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JULY-AUGUST 2019, VOL.25, NO.4

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CLEAN BEER



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by Rob Friesel

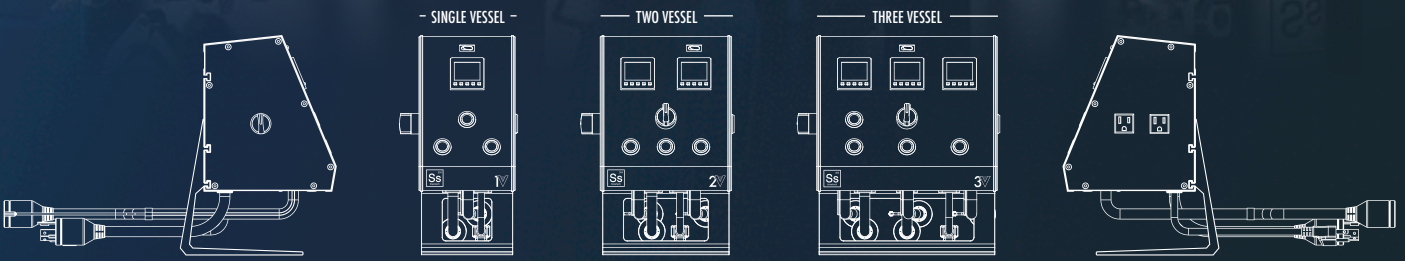
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by Dave Green

eControllers + eKettles

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RECIPE STANDARDIZATION

EXTRACT EFFICIENCY: 65%
(i.e. — 1 pound of 2-row malt, which has a potential extract value of 1.037 in one US gallon of water, would yield a wort of 1.024.)

EXTRACT VALUES FOR MALT EXTRACT:
liquid malt extract
(LME) = 1.033–1.037
dried malt extract (DME) = 1.045

POTENTIAL EXTRACT FOR GRAINS:
2-row base malts = 1.037–1.038
wheat malt = 1.037
6-row base malts = 1.035
Munich malt = 1.035
Vienna malt = 1.035
crystal malts = 1.033–1.035
chocolate malts = 1.034
dark roasted grains = 1.024–1.026
flaked maize and rice = 1.037–1.038

HOPS:
We calculate IBUs based on 25% hop utilization for a one-hour boil of hop pellets at specific gravities less than 1.050. For post-boil hop stands, we calculate IBUs based on 10% hop utilization for 30-minute hop stands at specific gravities less than 1.050. Increase hop dosage 10% if using whole leaf hops.

Gallons:
We use US gallons whenever gallons are mentioned.

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Q

Do you have a white whale beer style you just can't seem to master?

Porter. Need a beer that tastes like pie? I'm your huckleberry. Heck, need a beer made with huckleberries, I'm your partner. Need a porter? I'm going to need to talk to my buddy. For whatever reason, I can name all the notes but can't sing porter's song. So for me, I have to go borrow a proven recipe. It's confounding.

Melvillian framing appreciated! That's a tough question, because there's always room for improvement and execution usually falls short of any Platonic ideal. If I had to name a white whale, I guess I'd say Irish stout because that was my very first homebrewing obsession and led to so, so many rebrews. Nitrogen and stout faucets changed my life.

I'll be revisiting hefeweizen soon. It's one of my favorite beer styles, but the few attempts I've brewed lacked the complexity in the yeast profile featured in the terrific examples out of Germany.

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Northern English Brown Ale

English brown ales were at one point broken out into northern and southern style. While that distinction has mostly gone away

with the 2015 BJCP updates, many brewers will still make the distinction. Learn about the northern variation of the style from Jamil Zainasheff and get a recipe. <https://byo.com/article/northern-english-brown-ale-style-profile/>

MEMBERS ONLY



Grilling With Homebrew

There are a lot of different directions you can go when you combine food recipes with beer recipes. You can

add hops to a marinade or roasted malt to a rub. Check out professional chef and culinary consultant Mark Molinaro's take on bringing your homebrew onto the grill. <https://byo.com/article/grilling-with-homebrew/>



Recording Your Brew Day

Taking notes from brew day on through

the end of packaging helps brewers repeat what works, see why targets were missed, and better understand equipment, ingredients, and the science of brewing beer. Get a primer to understand your processes better. <https://byo.com/article/recording-your-brew-day/>

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Increasing Your Extract Efficiency

Is your extract efficiency

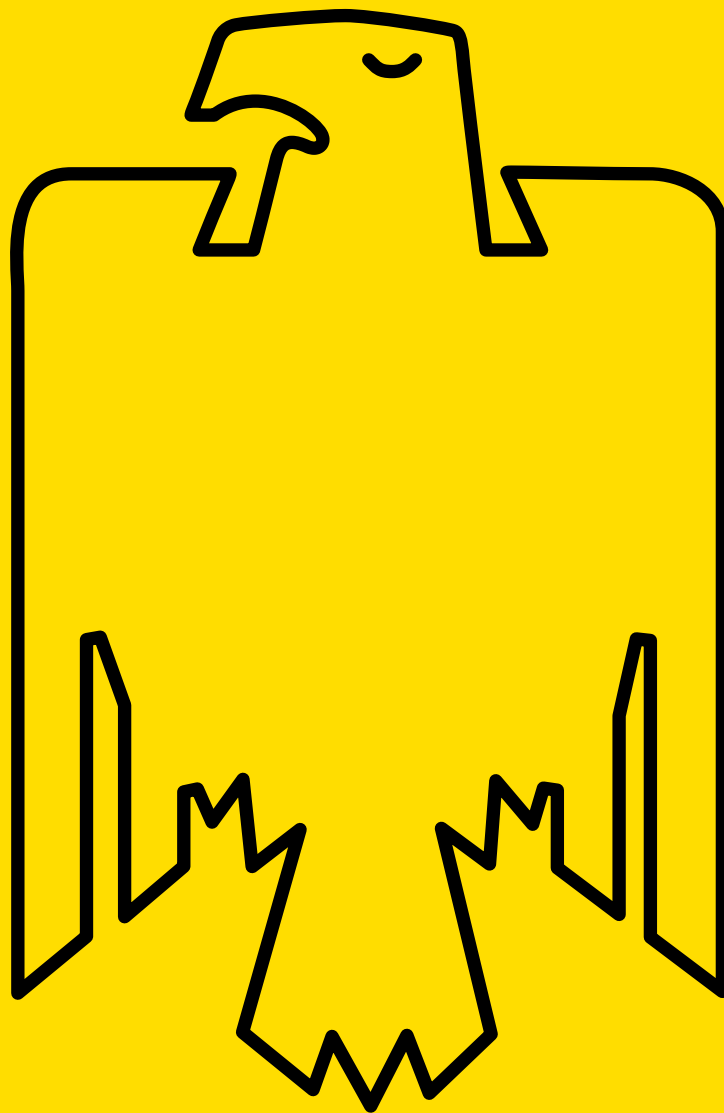
consistently low or just plain inconsistent? Get a primer on the factors that go into estimating your extract efficiency and what areas you may need to focus on to bump your numbers or to at least know what you should expect from each mash. <https://byo.com/article/increasing-your-extract-efficiency/>

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ADDING CRYSTAL MALT AFTER THE MASH

In Gordon Strong's May-June 2019 "Style Profile" recipe for California Common, he says to add the crystal malt at the end of the mash: "Begin recirculating the wort. Add the crystal malt and raise the temperature to 168 °F (76 °C) over the course of 15 minutes." What is the logic behind that? My calculations show that if the crystal malt is mashed, the pH would be at 5.5 without any added acid. The crystal malt is only worth 0.1 pH. Even more disturbing, the total calcium would be only 31 ppm, well below the rule of thumb of 50 for flocculation.

MB Boesen • via e-mail

Author Gordon Strong responds, "The crystal malt isn't mashed because it doesn't need to be; it's already converted and all you need to do is rinse the color and flavor from it. But if you are monitoring your mash pH, feel free to 'mash' it. As for the calcium levels, I've used this water treatment scheme for a long time and never had a flocculation problem. But if you are disturbed by the level, go ahead and adjust it to where you think it should be."

EXPLAINING AAUs

I am a German and have a question about a term I am not familiar with. I don't know the term "AAU" in the recipes for the hops. What does this mean? I have never seen it in Germany before.

Uwe • via e-mail

In the US, homebrewers often use AAUs (alpha acid units) to express bitterness in a beer — they are similar to IBUs (international bittering units) but easier to calculate on a homebrew scale. AAUs are calculated by multiplying the weight (oz.) x alpha acid % of a hop. So, 1 oz. of Cascade hops at 5% alpha acids would equal 5 AAUs. BYO lists AAUs because, particularly for bittering additions, the bitterness contribution is more important than the amount of hops added. The alpha acid percentage of a hop variety can vary greatly from year-to-year or depending on where it is grown. If a recipe calls for 1 oz. of 3.5% alpha acid Hallertau hops at the start of a boil (3.5 AAUs) but you instead have Hallertau hops that are 5.5% alpha acids, you would still be shooting for 3.5 AAUs. So, $3.5/5.5 = 0.63$ oz. hops needed at 5.5% alpha acids.



Bob Peak is a recently retired partner of The Beverage People Inc. in Santa Rosa, California (www.thebeveragepeople.com). Before The Beverage People, he was the General Manager at Vinquiry, a company

that provides analytical services to the wine industry. He is also an award-winning homebrewer, cidemaker, and winemaker, and writes about each of these subjects in his free time. He is the Technical Editor of *WineMaker* magazine and a BJCP judge.

In this issue, Bob combines his love of beer and food with an article on pairing beer styles with barbecue, beginning on page 44.



