Beat THE HEAT:

BY DEAN FIKAR

A TEXAS TALE ON HOW TO MAKE COOL BREWS WHEN THE WEATHER'S HOT

Fort Worth, Texas is a wonderful place to live but the weather here can be a little unfriendly at times. My fellow Cowtown Cappers and I have battled windstorms, duststorms, thunderstorms, hailstorms, and even the occasional killer tornado. The most consistent natural threat to brewing excellence for us Sun Belt brewers, however, is the omnipresent heat that bathes us for most of the year.

During July and August, fellow brewers across the country may find that their own brewing conditions start to mimic those of Texas. Fortunately, there are some things we can all do to beat the heat and avert the horrors that it would inflict upon our brews. This article reviews the troubles we have encountered with heat and various solutions that you can employ during the hottest months of your year.

Drying Out

Some of you brew indoors and therefore you may not face *all* of the problems that we outdoor brewers have. But many of us commune with nature—or at least our neighbors—while we brew. The first effect of the elements is seen not in the beer, but the brewer!

While we Texans sometime brag about our heat, the height of summer can make the exercise of brewing a hazardous thing. Once banished to the great outdoors I made the mistake of brewing a couple of times in the afternoon and got pretty dehydrated. This is really no laughing matter since mild dehydration can evolve into serious dehydration very quickly and should be actively avoided—especially if you are, or will, be drinking beer.

What I do now is set up my brewery after dinner the night before brew day when it is cooler. This shaves close to an hour off of my all-grain brewing day. I get up early the next morning to brew and usually finish before the hottest part of the day. If you have the whole day to play with you can put off brewery cleanup until evening or even the next morning when it is as cool as it is going to get outside.

Author Dean Fikar outfitted to brew on one of Ft. Worth's cooler days.

Wort Cooling

One dilemma I encountered during my first summer of brewing involved wort chilling after the boil. Most of us use either immersion or counterflow chillers for wort cooling, both of which are usually dependent on running tap water. My tap water temperature rises into the low 80's by July, which is a major problem since I like to pitch the yeast at around 70° F (21° C) or less. But even if your summer water temperatures only rise into the 60s, you may still have difficulty reaching your desired wort temperature.

A nifty solution to the problem is to build a "prechiller" to cool the tap water before it reaches the main chiller. What I did was take about 25 feet of 3/8" copper tubing and coil it so that it fit into the bottom of an extra ice chest I had lying around. I then connected my garden hose to the inflow side of the prechiller and hooked the outflow side to the main chiller using vinyl tubing and garden hose adapters which are available at most home improvement and hardware stores. By putting ice in the cooler around the prechiller coil I was able to lower the temperature of the tap water before reaching the main chiller coil. If you are a kitchen brewer you can simply use the sink to hold the prechiller and ice.

If you're using an immersion chiller I would suggest not adding ice to the prechiller until wort temperature comes down to 100° F (38° C) or so. The ice won't gain you much efficiency until the wort cools some and you won't need near as much ice this way.

As useful as the prechiller method is, it won't drop the wort temperature nearly enough for pitching lager yeast. I needed to find a way to cool the wort to at least 55-60° F (13-16° C) with my immersion chiller and, for a few extra bucks, I found a pretty good solution. Using a cooler to hold the ice bath, I added a submersible pump to push ice water directly through the main chiller coil, thus eliminating the prechiller. These pumps are pretty cheap and I got mine for about $35 at Home Depot.

An even cheaper method would be to set the cooler above the boil kettle and let the ice water flow through the immersion coil by gravity. I think, however, the few extra bucks for the pump are worth it since you can put just enough water in the bottom of the cooler to prime the pump, dump in the ice, and direct the chiller outflow back into the ice water bath. This way you do not have to keep adding water until all of the ice melts and you can be doing cleanup or something else. Again, the same advice applies to start with tap water until the wort reaches 100° F (38° C) or less or else you'll need a truckload of ice!

