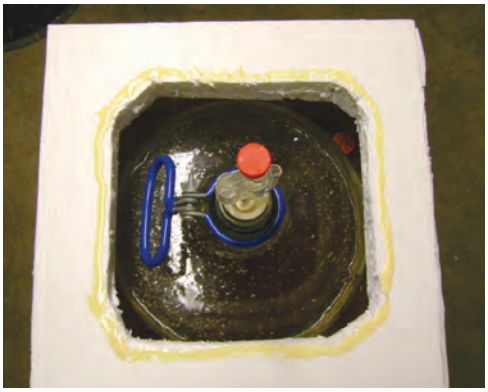


Now glue the top 3 pieces together, using the markings as a guide for the very top piece.

Weight them down with some reasonably heavy objects (books, boards or whatnot) and let them sit overnight. Time for a beer, and cleaning up that damn styrofoam mess.

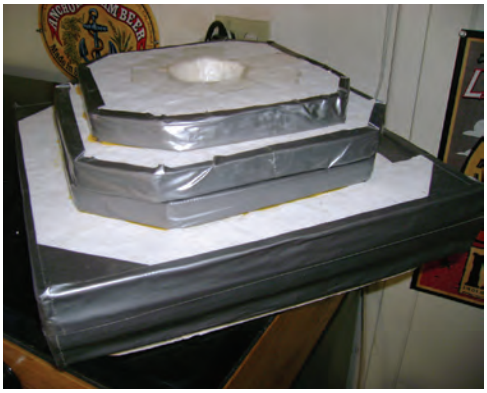


Now for the next step. Put a carboy in the cooler. Here's one of my carboys sitting happily at 60º in a 70º+ room. Notice the coke bottle and thermometer floating in the water.

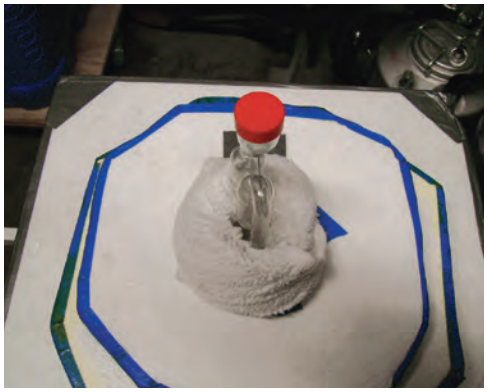


Make sure the carboy is centered and set the lid base on the cooler. I like to make sure my handles face the front of the cooler. Draw a bead of glue around the opening.

Set the 'dome' on the glued lid (make sure you have a good overlap on all sides first) and weight down to dry overnight.



If you choose to, you can finish the lid with some tape (duck tape works well). This keeps those damn styro bits from falling off and constantly making a mess.



For extra insulation, wrap a small towel around the airlock, which will help plug up the hole and keep the cool in.