Jill Ramseier is the Executive Chef at Deschutes Brewery. Raised in Canby, Oregon between a filbert orchard and an egg farm, she started her career cooking the savory comfort food she loves, everything from

high-volume Creole to farmhouse French cafe food. An adventure soon landed Ramseier in Ohio, where an opportunity to run a pastry program at a fine dining bistro allowed her to make breads, pastries, and pastas from scratch daily. Eventually she returned home to Oregon to open the Deschutes Brewery Public House in 2008. After setting up a 24/7 scratch baking program that turns out 50,000 of the brewery's well-loved pretzels a year, she returned to her savory roots and became Executive Chef in 2013. When not overseeing the brewery kitchen, she enjoys spending time at home with her family, puttering around in her garden, or enjoying their farm.

In this issue of *BYO*, Jill shares some of her favorite barbecue recipes that incorporate beer as an ingredient, beginning on page 54.



Terry Foster was born in London, England and holds a PhD in chemistry from the University of London. He now lives part of every year near New Haven, Connecticut where he often brews commercially with

Brewport Brewing in Bridgeport, Connecticut. Terry is known to many homebrewers as the author of the *Pale Ale* and *Porter* books in the Classic Beer Styles Series (Brewers Publications), *Brewing Porters and Stouts* (Skyhorse), as well as many feature articles in *BYO*. He also wrote the "Techniques" column for *BYO* from 2010–2016.

In this issue, beginning on page 30, Terry explores how the latter half of the 19th century in England influenced British beer styles as we know them today.



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When it comes to flavor/aroma additions, the AAU measurements are less important, but for hops that will be boiled 30+ minutes AAUs are as important, if not more important, than the amount of hops being added.

SOAKING OAK CHIPS

I am brewing Vin Blank IPA from the January-February 2019 issue. I have the 1 oz. (28 g) of oak chips soaking in gin at the moment but the recipe says to pour off the gin and add the white wine after about a week. It doesn't say how much white wine to replace the gin with? Can you give me an indication of how much should go in the keg with the chips?

There wasn't any indication as to how much gin to use either (which I know doesn't matter) but would help to know so I am not using too much or too little white wine.

Chris Hughes • Toronto, Ontario


As far as the amounts to soak the oak chips in with this recipe (or any) – with the gin all you need is enough to cover the oak chips since it will be dumped out (or drunk). Just make sure you add a little more than enough to cover the chips since the chips will soak some of it up. For the wine, it is really a decision based on preference. Anywhere from a cup to half a bottle or more of wine sounds reasonable to us, depending on the amount of wine flavor you'd like

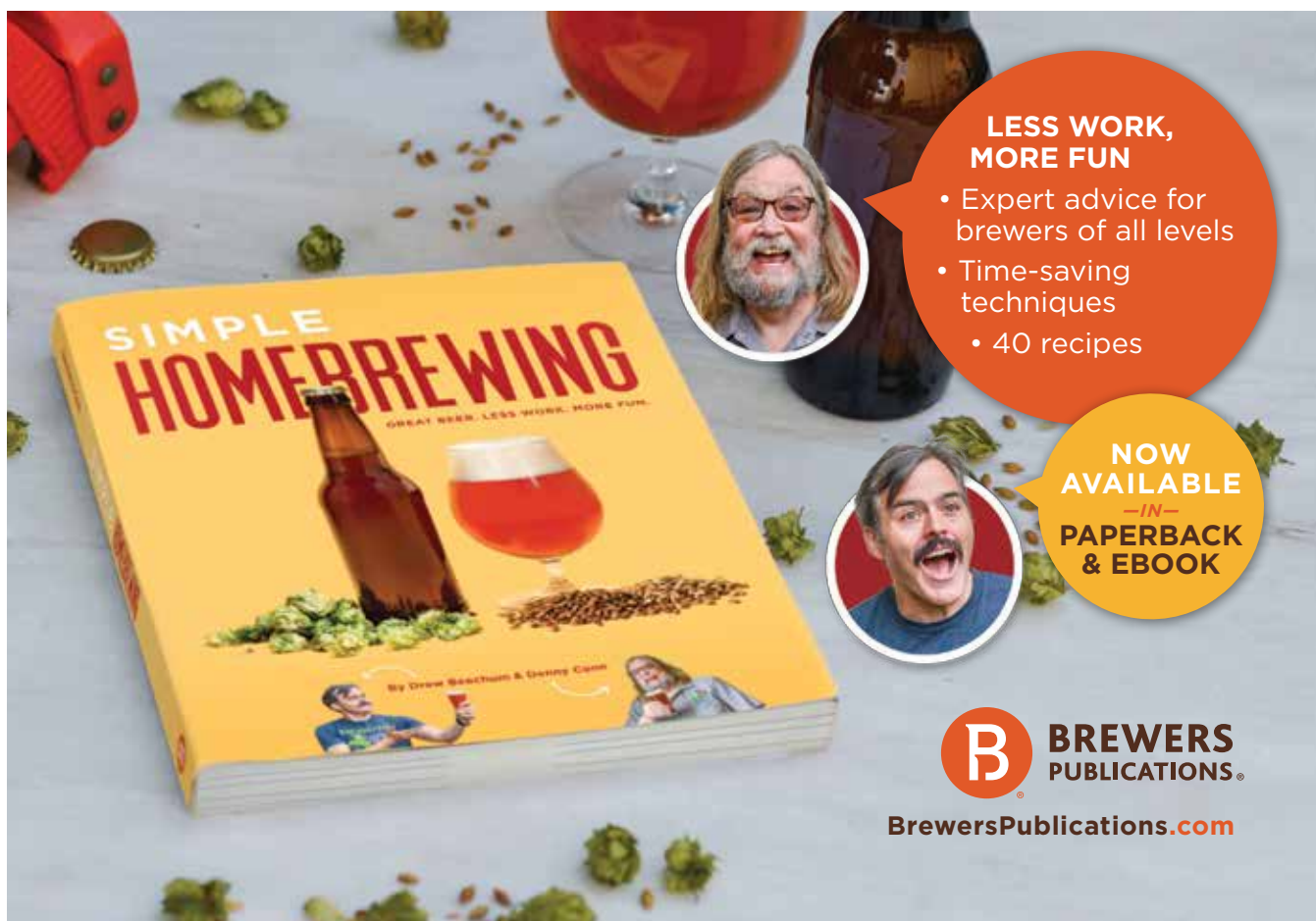
to add to your beer. If you are hesitant about adding too much and will be kegging the beer, I'd suggest starting with enough wine to fully soak the chips (8 oz./240 mL or so) and then tasting the beer once it is carbonated. You can always add more wine to the keg later if you'd like a little more of the vinous character in the beer. We'd love to hear any feedback when the brew is complete!

CLARIFICATION OF NEIPA RECIPE

I have a question regarding Scott Janish's New England IPA recipe in the March-April 2019 issue. In the step by step it says to cold crash the beer twice: "After 3 days, rack the beer into a CO₂-purged vessel such as a keg or carboy, then chill beer to 58 °F (14 °C). After fermentation is complete (7–10 days) soft crash the beer to 58 °F (14 °C) to encourage the yeast and first hop addition to settle out."

Clark Urdike • via e-mail

Sorry for the confusion in the step by step of this recipe, Clark, and everybody else excited to try this unique New England IPA recipe! Scott wanted to make an adjustment to the step by step in his recipe at the last minute before sending the issue off to the printer and, in doing so, this error was added in. The correct time to cold crash the beer down to 58 °F (14 °C) is after fermentation is complete. No need to adjust the temperature on the first transfer. 



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BEGINNER'S BLOCK

BY DAVE GREEN

DESIGNING EXTRACT-BASED RECIPES

As the recipe editor at *Brew Your Own* magazine, I'm often tasked with creating recipes for folks who brew with extract from an all-grain version. I wanted to share some of the basics of what I do so that everyone can take any all-grain recipe found online, through a brewery, a fellow homebrew club member or from friends, and create an extract-based recipe themselves. We will also look at the building blocks to crafting extract-based beers as stand-alone recipes.

BASE MALT CONSIDERATIONS

First off, I often swap out most, if not all of the base malts for a very light colored malt extract. So what are base malts? You can identify them with names such as Pilsner, pale ale, 2-row, Vienna, mild, and sometimes Munich malts (not all Munich malts are base malts). Other brewing grains such as wheat, rye, and oat malts can also serve as a base malt. Generally they are self-converting, meaning they are able to enzymatically convert the starch found in brewing grains into sugars and dextrins during the mash.

I personally prefer to use dried malt extract as a base malt substitute rather than liquid for many reasons including better storability and it's easier to measure out in small increments. Light-colored dried malt extracts are produced using the maltster's base malts and sometimes a touch of specialty grain like a dextrin malt to build body. These light-colored extracts are going to produce a straw-yellow colored beer. By themselves, they can produce a light-bodied, easy-drinking beer, or can make for a great jumping off point for a more complex beer. Extracts such as wheat, Pilsner, Vienna, or Munich can be utilized depending on your desired goal for the beer.

SPECIALTY GRAIN CONSIDERATIONS

The only reason I will keep grain base malts in an extract recipe is if a large percentage of the specialty grains should be mashed instead of simply steeped. How do you know if the grain should be mashed instead of steeped? Steeping grains fall into the categories of crystal/caramel (cara) and highly-roasted malts. There are some notable exceptions to this rule like Special B (or Special W) malt, which is actually a steeping grain. Any good homebrew shop should be able to answer correctly in this arena and there are charts found online as well.

If you have 10% or more by weight of specialty grains in your recipe outside of the steeping world, then I recommend mixing a 1:1 ratio of base malts to specialty grains to perform a partial (or mini) mash. Mashing specialty grains include the likes of biscuit, aromatic, brown, melanoidin, and honey malts to name a few. Also any grain that is not malted is included in this such as flaked barley, flaked oats, and torried wheat.