Chilling Fiery Fermentations

Following the boil another big hot-weather headache arises: managing the fermentation temperature. Brewer's yeast can throw off all sorts of unwanted esters, fusel alcohols, and other undesirable compounds if the fermentation temperature is too high.

The first step in managing the problem is to know the temperature of the contents of the fermenter. Simple, you say, just leave a thermometer next to the fermenter and check it periodically. Well, the problem is that the actively fermenting wort can be a lot warmer than the ambient air. I have monitored this during my last 40 or 50 brews and have found that for ales the wort can occasionally be ten or more degrees warmer than the room or chamber that holds the fermenter. Fortunately, there is a simple and fairly accurate way of monitoring the temperature inside the fermenter without having to put a thermometer directly into the vessel and incurring the risk of infection.

Most homebrew shops carry inexpensive liquid crystal thermometer strips that stick to your fermenter and give a pretty accurate indication of the temperature of its contents. I have found that they work well for glass, plastic, and stainless steel

External thermostat with temperature probe.

Plastic bucket fermenter in water bath with T-shirt and small fan blowing on bucket bath.

kegs. The strips have an adhesive backing that sticks permanently to the vessel. For those of you with several fermenters, like myself, one money-saving tip is to leave the paper backing on the strip and stick both ends to the fermenter with small pieces of duct tape. You can move it from vessel to vessel this way.

Okay, so now you know the temperature of your fermenting wort. How are you going to keep it cool?

My preference is to ferment in a temperature-controlled chamber, typically a refrigerator or freezer. Used refrigerators and freezers can often be had quite cheaply, occasionally even for free if you'll haul them off. If you know someone in the real estate business sometimes they can tip you off to good deals when people are moving.

If you're lucky enough to have a spare refrigerator or freezer you'll need to find a way to control the temperature since even the warmest setting is usually too cold, especially for ale ferments. An external temperature controller works quite well and can be had for around $50 at many homebrew shops or mail order suppliers. They generally have a plug that fits into a wall socket, a socket where you plug in your refrigerator or freezer, and a temperature sensor probe that goes inside the refrigerator or freezer. You turn the refrigerator or freezer's internal thermostat to its coldest setting, set the temperature that you want using the dial on the external controller and it turns the power to the refrigerator on and off similar to the way the internal thermostat would do. These units are designed to place a reasonable load on the compressor and they don't cycle on and off too often.

One suggestion I would make in order to fine tune the process is to tape or otherwise fix the controller unit's temperature sensor to the side of the fermenter so that the surrounding air will stay cooler when the fermentation is throwing off a lot of heat. For example, you might have the sensor sitting a few inches away from the fermenter, set at 65° F (18° C). It will then hold the fermentation chamber's temperature to about 65° F (18° C) but the fermenter contents might be up to ten or more degrees warmer. If the sensor is affixed to the side of the fermenter it will sense the heat being generated by the fermentation and lower the temperature accordingly. During one recent vigorous high gravity ale ferment, I had my sensor taped to a keg fermenter set at 66° F (19° C). During the vigorous exothermic phase I noticed that the ambient temperature of my fermentation fridge was about 55° F (13° C) while the liquid crystal strip on the fermenter read about 68-70° F (20-21° C). If the sensor had not been in contact with the fermenter I have no doubt that the contents would have gotten into the mid- to high-70's which would have been too high for style.

If you are on a tight budget but do have access to a spare refrigerator or freezer you could consider using a relatively inexpensive programmable timer like the ones that are often used for turning lights or other appliances on and off. The three-pronged heavy-duty appliance timers cost about $10-$12 last time I looked. The ones that have multiple small tabs on the face of the timer can produce many on/off cycles per day and, with some experimentation, you can have the unit cycle on enough to keep the inside temperature in an acceptable range, say 55-70° F (13-21° C) or so for ales. Obviously, this is pretty imprecise temperature control but the multiple daily cycles and the considerable thermal mass of 5 or 6 gallons of beer make for a reasonably stable internal temperature. I used this method myself for awhile and it worked pretty well once I calibrated the number of on/off cycles needed per day.

