Who doesn't love to watch thousands of bottles get filled with beer?

MAY IT BE BOTTLED

The Magic of the Line

words: Don Osborn **photos:** Jonathan Pavlica

BEER LOVERS KNOW THE ENJOYMENT OF GOOD BEER WITH FRIENDS. Historically that would have taken place in a neighborhood pub. In the early 1900's, however, there was an increase in the availability of beer packaged for home consumption. Since that time, beer in various bottles, cans and containers has been more popular than draft beer. One of the most common forms, especially to craft beer lovers, is the 12 oz glass bottle. Let's examine what it takes to bottle beer at a large commercial brewery.

Bottles are labeled with the "enjoy by" date as their journey begins.

BOTTLE SUPPLY

Most breweries start with new glass bottles. The age of returnables is mostly behind us due to the difficulties of collecting, inspecting and cleaning used bottles. The type of new bottle will vary with each brewery. Summit Brewing Company in St. Paul, MN uses a slightly squatty "Heritage style" bottle with their logo raised in the glass. They tear through six pallets of new bottles per hour, with 182 cases per pallet (over 26,000 bottles/hour). As the bottles are being funneled into line, the "enjoy by" date is printed on the neck.

PREPARE BOTTLES

The bottles are clean when received from the manufacturer. Summit rinses new bottles with UV-light-sterilized water and turns them upside down to drip dry. A sanitizing process common to homebrewing is not needed in this situation.

FILLING AND CAPPING

Summit purchased Sierra Nevada's old bottling line a few years ago, and they fill 450 bottles per minute (search You Tube for "Summit brewing bottling"). When filling, the bottles receive a blast of CO^2. The filler itself is an umbrella that covers the mouth, and a venting tube is inserted in the middle of the bottle. The beer flows out of the umbrella and cascades down the inside of the bottle while the air and CO^2 is drawn out through the venting tube in the middle. Seconds later the just-filled bottle passes under a light jet stream of 200° water. This small addition of hot water causes the foam to boil over. Immediately, the bottle is capped onto the foamy bubbles, ensuring very little air in the headspace and bottle.

A hot stream of water causes the beer to foam over and push out any remaining air before capping.

Beer is filtered when transferred from fermentation tanks to bright tanks.

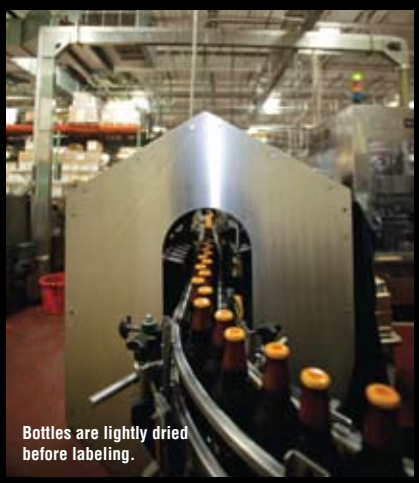
READYING THE BEER

There are many ways the beer can be prepared for bottling, but Summit filters their beer the night before bottling. Beer is moved from the fermenter through one or even two filters (or none, depending on the beer), into flat-bottomed "bright" tanks. Of course, some breweries do not filter at all.

The carbon dioxide is produced by bunging the fermenter near the end of fermentation. Instead of allowing it to escape it remains in the beer. The desired level of CO^2 can be adjusted in the bright tanks before bottling, either venting excess off, or forcing more into solution.

CO^2 pressure can be adjusted to the desired level in the flat-bottomed bright tanks.

It's all about being clean.



Bottles are lightly dried before labeling.

LABELING

After capping, the bottles are rinsed to clean off residual beer. They are dried off slightly with a blower, but the glue used to attach the labels is designed to work with cold wet bottles so complete drying is not necessary. The labeling rate is slightly faster than the bottles are filled, but the labeler does not mind waiting for more bottles.

CASE PACKER

The labeled bottles move along the conveyor towards the case packer. The day I was there they were filling cardboard 12 packs. The bottles are dropped into the box and the box is glued shut. Another date is stamped on the box. If a bottle breaks, the lighter weight of the box will cause it to be kicked out to the side. The rest of the bottles might be able to be re-packed.

The filled boxes then go on a nice conveyer-belt saunter through the brewery. It looks Willie Wonka-esque (see the video mentioned above) but the long journey is for a reason. The slowest part of the process is getting the packed boxes onto a pallet. This happens more slowly than the filling and capping, and so the extra time is needed so things can keep moving at all stages of the process. This balance is important. Packaging Manager Kenny Gunderman says "you want everything to keep running. You don't want to have to stop and start." There are many steps in the process and they all need to work in concert with each other for a smooth bottling day. Once the filled boxes are glued shut and arrive at the end of their journey, machines stack them onto pallets. The box alignments are alternated to give strength to the stack. Then the entire stack of boxes on the pallet is shrink-wrapped by a helpful robotic machine. After that, they are ready to either be held temporarily in the cold room, or loaded onto trucks and delivered to thirsty drinkers.

Pallets of beer are shrink wrapped for easier shipping.

Holes drilled in the caps where dissolved-oxygen samples have been taken.

QUALITY CONTROL

Bottles that are short filled are kicked out by weight sensors. A filled bottle is checked every 15 minutes for dissolved oxygen levels. It is pulled off the line and put under a drill-press like device that punctures the cap, sucks up the beer, and takes a reading. If the reading is too high, the bottling line is stopped and a correction is made. This test must happen frequently as the high rate of bottling would mean a great number of faulty bottles if the problem was not discovered for any length of time.

Acknowledgements: Thanks to Kenny Gunderman and the folks at Summit Brewing *www.summitbrewing.com* or letting us see the bottling process from inches away, something not normally open to the public.
Thanks to Jonathan Pavlica for the fine photos: *www.pavlicaphotography.com*.

The Willy Wonka looking mess of conveyors in a large bottling facility.

It's like a giant game of Mouse Trap. Except instead of a cage falling we get beer.