So what specialty grains should you choose? Basically if you can become adept in the partial mash process, there are very few constraints on your brewing process. Almost all styles of beer are possible with extract as the base. Smoked beers (rauchbiers) are going to be one of the biggest challenges of any extract brewer because smoked malts are enzymatic and usually comprise 25–75% of the total grain bill. Learning the nuances of various specialty grains are something that even professional brewers who have been at it for decades are still constantly learning. I advise doing your own research and then it will be trial-and-error time to advance your understanding in this department.

THE STEEP VS. MASH

The main difference between a steep and a mash is time and temperature. When performing a partial mash, the grains and water mixture should be kept between 145–162 °F (63–72 °C) for 30–60 minutes. This is because there is an actual biological process occurring in the mash that is sensitive to temperature and takes time to complete. Generally warmer mashes can be held a shorter time period though as the biological process speeds up.

Grains that are being steeped don't need the assistance of any biological processing, so it's more like a coffee or tea steeping process . . . you're simply trying to extract the sugar and some other flavor and/or color components from the grains. And just like those steeping processes, you do still want to be cognizant of time and temperature. You never boil your coffee beans or tea bag, and the same holds true of steeping grains. A steep can be complete in 15–20 minutes so long as those extractables dissolve in the water.

OTHER CONSIDERATIONS

Water is the first up: If you are brewing with extract, I always advise using either reverse osmosis (RO), distilled, or tap water, as long as your tap water is soft (aka low in dissolved salts like carbonates). Next is full-volume boil vs. partial-volume boil. If hops are going to be a big part of your beer's profile, then I generally advise full-volume boil. If not, then you can look at doing a smaller-volume boil and adding water just before pitching yeast. Finally, there is the boil . . . is it even necessary? In all honesty, many extract-based recipes may not need to be boiled for 60 minutes, let alone boiled at all. If you want to explore this more, I advise doing some research about the benefits of a boil in brewing.

HOMEBREW DROOL SETUP

STEVE HOLLINS • ELDORADO, WISCONSIN

I started brewing beer over 20 years ago making a partial mash-extract system on the kitchen stove top. Upon retiring I decided it was time to move into the world of all-grain brewing. I live in bucolic countryside so we built the brew room on the end of the machine shed and made it look like an old milk house. With the help of many fantastic neighbors, we built the room with salvaged materials sourced locally from old barns such as:

- The wooden wall is built from a neighbor's grandfather's red wood silo.
- The milk pipes that have chilled water running through is from a neighbor's old milk barn.
- The beams were also given from a neighbor's barn that was being torn down.
- The barn door rail for the chain hoist to lift the grain basket was from a neighbor.

- The table was also built from beams from a neighbor's barn and redwood from the silo.
- The wire corncrib that is used to grow hops on as well as to sit inside is from a neighbor – this was moved with the help of neighbors and their equipment.
- The hayfork was from a neighbor's parent's barn.
- Barn rope and old wooden barn pulleys are from a neighbor's old barn long ago torn down.

The brew room includes:

- A sloped concrete floor to a 6-ft. (1.8-m) floor drain.
- Four 240-V circuits to each of the fermenters.
- Water supply in wall behind fermenters.
 - o Reverse osmosis (RO) water (for brewing.)
 - o Treated hot and cold water.

- o Well water for cooling.
- o Chilled water from glycol chillers located in machine shed area.

Brewing system includes:

- Monster Mill MM-3PRO grain mill with stainless steel rollers and extended hopper.
- Four large-sized Microbrewery BIAC Brewing Systems from Brewha Equipment Company.

Brewing has become an awesome neighborhood activity. Neighbors come to brew, sample previous batches, and take beer home to have it in their bars.

At the end of brewing we sit around the firepit table in the corncrib surrounded by growing hops plants and their aroma. The area is lit up by LED lights wrapped around an old hayfork hanging from the crib roof with an old barn rope and pulleys. A perfect place to end the brew day!



WHAT'S NEW



SPIKE FLEX

The new Spike FLEX is a small-batch, 5-gallon (19-L) fermenter that is meant to fill the gap between pro-style conical unitanks and a glass carboy or plastic bucket fermenter. The FLEX was designed with versatility in mind. The base FLEX model features include sanitary welded 1.5-in. tri-clamp fittings, a liquid crystal stick-on thermometer, a three-piece valve and 5/8-in. quick-connect racking arm, which rotates for clearer beer transfers. The domed, five-clip lid holds 2 PSI and includes an airlock, bung and a 4-in. tri-clamp port. The FLEX+ adds several upgrades to the base model including the ability to hold 15 psi. There are over 20 accessories that can be added to the base FLEX to control temperatures, pressure transfer, and carbonate. Learn more at: <https://spikebrewing.com/flex>



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This oat malt is lightly roasted (4 °L), providing a mild sweetness with full mouthfeel – and can be used to impart character and flavor to any beer style. Higher levels of usage will create a progressively clean, “oaty” flavor. Blonde RoastOat™ malt does not have any diastatic power, so 30% would probably be the maximum recommended when used in conjunction with a high-diastatic base malt. Blonde RoastOat™ kernels are thinner than whole kernel malted barley so changing the gap setting on your mill is recommended. For more visit: <http://www.brewingwithbriess.com/Products/Roasted.htm>



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Photo courtesy of Lars Garshol

A traditional yeast starter (kveik) for Norwegian farmhouse ales. The yeast from the previous batch dries on the yeast ring and propagates in the new wort.

THE NORWEGIAN INVASION

Unless you've been hiding under a rock, most homebrewers and many craft beer enthusiasts have heard of the Norwegian kveik strains of yeast, which have taken hold in the US beer scene. Now available from multiple yeast manufacturers, these strains of yeast have many distinct traits that are highly advantageous for brewers including a tolerance for producing “clean” beers even under high heat (think summer in Texas-type heat). This quality allows those of us without good fermentation temperature control to brew a much wider range of styles any time of year since many traditional brewing strains that were heat-tolerant are phenolic off-flavor positive (POF+). These kveik strains are also quick fermenting and fast flocculators, allowing brewers to go from grain to beer in a very short timeframe. Temperature tolerance does vary from strain to strain, but Lars Garshol from *Larsblog* suggests 60–104 °F (15–40 °C) as a typical range. Kveik strains do produce some farmhouse qualities with more esters coming out when you pitch less yeast. Higher pitch rates and lower fermentation temperatures makes for a cleaner profile beer. Not everyone will be a fan, so you may want to seek out a commercial version before you brew a full batch with one. But when the temperatures rise this summer, remember to check in with your favorite suppliers in order to find out the availability of these kveik strains.

Upcoming Events



JULY 1
Michigan State Fair Homebrew Competition
Be part of

Michigan State Fair's first annual homebrew competition! The competition is limited to the first 300 entries and sign-up takes place online. The cost is \$5 per entry and there is a 5 entry per person limit. All entries must be received by July 1: <http://www.michiganstatefairllc.com/home-brewing-competition>



AUGUST 17
BrewBQ Home Brew Fest takes place in Chicago, Illinois. This event is free

to the public, but the club host C.H.A.O.S. depend upon donations to help fund their club and their group brewspace. Food, local vendors, music, and lots of homebrew from 10–15 homebrew clubs make this a summer staple for the area. For more check out: <https://www.chaosbrewclub.net/event/brew-bq-homebrew-beer-fest>

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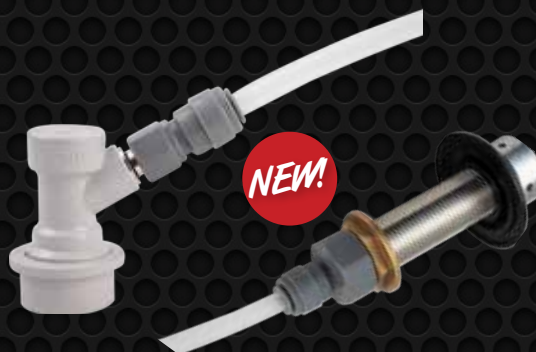
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DEAR REPLICATOR, I recently took my first trip to London, England (technically for work, but emotionally for the beers) and had a blast exploring the pub culture. As a huge fan of cask ales, and attempting to replicate them as a homebrewer, I paid particular attention to all the beers on hand pump across the city. In all my tastings (for science, of course) the one I kept coming back to was Tiny Rebel Brewing Co.'s Bitter Sweet Symphony ESB. It was everything I wanted in an ESB and it almost pained me to try other beers after it. Turns out, it was impossible to find in cans or bottles and further investigation on their website indicates it's only available in cask and it's a seasonal brew. Short of importing a cask from Europe in the next few weeks, finding a replica recipe is my only hope. Can you work your magic and deliver the goods? Thanks in advance!

Jeremy Bersano
Chicago, Illinois



Thanks Jeremy for your request! You hit a soft spot in my heart as I also have a penchant for a well-made ESB. And with the good nature of the folks at Tiny Rebel Brewing, you won't have to pay for the extravagant shipping charges and import a cask of Bitter Sweet Symphony either.

Tiny Rebel was founded in Newport, South Wales in 2012, by brothers-in-law Brad Cummings and Gareth (Gazz) Williams. As is the case with many of the modern breweries, Gazz learned to homebrew from someone close to him — his grandfather. Gazz subsequently introduced Brad to the hobby. After several informative years as homebrewers, the two decided to up their game and turn the love they had for the hobby into a profession. The pair rented an industrial unit in the Maesglas area of Newport and had to rapidly expand into the neighboring unit due to demand of their product.

But what to call their brewery? "It eventually became blindingly obvious. Two blokes in a garage seeking an alternative to big brewery rubbish. We're tiny, but we're rebels . . . brewing whatever took our fancy, adding weird and wonderful stuff to our brews. We are 'Tiny Rebel'."