For those of you who don't have access to a dedicated refrigerator or freezer there are some other things you can do to control the fermentation. If you have a closet in the interior of your house you might be surprised to find that it is a few degrees cooler than the rooms that have outside walls. You might stick a thermometer in there and check it after a few minutes. This may be sufficient for your needs.

Wet T-Shirts and Other Options

Many of you have heard of the "wet T-shirt" method of evaporative cooling and it is effective, especially in arid climates. For those of you who aren't familiar with this, what it amounts to is placing the fermenter in a water bath a few inches deep and either wrapping a towel around it or placing an old T-shirt over it. The *(continued on page 60)*

Cardboard box with side cut out so cold air funnels past the fermenter from the window A/C unit. Box sits on sofa bed.

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key is to have the towel or T-shirt partially submerged in the water bath so that moisture wicks up along the sides of the fermenter and evaporative cooling takes place. This can be augmented with a small fan blowing on the fermenter which will enhance evaporation and thus cooling.

I have used this method with limited success, generally gaining about 3-5° F (2-3° C) of cooling. I live in a pretty humid area which limits the efficiency of evaporative cooling. I have heard anecdotal reports of brewers in drier climates who are able to achieve ten degrees or more of cooling with this method. It is worth a try if you need only a few degrees of extra cooling. One suggestion I'd offer if you try this is to put some sanitizer solution in the water bath so that it doesn't get too funky after several days of stagnation.

Another related method I have used with better success is to divert cool air from an air conditioner vent to the fermenter. I have a wall unit in the room I use for fermentation and have rigged a cardboard box to fit over the vent, held in place with a couple of pieces of duct tape. One side of the box has been cut out and I place the fermenter next to that side so that the cool air flows past the fermenter.

This setup won't win me any awards for beauty or elegance but it took only about 5 minutes to construct and allows me to bathe the fermenter in air that is typically eight to twelve degrees cooler than the air in the rest of the room. One benefit to this setup is that I can simply fold up the box and put it the closet when I'm through.

Those of you who have central air conditioning can rig up something similar if you have an accessible vent. I have heard of people building insulated boxes to fit over floor vents and I would think that this would work well. One thought I have had is to combine this method with the wet T-shirt approach. I haven't needed to try this yet but I would think that the effect would be additive and might be worth experimenting with if either method alone does not provide quite enough cooling for your needs.

If you're not as mechanically challenged as I am, you can find more elegant options for fermenter cooling. These projects tend to take a bit more time and effort but can be fun and also yield great results with little monetary cost. Fellow Texan Ken Schwartz of El Paso has developed an intriguing temperature-control solution. Ken has created and refined the "Son of Fermentation Chiller" which is "is an insulated box that uses ice, a thermostat, and a small fan to accurately regulate the temperature of a fermenter".

Submersible pump (Little Giant, model P-AAA) used in photo at bottom left.

The box can be built for $60-$70 dollars with all new materials or for even less with careful shopping from surplus houses and dealers, according to Ken. The chiller box will hold a 7 gallon fermenter with fermentation lock and has a separate ice chamber where you put a couple of gallon-sized ice jugs for cooling. Ken is able to achieve about a 30-degree F (17° C) drop in temperature relative to ambient air. You could even ferment at lager temperatures if the ambient air is near room temperature. Temperature control is quite good since the unit's fan cycles only as needed to move the cold air stored in the ice chamber across to the fermentation chamber.

The unit is amazingly efficient according to Ken: "with a nominally minus 15° F (8° C) differential between your wort and the outside world, you'll need to change the ice about every two days". And the unit operates off safe low-voltage DC current from an AC adapter. The low-power fan (less than two watts) and low average duty cycle make it a very efficient unit to operate. You'll probably use more energy freezing the jugs in the freezer than you will running the Chiller! If this sounds like the sort of device you could use in your brewery then check out Ken's web page at http://home.elp.rr.com/brewbeer/chiller/chiller.html where you'll find details on building the box and where to find the parts.