"All that we needed was an image that ties together every aspect of our attitude: Fun, creativity, relaxation, and rebelliousness. Like our home city of Newport, we're a bit rough around the edges. We love the urban environment and all the graffiti artwork that comes with it. And so our bear came to be!"

The company opened their first

bar, Urban Tap House, in Cardiff in late 2013, with the sweat equity that accompanied winning the top three places at the Great Welsh Beer and Cider Festival. The heavy lifting was done with three beers from their initial lineup: Dirty Stop Out (gold), a smoked oat stout; FUBAR (silver), an American Pale Ale; and Urban IPA (bronze), an intercontinental IPA. Because of this showing, they were crowned with the title Champion Beer of Wales, which they then went on to defend in 2014 when FUBAR won gold. Later in 2015, a branch of the Urban Tap House opened in Tiny Rebel's hometown of Newport further expanding the brand.

2016 brought further expansion of Tiny Rebel. The brand of Urban Tap House was retired and both bars were renamed Tiny Rebel. Then, in the middle of 2016, the company announced a massive expansion with a 36,000-sq.-ft. (3,350-sq.-m) brewing facility in the Rogerstone area of Newport. After moving into their new brewery and bar in July 2017, Tiny Rebel was able to increase their capacity up to five-fold to keep up the growing demand of their beers. This equates to up to 20,000 L (~5,280 gallons) per day. In terms of packaging, they can fill ~2,000 cans per hour (~35 kegs or ~50 casks an hour).

Staying true to themselves, Tiny Rebel remains a close supporter of activities and events in their local community. Before the company moved into their Rogerstone brewery and bar, they ran a local competition to find their "Biggest Fan" who would win the chance to cut the ribbon at the opening

on the company's behalf. The winner was later offered a job in the business. In addition, they support St. David's Hospice Care, which is located 5 miles from their Newport brewery, and provides hospice care to over 3,300 people.

As beer is a creative product, Tiny Rebel aids other organizations in their creative efforts as well. They support the Welsh Music Prize, which celebrates the best of Wales-based sound and happens to be a perfect fit as Tiny Rebel employs several musicians. Alternatively, Tiny Rebel and BAFTA (British Academy of Film and Television Arts) Cymru announced a one-year partnership at the same time as the Rogerstone locations opened. "We were immensely proud to team up with them. Together, we celebrate Welsh creativity on screen and in the glass!"

Bitter Sweet Symphony isn't your typical ESB. Although it's fermented with a traditional top-cropping English yeast, the rest of the ingredients are global in nature. A good portion of the hops are from the United States and most of the additions are in the whirlpool or as dry hop for that extra punch. Also, the malt bill comes from the UK, US, and Germany. The added Munich malt adds the bit of base malt complexity without additional specialty malts. As for the crystal 300, feel free to substitute this out for another dark crystal with rich toffee or dark fruit character or use a darker Munich malt to compensate. With any luck you'll be able to craft this unique ESB with plenty of character to go around and won't have to import an entire cask.

TINY REBEL BREWING CO.'S BITTER SWEET SYMPHONY CLONE



(5 gallons/19 L, all-grain)
OG = 1.056 FG = 1.012
IBU = 30 SRM = 12 ABV = 5.7%

INGREDIENTS

8.5 lbs. (3.86 kg) pale ale malt
1.25 lbs. (0.57 kg) Munich malt
1.25 lbs. (0.57 kg) torrified wheat
0.5 lb. (0.23 kg) crystal 300 malt
(115 °L)
2.8 AAU Cascade hops (60 min.)
(0.35 oz./10 g at 8% alpha acids)
16 AAU Cascade hops (0 min.)
(2 oz./57 g at 8% alpha acids)
1 oz. (28 g) Bramling Cross hops
(dry hop)
2 oz. (57 g) El Dorado® hops
(dry hop)
Wyeast 1275 (Thames Valley) or
White Labs WLP023 (Burton Ale)
or SafAle S-04 yeast
½ cup corn sugar (if priming)

STEP BY STEP

Mill the grains, then mix with 3.6 gallons (13.6 L) of 166 °F (74 °C) strike water to achieve a single infusion rest temperature of 151 °F (66 °C). Hold at this temperature for 60 minutes. Vorlauf until your runnings are clear before directing them to your boil kettle. Batch or fly sparge the mash to obtain 6.5 gallons (25 L) of wort in the kettle. If fly sparging, stop once your running's SG hits 1.012 and top off to the desired pre-boil volume with water. Boil for 60 minutes, adding hops at the times indicated above left in the boil. At 15 minutes left in boil add either Irish moss, Whirlfloc, or other kettle fining agent of your choice.

After the boil, add flame-out hops and whirlpool for 15 minutes before rapidly chilling the wort to slightly below fermentation temperature, which is 70 °F (21 °C) for this beer. Pitch yeast and aerate well.

Maintain fermentation temperature to avoid producing too many esters, which can easily occur with this strain. Once primary fermenta-

tion is done, drop the temperature to 61 °F (16 °C). Add the dry hops and let them extract for 5 days. Bottle or keg the beer and carbonate to approximately 2.0 volumes.

TINY REBEL BREWING CO.'S BITTER SWEET SYMPHONY CLONE



(5 gallons/19 L, partial mash)
OG = 1.057 FG = 1.013
IBU = 30 SRM = 11 ABV = 5.7%

INGREDIENTS

4.5 lbs. (2.04 kg) light dried malt extract
1 lb. (0.45 kg) Munich dried malt extract
1.25 lbs. (0.57 kg) torrified wheat
0.5 lb. (0.23 kg) crystal 300 malt
(115 °L)
2.8 AAU Cascade hops (60 min.)
(0.35 oz./10 g at 8% alpha acids)
16 AAU Cascade hops (0 min.)
(2 oz./57 g at 8% alpha acids)
1 oz. (28 g) Bramling Cross hops
(dry hop)
2 oz. (57 g) El Dorado® hops
(dry hop)
Wyeast 1275 (Thames Valley) or
White Labs WLP023 (Burton Ale)
or SafAle S-04 yeast
½ cup corn sugar (if priming)

STEP BY STEP

Bring 6.5 gallons (25 L) of water to roughly 150 °F (66 °C). Steep the torrified wheat and crystal malt for 15 minutes before removing. Add the malt extracts, with stirring, before heating to a boil. Boil for 60 minutes, adding hops at the times indicated above left in the boil. At 15 minutes left in boil, add either Irish moss, Whirlfloc or other kettle fining agent of your choice.


After the boil, add flame-out hops and whirlpool for 15 minutes before rapidly chilling the wort to slightly below fermentation temperature, which is 70 °F (21 °C) for this beer. Pitch yeast.

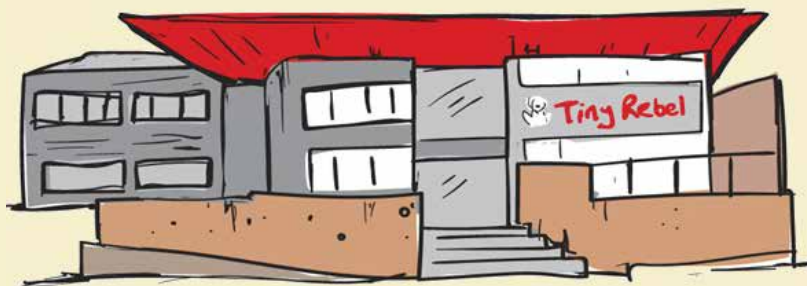
Maintain fermentation temperature to avoid producing too many esters, which can easily occur with this strain. Once primary fermentation is done, drop the temperature to 61 °F (16 °C). Add the dry hops and let them extract for 5 days. Bottle or keg the beer and carbonate to approximately 2.0 volumes.

TIPS FOR SUCCESS:

First off, let's talk about numbers. If you put the amount of hops into your favorite brewing software program, you'll likely find that the IBUs calculated are far from the value of 30 given. Fear not, the ratio of hops comes straight from Tiny Rebel's brewers and there will be plenty of hop character. Hop chemistry is a complex beast and elements such as flavor, isomerization, etc., remains cloaked in mystery.

As for your water chemistry, Mark Gammons, Tiny Rebel's Production Manager, recommends a profile to target a traditional sweet ale flavor. Within these boundaries, shoot for 200 ppm total hardness with chlorides around 150 ppm. In addition, the pH of your wort prior to pitching should be around 5.1, which means that your mash pH should be at the upper end of the ideal mash pH range, 5.4–5.5.

Finally, there's nowhere for inferior ingredients to hide in this style. Use the freshest ingredients possible otherwise it'll show faster than a year-old IPA. 



TIPS FROM THE PROS

BY DAWSON RASPUZZI

BBQ WITH BEER

Using beer as an ingredient on the grill

Give me some barbecue and a beer and I've got an ideal dinner on a warm summer evening. However, beer isn't just good to wash down those steak tips, grilled fish, or smoked brisket; it can also be an excellent source of flavor in the recipe. From sauces to bastes and marinades, beer adds a whole new range of complexity to smoked or grilled meats and vegetables. Get tips on how to incorporate your own homebrew into your BBQ from two chefs who aren't just blowing smoke.

For marinades, I lean more towards crisp, classic styles like Pilsners and pale ales.



*Over a decade ago in a biergarten in Vienna, Austria, Lori Rice found a passion for travel, food culture, and well-crafted beer, which led to the publication of her cookbook *Food on Tap* (Countryman Press, 2017). Her next cookbook, *Beer Bread* is set to publish in February 2020. Based in Central California, Lori is a certified beer server, photographer, and writer specializing in food and drink.*

There are three things to consider when using beer as an ingredient in barbecue – heat level, length of cooking time, and flavor goals. I usually suggest skipping IPAs when you get started – as they are in danger of turning too bitter when exposed to high heat or exposed to heat for an extended period of time – and leaning more towards flavor notes that fall into the category of caramelized or toffee, something that adds sweetness. Boozy is never a bad thing either. Not necessarily a high-ABV barrel aged, but I like cooking with Belgian styles. Crisp light beers work well too if you don't want an overwhelming beer flavor. (I'm not sure who wouldn't want that, but to each their own!)

For marinades, I lean more towards crisp, classic styles like Pilsners and pale ales. While slightly different with more of a bright peppery note, a saison is another good choice. The flavor they add isn't exactly acidic and there are some malty notes, but it's sharper than a mellow brown ale, for example. Their flavors play a role that's more closely aligned with a vinegar or lemon juice, a bit refreshing to lighten things up.

There are a lot of options when you are creating a barbecue sauce, and this is where I like to go smooth and sweet. Amber ales offer a sweeter caramel note that can sometimes be a bit floral as well. Brown ales lean towards toffee and nuttiness. Cream ales are a nice mild option that works well in sauces. The Belgian styles I mentioned earlier, such as dubbel, offer boozy sweetness. Stouts and porters with coffee notes, or even those that are more chocolatey can create an intriguing

flavor in sauces. Fruity ales and wheats can go a long way here as well. Even if you might shy away from a sweeter fruit beer to sip, they can create some stellar sauces for barbecue – especially those with tropical fruits like guava and pineapple.

Beyond the main course, there are so many ways to incorporate beer in side dishes and condiments. The Miso-Witbier Dressing and the Pale Ale Parmesan Dressing in my book, *Food on Tap*, can be used in potato salad or coleslaw. They can also be used as a side for dipping BBQ ribs or grilled chicken. The Pilsner Quick Pickles are also great for topping BBQ sandwiches and burgers.

Besides hoppy beers, as mentioned earlier, another category of beer that is more difficult to incorporate into cooking is wild ales or sour beers (this is not consistent across the board for the style, it depends on how sour). A fruit-forward sour would work. The style can be a bit harder to incorporate into sauces, though, due to the tartness taking over the flavors of other ingredients. For me, they make much better partners for BBQ pairings than ingredients when making it.

Speaking of pairing beer and BBQ, some of my favorites are brown ales and Belgian dubbels with smooth, sweet sauces like those used on pulled pork and chicken. The sweetness of the beer is a good match for molasses and brown sugar in the sauce. For spicier BBQ, I'd pick a crisp Pilsner or a kölsch. Mexican lagers can be a great pairing here, too. They tend to calm the heat without causing it to disappear for an enjoyable meal.



Richard Silvey is the Executive Chef at New Realm Brewing Co.'s Richmond, Virginia location. Chef Richard has been cooking professionally for 25 years and has been the Chef for many successful restaurants throughout his career. He has a passion for Latin American cuisine and is a pizza expert, having attended "pizza school" in Milan, Italy.

My first rule when using beer in BBQ is to use a style that still tastes good when heated and concentrated. Hoppy beers are the most difficult to cook with because they tend to get bitter when concentrated, and the hops can come across as metallic against a sweet/smoky tomato base. Malty beers, on the other hand, help add a depth of flavor to a sauce or marinade. Bocks, stouts, ambers, and porters work well for marinades, while a lager makes a really good brine.

When making a baste I like to use a cup of dark beer, a cup of honey, one stick of melted butter, and three tablespoons of minced garlic or ginger. The sugars are going to form extra flavor on the crust and add a lot to the recipe. For sauces I like to use a Belgian krieb lambic or a Flanders red ale to add some sweetness and depth to the sauce.

Another technique that you could use to incorporate homebrew into barbecue is using beer as a spritz. For this, I like to put some beer in a spray bottle and spritz it over meat in the

final stages of cooking. The flavors of the beer will taste fresh and appealing. Those final minutes of cooking are often when meat loses moisture, and spritzing can offset that process.

When it comes to smoking meats, I would use a smoked porter as a base to marinate the meat in before smoking. I have tried to soak the wood chips in beer before smoking and it is not a pretty picture. The chips get sticky and don't burn very well.

And, of course, there is the classic beer can chicken, which we offer at New Realm. The best things about the beer can chicken is how moist the meat stays while the skin gets nice and crispy because it's standing up. Also, don't forget the sides! A couple of times I have used both lambic and Flanders ale in a vinaigrette for grilled vegetables or a side salad. **BYO**

Find more tips from both of these pros (plus a recipe for Chef Richard's coffee stout sauce) online at <https://byo.com/article/bbq-with-beer/>

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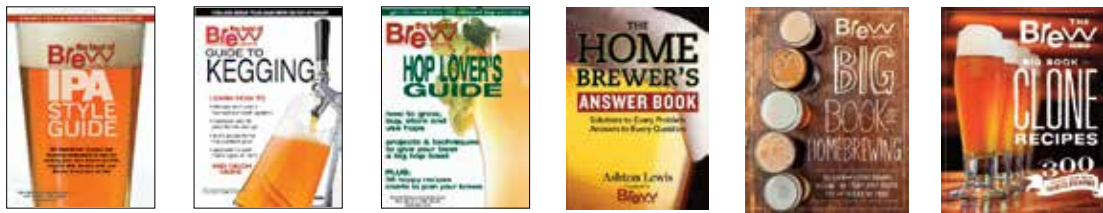
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BY ASHTON LEWIS

TERMINAL GRAVITY WOES

Also: Hot-side aeration and adding water to a boil

Q CAN I ADD ALPHA AMYLASE ENZYMES TO MY FERMENTER TO HELP MY BEER ATTENUATE? MY ORIGINAL GRAVITY (OG) WAS 1.079 AND IT HAS BEEN TWO WEEKS. NOW MY BEER IS AT 1.040 AND IS NOT SHOWING ANY FERMENTATION ACTIVITY.

PAUL EPP
VIA EMAIL

A Alpha amylase can be added to the fermenter to aid in attenuation, but it has limited efficacy in converting dextrins and starch into fermentables. The primary role of the endoenzyme alpha amylase in the mash is as a debranching enzyme that chops up amylose and amylopectin into pieces from the interior of these molecules. Although alpha amylase does produce fermentable sugars, the yield of fermentables is better when beta amylase works alongside alpha. Before digging deeper into the enzyme rabbit-hole, let's back up a few steps and talk about the factors that influence the final gravity of a batch of beer.

The OG of wort increases as "stuff" is dissolved in water during wort production. All-malt brewers dissolve this stuff from malt, and this stuff is primarily made up of fermentable sugars, unfermentable dextrins, starch bits that may not have been converted in mashing, and proteins. Brewers who use enzyme-free adjuncts, like rice and corn, also dissolve stuff, mainly carbohydrates, from these ingredients. And then there are ingredients in the "other" category that contribute fermentable sugars, unfermentable sugars, e.g., lactose, carbohydrate gums like beta-glucan, and myriad flavor compounds from the wide range of non-traditional ingredients used by brewers. Wort OG does not tell the brewer anything about how much stuff in the wort that drives OG is actually fermentable; OG

is simply the density of wort before fermentation. Salt water's density is greater than pure water, but is not fermentable. You get the point.

For the sake of discussion, let's assume that a batch of wort was made with 60% non-enzymatic rice adjunct and 40% malted barley with a diastatic power (DP) of 135 °Lintner. Rice solids are approximately 90% starch, so most of the rice used in brewing can contribute fermentable extract. But enzymes are required for this to happen and in this example the enzyme package from the malted barley has been significantly diluted to ~54 °Lintner by the rice adjunct. The enzymatic threshold cited for functional conversion is about 60 °Lintner, depending on mash time and temperature, and this example describes a mash that is borderline enzymatically weak. This situation does not mean that the rice will not contribute extract, however, but it may result in decreased fermentability.

Continuing down this path, how does a brewer know what to expect from wort in terms of FG (final gravity) when brewing a beer for the first or fiftieth time? Many homebrewers like brewing new beers on a regular basis and rely on a recipe for the expected FG. Given the details provided in most recipes, the FG can be approximate at best and, at times, not much more than a guesstimate added to a recipe that has never been brewed. However, if the recipe is something that is routinely brewed by a brewer, the FG value holds

Given the details provided in most recipes, the FG can be approximate at best and, at times, not much more than a guesstimate . . .



Photo by Les Jørgensen

HELP ME, MR. WIZARD

much more weight, especially if the ingredients used for the beer are consistent and if the brewer is not constantly adjusting the recipe. My point in relation to your problem is that you probably don't know what the FG of your brew will be after fermentation is complete unless you have performed a forced fermentation test (aka an accelerated form of fermentation).

How can a recipe have a guesstimated FG if the recipe has never been brewed by the recipe's author? As it turns out, most infusion-mashed worts have an apparent degree of fermentation (ADF) somewhere in the 70–75%, depending on the yeast(s) used for fermentation. For example, a 1.065 (16 °Plato) with an assumed ADF of 75% will finish at 1.016 (4 °Plato). This approximate value is useful when brewing a beer for the first time and also handy when trying to troubleshoot a problem. Your 1.079 (19 °Plato) wort should probably finish somewhere around 1.019 (4.75 °Plato). Assuming that you have produced a relatively “normal” wort in terms of ingredient selection and production method, your current gravity is quite a bit off the normal course.

The real question for you is “what's the problem?” And the answer to this question likely lies on one of the following buckets: 1) yeast, 2) pre-fermentation preparation, and/or 3) wort properties. Here is a high-level view of what may be considered to help narrow things down:

Yeast

- Did you pitch enough yeast? The rule of thumb for a 1.075 SG wort is somewhere in the 10–25 million cell/mL range. Higher gravity brews require more yeast than lower gravity brews.
- Was your yeast in good health when it was pitched?
- Is it possible that you are using a highly flocculent strain that dropped out early?
- Does your chosen strain do well in higher gravity fermentations?