Ice water bath running through counterflow chiller powered by cheap submersible pump. Water bath outflow directed back into cooler. Chiller outflow to keg fermenter.

Cornelius keg fermenter in fridge with a liquid crystal thermometer strip and temperature sensor probe both affixed to fermenter with duct tape. (Note second probe for external thermometer in small water bath on right side of picture. This is so I can see what the ambient temperature is without having to open the fridge door.)

Warm-Weather Yeasties

So what if all of this sounds like too big of a hassle or gives you scary Rube Goldberg flashbacks? Maybe your hot-weather season just doesn't last long enough to justify special additions to your brew ware collection. In all of these cases, the good news is that with proper yeast selection you can ferment at temperatures up to 85° F (29° C) (no, that's not a typo) and still be within the recommended range for some yeast strains. My advice to you would be to lose your inhibitions, forget the Reinheitsgebot for the summer, and think Belgian.

To get some ideas for summer brewing I asked two yeast gurus for their recommendations for warm fermentations (70° F (21° C) or greater).

Les Perkins, Microbiologist at Wyeast, writes as follows:

"There are quite a few options for warm weather brewing. The first that leap to mind are Belgian beers. Most Belgian strains work very well at temperatures above 70° F (21° C), some as high as 85° F (29° C). Following are some examples:

3463 Forbidden Fruit
3522 Belgian Ardennes
(up to 85 degrees)
3787 Trappist High Gravity
3942 Belgian Wheat
3944 Belgian Witbier
1214 Belgian Ale
3278 Belgian Lambic Blend

"It is important to note that increased fermentation temperatures will cause an increase in esters and phenols with these strains. You will not produce a clean mild flavored beer at high temperatures, that is why many Belgian beer styles are ideal for warm temperature brewing."

"One could also use a few different ale yeasts, keeping in mind that the flavor profile will be different than if the yeasts were used at a lower temperature. It would be best to stay with ale yeasts that have a clean, dry flavor profile. Strains like:

1007 German Ale
1028 London Ale
1275 Thames Valley Ale
1335 British Ale II"

Chris White, President of White Labs, Inc., also has some recommendations for his company's products:

"WLP001, California Ale Yeast, is the best warm temperature fermentor we have. Very little esters and fusel alcohol production all the way up to 80° F (27° C). Other good strains are WLP008, East Coast Ale Yeast, and WLP300, Hefeweizen Yeast. As the temperature rises over 75° F (24° C), WLP300 produces more banana flavor esters. Some breweries like that character so much they run the fermentations at 80° F (27° C)."

I can personally vouch for two of these recommendations. Last summer I brewed a nice clean American pale ale with White Labs WLP001 strain at about 72-73° F (22-23° C). I later brewed a Belgian pale ale with Wyeast's 3787 strain at 73-75° F (23-24° C) and was able to achieve a pleasant level of esters and a seductive yeasty aroma. Both beers were wonderfully refreshing and perfect for quaffing in the late summer heat.

No Excuses!

As a regular reader of brewing-related Internet discussion groups I see too many comments from brewers saying, "I can't wait until fall so I can start brewing again". If you are this type of "seasonal brewer" I hope I've convinced you that, with just a little extra planning and flexibility, there's no reason to stop brewing when the mercury rises.

Dean Fikar has been beating the heat in Ft. Worth, Texas ever since he took up the hobby of brewing three years ago. By all indications, he's been doing a pretty good job of it as well, having won more than 60 regional and national homebrewing awards including two bronzes and one gold at the AHA National Homebrew Competition finals ('98 and '99) and a gold at the recent MCAB II finals. He's a big fan of the internet for brewing education and information exchange and says that he doesn't really have a favorite beer style, that he likes 'em all!