Pre-Fermentation Preparation

- Was your wort properly aerated/oxygenated?
- Did you add yeast nutrients?
- Did you add a source of zinc?
- Did you cool the wort to the approximate fermentation temperature?
- Is the fermenter located in a stable environment with a relatively constant temperature?

Wort Properties

- Do you know what the actual FG should be?
- Is it possible that your wort is nutrient-poor?
- Did anything occur during mashing/wort preparation that makes you suspect that adding enzymes is going to fix the problem?

Unless you really diluted your malt enzyme package, used a boat-load of starchy adjuncts as steeping ingredients added to an extract wort, or mashed at a very high temperature (non-calibrated thermometer), I don't think enzymes are your problem because your gravity is so off of the mark. If I had to place a bet on the root cause, I would place my wagers on yeast and wort zinc level. I am not going to address what you could have done differently before fermentation to address these issues because that is a separate question, so I will finish on what you may want to do to help your fermentation finish, and that is to kräusen your beer.

On the surface, kräusening is just a traditional method of carbonation. And in today's world of brewing, traditional is oftentimes lumped into the bag of “boring tricks” that your grandfather used. But kräusening is much more than a carbonation method and is the perfect tool to dust off when fixing fermentation problems. The method is to make a “kräusen beer” that is about 15% of the volume of the beer being rescued. This kräusen beer can be different from the beer being kräusened; that's OK if the blended recipe is considered.

Kräusen beer is essentially a yeast starter that is added to beer after fermentation, or in mid-fermentation to stuck fermentations, for the purposes of carbonation and flavor maturation. Traditional lager brewers would add kräusen beer to the lagering tank, seal the tank up with a relief spunding/bunging valve, and allow the beer to carbonate and mature. Homebrewers can kräusen a batch without capturing the carbon dioxide if the goal is to simply help the fermentation finish and provide fresh, healthy yeast cells to clean up things at the end of the game.

If I were you, I would kräusen this batch before ever thinking about adding enzymes, *unless* I had a very good reason to suspect that the beer in my fermenter had a lower-than-usual wort ADF and that the enzyme treatment was more than a Hail Mary. By the way, granddad's brewing toolbox had a lot of really cool and useful tools that the modern brewer should consider dusting off!

Q I HAVE AN ELECTRIC BREW-IN-A-BAG (EBIAB) SYSTEM WHICH IS OUTFITTED WITH A MESH BASKET TO HOLD THE GRAINS FOR MASHING. THERE IS A CENTER POST IN THE BASKET WITH HOLES TO RECIRCULATE THE WORT. THESE HOLES FORM A RING AROUND THE TUBE AND THERE ARE SEVERAL SETS OF THESE HOLE RINGS FROM THE BOTTOM TO THE TOP OF THE TUBE. MY CONCERN IS WHEN THE BASKET IS NOT FULL, THE WORT IS SPRAYED OUT OVER THE GRAIN BED THROUGH THE HOLES SEVERAL INCHES ABOVE THE SURFACE. I HAVE HAD SEVERAL BATCHES COME OUT OF PRIMARY FERMENTATION WITH AN AWFUL SMELL AND TASTE AND HAD TO DUMP THE WHOLE BATCH. IS MY ASSUMPTION THAT THE WORT IS EXPOSED TO TOO MUCH OXYGEN DURING THE MASH CAUSING THIS OFF-FLAVOR?

MARK KUTIL
GERMANTOWN, TENNESSEE

A Identifying that one problem, the thing responsible for the majority of brewing issues, is the dream of every brewer who knows that their beer is just one step away from greatness. And, for many brewers, hot-side aeration (HSA) becomes the boogeyman to conquer. Without smelling and tasting your beers, it is impossible for me to provide any definitive advice from my office perch. But I do have some thoughts that may help you in your brewing endeavors. And my first thought is that you should look beyond HSA.

Hot-side aeration refers to oxygen pick-up in mash and wort caused by splashing in the “hot side” of the brewery. Flavors that relate to HSA include wet paper (trans-2-nonenal), caramel/ toffee, and Sherry; the typical buffet of oxidized beer flavors that may arise from enzymatic and non-enzymatic oxidation reactions.

The primary concern that commercial breweries, in particular those brewing very lightly colored and flavored beers, have with HSA begins with the malt. Very pale malts are made using gentle kilning methods that minimize color development and enzyme degradation. These types of malts may have lipoxygenase (LOX) levels that lead to lipid oxidation. The products of LOX activity survive wort production and can continue oxidative reactions in beer that lead the development of the classic wet paper aroma. Today, there are even LOX-less barley varieties being developed to eliminate this cascade of biochemical reactions from beer (for more on this, see “LOX-Less Malt” in the January-February 2019 issue). Fortunately for most home and craft brewers, higher kilning temperatures puts a real hurt on malt LOX levels and most of the base malts used by this group of brewers does not contain much LOX. Add to this the effect that mash temperature has on LOX stability and the fact that most home and craft brewers infusion mash at temperatures well above the ~ 122 °F (50 °C) sweet-spot for LOX activity, and it is reasonable to conclude that LOX activity is not a major concern for this group of brewers. LOX activity is not the only concern with HSA; non-

enzymatic oxidation reactions do occur, but to a lesser extent due to process time and reaction rates.

The other thing to consider about HSA is scale, the source of much of the data about HSA, and how all of this relates to homebrewing. Research related to HSA, like almost all brewing research, was conducted by, and for, large-scale brewing. When large, commercial brewers talk about mash and wort splashing, they are talking about

SPLASHING! Imagine an 8-in. pipe (200 mm) that is dropping mash at a rate of 450 gallons per minute (1,700 Lpm) 12 ft. (3.7 m) from the bottom of a mash mixer . . . by the time the mash hits the bottom it is traveling approximately 30 feet per second (9 m/s) or about 20 miles per hour (32 kph)! And that is just the beginning of splashing in brewhouses that were built before brewers figured out that all of this splashing was not ideal. Lauter tuns



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used to be filled from the top, and wort flowed from open grants into the kettles from the top. More splashing! The brewery engineers must have really been groovin' to Bobby Darin's "Splish-Splash." My point is that the splashing you are seeing in your eBIAB is on a much smaller scale and is prob-

BJCP and Cicerone programs, read articles on the topic, use flavor standards to help train your senses, taste beer alongside of skilled tasters who can help guide you, and attend homebrew club meetings. The purpose of this training is to help develop a beer flavor vocabulary that ties to causation.

“ The key to efficient problem solving is knowing where to look. ”

ably not *the* cause of your brewing ails. Not saying that HSA should be dismissed, but my beer gut always tells me that the best beers result from multiple right moves.

Now what? The root cause of the awful flavors that resulted in the drain pour could have been poor sanitation, contaminated yeast, insufficient yeast, low yeast pitching rate, improper wort aeration, lack of temperature control in fermentation, and countless other factors that cause flavor issues with beer. The key to efficient problem solving is knowing where to look. Even the best-equipped analytical brewing lab makes problem solving difficult to do if the analyst does not have an idea of where to begin. This is where sensory evaluation skills can really help point your nose in the right direction.

I suggest that you invest in some sensory training to help guide your troubleshooting efforts in the future. You can take classes, for example at *BYO's* Boot Camp, or enroll in the

For example, beers that have a spicy, clove-like aroma result from POF+ (phenolic off-flavor positive) yeast strains. If you like beers with this aroma and want to brew more beers with this character, seeking out POF+ yeast strains is something that will cut down on trial and error time. It could be that you don't like the smell of cat urine on your beer. What . . . cat urine? Yep. That aroma is found in certain hop varieties, most notably North American hops, and simply changing hop variety can be the silver bullet for that particular aroma. Whatever the flavor issue, sensory is a great starting point to help define what is happening.

Sitting at my keyboard without your beer to smell and taste does not allow me to identify the cause of your brewing woes. But hopefully this discussion has opened some doors about what you can do to become your own brewing detective, allowing you to hone your senses to help troubleshoot your future brews.

Q BRAD SMITH HAS STATED A 90-MINUTE BOIL IS RECOMMENDED FOR BOILING OFF DIMETHYL SULFIDES (DMS). MY POT IS ONLY 8 GALLONS (30 L) SO 90 MINUTES RESULTS IN TOO LITTLE WORT INTO THE FERMENTER. IS IT OK TO ADD WATER ALONG THE WAY DURING THE BOIL?


PETER YOUNG
SAULT SAINTE MARIE, MICHIGAN

A Brewers, and those of us brewers who write about brewing, have all sorts of rules of thumb to help guide us through our brewing journeys. Boil time is one such rule. Some brewers say to boil for a least an hour to allow all of the things required in the boil to occur, and others skip straight to what works best for them and use that as their rule. Just guessing here, but Brad Smith probably has figured out that a 90-minute-long boil works best for his brews. A real dilemma with long boils, however, is excessive evaporation and energy consumption.

Adding water during the boil and/or at the end of the boil can certainly be done to help you hit your volume and gravity targets while hitting that 90-minute target. But long boils may do more than drive off DMS and water; they lead to flavor development, wort darkening, and contribute to beer oxidation through the creation of peroxide radicals that survive wort production.

As a starting point, you can slowly dial back the boil time if you are not having issues with DMS. At a minimum, you

may be able to shave off a few minutes to your brewing day, and, in the process, you may discover that the shorter boil improves your beer flavor since different systems do better with different boil times.

Boil duration, intensity, and evaporation rate has been a topic of significant interest for the last 25+ years, and continues to be investigated because of the amount of energy consumed during this stage of the brewing process. Today, there are several high-temperature, thermal processing methods to sterilize wort, precipitate wort proteins and polyphenols, isomerize alpha acids, convert S-methylmethionine to DMS, and strip DMS from wort with either very minimal or no wort boiling. All of these methods incorporate some sort of wort stripping technique to remove DMS from the wort during the process and/or right before wort cooling. These methods will undoubtedly become more common in the future as concerns about energy consumption continue to intensify. Today's rule of thumb may soon become another historical brewing technique. 

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STYLE PROFILE

BY GORDON STRONG

BELGIAN PALE ALE

The Pride of Antwerp

While the style is called Belgian pale ale, the beer is usually amber to copper colored rather than pale.

BELGIAN PALE ALE BY THE NUMBERS

OG:	1.048–1.054
FG:	1.010–1.014
SRM:	8–14
IBU:	20–30
ABV:	4.8–5.5%



Photo by Charles A. Parker/Images Plus

I've previously written about the inspiration for my style columns – sometimes they are discoveries from travel, sometimes they are competition winners, sometimes new style guideline entries. Or sometimes my editor says, "Hey, do you know you've never written about Belgian pale ale before?" So, *BYO* edit staff, this one is for you. Fortunately, it's not only seasonally appropriate but also one of my favorites.

I also have a funny story about the style. Many years ago on a trip to Belgium, I was drinking in 't Brugs Beertje in Bruges (Brugge) with a friend. It was my turn to buy a round so I thought I'd get us a couple bollekes of De Koninck. So I signaled to the bartender by holding up two fingers and saying, "De Koninck." Except I didn't realize that in Europe, the number two is signaled using the thumb and index finger, not the first two fingers. So the bartender saw two fingers, assumed the thumb was being used too, and gave me three beers. Hey, I said it was a funny story, not a bad outcome . . .

Having a bonus glass of Belgian pale ale is not a bad thing you see, especially when you're day drinking. With a lot of high-gravity choices, calling for a standard strength beer during the day can be a lifesaver (or at least a liver-saver). It's nice to have a solid choice when you want something that isn't extreme and you just want to have a nice sociable conversation in a pub. You know, the way the English drink. So it seems fitting that this style of beer would have very English roots.

The Beer Judge Certification Program (BJCP) Style Guidelines groups Belgian Pale Ale in Category 24 (Belgian Ale) along with Witbier and Bière de Garde (yes, I know that last one is mostly French, but it's just over the border from Belgium). Belgian Pale Ale is style 24B in the guidelines.

HISTORY

Belgian pale ale is a twentieth-century invention, created as a result of a competition organized by the Union of Belgian Brewers in 1904 and judged at the Liège exposition of 1905. Jef Van den Steen (author of the book *Spéciale Belge Ale*) is credited by Michael Jackson with telling that story. Apparently, the concept was to create a regional specialty beer to compete with rising imports of both British ales and continental lagers (Pilsner-type beers). The result was an all-malt, top-fermented beer of about 5 to 6% ABV that was not dry-hopped, aggressively bitter, or otherwise containing strong flavors.

While a competition existed, names have been elusive: *Bière Belge*, *Belge*, *Spéciale Belge*, *Spéciale*, and *Ale* have all been used. The beer is common in the provinces of Hainaut, Brabant, Antwerp, and East Flanders. Breweries began making this beer after the competition, with many versions surviving until today: De Koninck (1913), De Ryck (1920), and Palm (1928) are still making good examples. Other well-known examples include Vieux Temps, Op-Ale, and Ginder Ale. New Belgium Brewing Co.'s Fat Tire is loosely in this style as well.

While the style is called Belgian pale ale, the beer is usually amber to copper colored rather than pale. It is more like a traditional English pale ale in color (think Bass ale or something similar) than being yellow-gold. As it was designed to compete with English pale ales, the name is appropriate. However, it will likely be termed an amber ale in Belgium, where beer menus often just list the color and strength of a beer. Amber ale is more generic, while *Spéciale Belge Ale* (Belgian Special Ale) is more specific. Belgian pale ale as a style name is what beer judges use, while beer labels tend to use the Belgian name.



De Koninck of Antwerp is the best-known modern example of the style, although a few of these beers may be found occasionally as imports in the United States. Since they are not big or highly-hopped beers, understand that many times the imports will not be fresh. Oxidized examples with higher caramel flavors, increased sweetness, and muted bitterness are common. I certainly recommend trying them on draft in Belgium for the best experience (just make sure you are ordering the correct number of them).

SENSORY PROFILE

Belgian pale ale is actually a top-fermented Belgian amber ale, but be careful about your expectations. It's not *too* Belgian. That is, it doesn't have a strong yeast character, particularly in the phenolic dimension. It also doesn't have any funkiness or tartness like you'd find in wild ales, or the dry-hopped character of distinctive beers like Orval. It's meant to be a sociable beer to compete with English pale ales and lagers, so it isn't going to challenge your palate.

The color of the beer is amber to copper, staying clear of darker brown colors and the golden to yellow pale range. It can have a large head as it is well-carbonated, but it doesn't last as long as some of the higher gravity bottle-conditioned Trappist-type beers. The white head should be well-formed and not disappear immediately. As with most Belgian beers, clarity is typically excellent.

The aroma and flavor are generally malty first, typically at a moderate level. The malt character has a bready note, but often has at least one (often more) character accents — things like toasty, biscuity, caramelly, honey-like, or nutty. Not all of these need to be present, but some malt complexity is welcome; however, nothing roasty or too sharp should be noted.

The yeast character shows itself mostly as fruitiness, with pome and citrus fruits (pear, orange, apple, lemon, etc.) common. Sometimes darker caramel type malts can add some fruitiness like plums, but not as much as many other styles such as dubbels. The yeast can add some peppery phenols, but

BELGIAN PALE ALE

(5 gallons/19 L, all-grain)
OG = 1.047 FG = 1.010
IBU = 25 SRM = 12
ABV = 5%



INGREDIENTS

6 lbs. (2.7 kg) Pilsner malt
2.5 lbs. (1.1 kg) Vienna malt
8 oz. (227 g) aromatic malt
8 oz. (227 g) Caramunich® III malt or crystal malt (80 °L)
6 oz. (170 g) biscuit malt
0.4 oz. (11 g) debittered black malt
5 AAU Saaz hops (60 min.)
(1 oz./28 g at 5% alpha acids)
2.5 AAU Saaz hops (10 min.)
(0.5 oz./14 g at 5% alpha acids)
0.5 oz. (14 g) Saaz hops (2 min.)
White Labs WLP515 (Antwerp Ale),
Wyeast 3655 (Belgian Schelde Ale),
Omega Yeast OYL-049 (Belgian Ale DK), or SafAle S-33 yeast
 $\frac{3}{4}$ cup corn sugar (if priming)

STEP BY STEP

This recipe uses reverse osmosis (RO) water. Adjust all brewing water to a pH of 5.5 using phosphoric acid. Add 0.5 tsp. each calcium chloride and calcium sulfate to the mash.

Mash the Pilsner, Vienna, and aromatic malts at 151 °F (66 °C) for 60 minutes. Start recirculating wort. Add remaining malts and raise the temperature to 168 °F (76 °C) for 15 minutes. Sparge slowly and collect 6.5 gallons (24.5 L) of wort.

Boil the wort for 90 minutes, adding hops at the times indicated in the recipe. The longer boil will help drive off the precursor compounds of dimethyl sulfide (DMS), found in Pilsner malt. You can add a kettle fining agent if you so desire.

After the boil is complete, chill the wort to 64 °F (18 °C), pitch the yeast, and ferment until terminal gravity is reached. Allow the yeast to free rise in temperature to promote full attenuation, but don't let the temperature get above 77 °F (25 °C).

Rack the beer, prime, and bottle condition, or keg and carbonate.

BELGIAN PALE ALE

(5 gallons/19 L, extract with grains)
OG = 1.047 FG = 1.010
IBU = 25 SRM = 12
ABV = 5%



INGREDIENTS

6 lbs. (2.7 kg) liquid pale malt extract
8 oz. (227 g) Caramunich® III malt or crystal malt (80 °L)
6 oz. (170 g) biscuit malt
0.4 oz. (11 g) debittered black malt
5 AAU Saaz hops (60 min.)
(1 oz./28 g at 5% alpha acids)
2.5 AAU Saaz hops (10 min.)
(0.5 oz./14 g at 5% alpha acids)
0.5 oz. (14 g) Saaz hops (2 min.)
White Labs WLP515 (Antwerp Ale),
Wyeast 3655 (Belgian Schelde Ale),
Omega Yeast OYL-049 (Belgian Ale DK), or SafAle S-33 yeast
 $\frac{3}{4}$ cup corn sugar (if priming)

STEP BY STEP

Use 6.5 gallons (24.5 L) of soft or reverse osmosis (RO) water in the brew kettle; heat to 158 °F (70 °C).

Steep the malts for 30 minutes in a mesh bag. Remove and rinse by dunking the bag several times. Turn off the heat. Add the liquid malt extract and stir thoroughly to dissolve completely. You do not want to feel any liquid extract at the bottom of the kettle when stirring with your spoon. Turn the heat back on and bring to a boil. Boil the wort for 60 minutes, adding hops at the times indicated.

After the boil is complete, chill the wort to 18 °C (64 °F), pitch the yeast, and ferment until terminal gravity is reached. Allow the yeast to free rise in temperature to promote full attenuation, but don't let the temperature get above 77 °F (25 °C).

Rack the beer, prime and bottle condition, or keg and carbonate.



STYLE PROFILE

the yeast character is quite subtle for Belgian beers. Do not expect a big phenolic bite, clove character, or a saison-like spice. The fruitiness, though, can be moderate to moderately-high in the balance, and should complement the malt.

Hops can provide a pleasant aroma and flavor, with herbal, floral, spicy, and similar notes typical. The level of hopping is restrained, however, with the malt commonly being slightly more dominant in the balance. The bitterness level is moderate, but some examples can be a bit sweet. When oxidized imports are tasted, they often have an elevated caramel sweetness and reduced hop notes, so keep this in mind if the beer isn't brewery-fresh.

The beer usually has a dry finish, although the level of bitterness might not seem aggressive. So a lower bitterness level might make some examples of the beer seem a touch sweet. The alcohol level is roughly 5% ABV, with some examples being a bit less and some ranging close to 6%. An alcohol bite or noticeable warming should not be noted. The body should not be lean; however, it should also not be heavy. A medium body is most common, although it can be a little lighter.

The overall impression is like a Belgian version of an English pale ale – often fuller in flavor and body, not dry-hopped or aggressively bitter, with a more estery and a bit

more spicy yeast character. Compared with modern English bitters, the Belgian version is stronger, more like a strong bitter. The range of flavors allows for more malt character, and adjunct flavors are not to be found. The best summary is to combine the flavor complexity of Belgian beers with the drinkability of British pale ales.

BREWING INGREDIENTS AND METHODS

As a twentieth-century Belgian ale, the beer uses modern brewing practices. Due to the competition in its origin, we also know something about how the beer is made. Some educated guesses based on flavor profiles and brewery visits fills in the rest of the information.

The base of the beer is often Belgian Pilsner or pale ale malt, with some more flavorful base malts taking up part of the grist – Vienna malt and perhaps Munich would be used, with a light touch of aromatic malt to boost the maltiness. Keep in mind that the beer isn't heavy or strongly malty like a bock, so Pilsner malt likely helps maintain the drinkability. Contemporaneous accounts stress that the beer is 100% malt, so avoid adding corn, oats, or other grains and also leave out the Belgian sugars.

The flavor profile and color suggests some medium-color caramel-type malts are used. Biscuit-type malts may be present (or bready pale ale malts may be used). Amber and copper beers are often colored with a touch of black malt in the grist, so care should be taken to avoid any flavor pickup. There will be some creativity allowed on the part of the brewer in grist selection since the character malt flavors can have a varied range.

The body and attenuation need to be handled through mash control primarily, so avoid extreme mash programs. A simple single-infusion mash works well for this average-strength beer, keeping the saccharification temperature at the low end of the typical range (150 °F or 65 °C, or a little higher).

Hops can be Belgian, English, or continental European. Saazer-type (noble) hops, English Goldings, Fuggles, Styrian Goldings, or other quality hops are common. Since the beer does not have a huge hop character, restraint and subtlety is required. Dry hopping is not typical for this style, but the beer should have some flavor and aroma hops.

As I've mentioned, yeast selection can be somewhat difficult. There is a strain of yeast based on De Koninck (White Labs WLP515 Antwerp Ale) that suits the style, but there is also Wyeast 3655 (Schelde Ale) yeast that could be used. If using dried yeast, your options are a bit limited, but try to avoid POF+ (phenolic off-flavor positive) yeast strains. I would avoid Trappist-type yeast strains as they can produce a lot of phenolics. I would also avoid witbier-type strains that can add tartness. If the preferred yeast strains aren't available, you may want to keep the fermentation temperatures on the cool side to avoid excessive spiciness (maybe low 60s °F or 16–18 °C).

HOME BREW EXAMPLE

While I enjoy many versions of the style, the inspiration for my recipe is De Koninck. I have used information from their



Photo courtesy of Brouwerij De Koninck NV

De Koninck is one of the most popular renditions of the Belgian pale ale style, but others such as Palm made by Brouwerij Palm and Vieux Temps by Stella Artois are also versions of this relatively new style that can be found.


website and Michael Jackson's *Great Beers of Belgium* to provide clues for something similar. Since I'm trying for a clone-type recipe, I'm going to reference as much publicly-available information as possible.

The brewery's website mentions a 1.047 starting gravity and a 5% ABV content, so the final gravity should be around 1.010. Michael Jackson said it is an all-malt beer (which fits with the historical context), and that it uses Pilsner and Vienna malts as part of the grist. He said it also uses Saaz hops in three additions, and has a bitterness level of 25 IBUs. I will use those hops in bitterness, flavor, and aroma.

Other examples of the style mention aromatic malt in their grist, so I like to add that to my recipe. It is an easy way to increase the maltiness. Biscuit and Caramunich® malts are often used in these beers, and I do taste similar flavor so I'll add those. Finally, I use a touch of debittered black malt for color adjustment. I don't want any roasted flavors, but I do like a touch of copper color in the beer.

Considering the final gravity of the beer, a mash temperature on the lower side of the range is appropriate; let's say 151 °F (66 °C). Remember, this is an all-malt beer, so resist the urge to use any adjuncts like flaked maize or candi sugars or syrups. Mash control and yeast handling must account for proper attenuation to counter the body building malts.

White Labs WLP515 (Antwerp Ale) yeast is reputed to be the De Koninck strain, so it's the obvious choice. While the beer is said to be fermented at 77 °F (25 °C), I think that is likely the top end of the range; I will start the yeast much cooler (64 °F, 18 °C) and let it free rise as it desires. In my experience, Belgian yeasts don't like to be constrained during fermentation so let it do what it wants.

Serve the beer fresh and well-carbonated, preferably in the company of friends. De Koninck's version of a Belgian pale ale is, to me, well worth emulating. While the range of the style is more than what a single brewer produces, I've always found this beer enjoyable and that's what best characterizes the style for me. 



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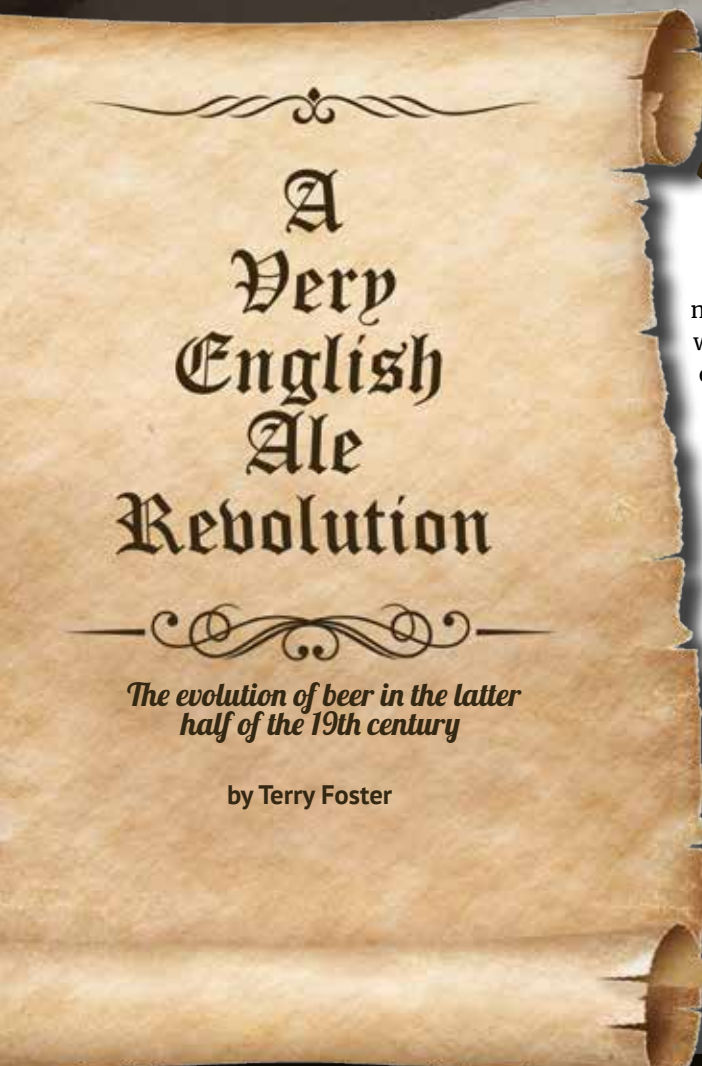
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A
Very
English
Ale
Revolution

*The evolution of beer in the latter
half of the 19th century*

by Terry Foster

“The classic English styles of today, such as mild, bitter, stout, and barley-wine, have been around forever.” What a stupid statement!

Well, I had to start somewhere, didn't I? These styles have constantly changed and evolved as tastes changed, as breweries grew in size, and as outside events such as the development of the railways and government regulations changed. I want to look at this from a view of what happened in the last half of the 19th century, as the impact of events was significant.

At first sight this might seem to have been a quiet period in Britain's history. Queen Victoria's long reign continued

throughout it, the British Empire was well-established, the Industrial Revolution was well under way and the nation was wealthy and prosperous (although not all of its peoples were so!). Apart from the Crimean War in the 1850s and the Boer War at the end of the century, hostilities were much more limited than they were in the previous century and would be in the next century.

But brewing in general underwent quite a few changes in this period. Perhaps the most obvious outside change was the spread of the railway network in England, which started around 1830. Not all of that network was set up before the end of the 19th century, of course. But, to give you an idea of how extensive it became, according to my count there are currently 12 major terminals in London, and many of them were built in the 1800s. Compare that to just two in New York City. The point is that



Alcohol levels in beer decreased significantly in Britain after a law was passed that taxed breweries based on the gravity of beers. These lower-alcohol beers are now what the world thinks of when considering British beer styles.

this opened up new opportunities for growth for brewers, since they could now sell their beer to distant cities and towns.

Another change came with the development of brewing science, with perhaps the biggest discoveries coming in France, when Pasteur in 1876 definitively showed the true nature of yeast and in Denmark when Hansen isolated a pure single strain of the lovely fungus. Pasteur visited England in 1871 and showed the brewers at Whitbread what their yeast looked like under a microscope and that it contained significant amounts of bacteria. It is reported that Whitbread made haste to buy their own microscope! Hansen's pioneer work had less effects during the period I am considering, for his work was only translated into English in 1896.

Use of the saccharometer and the thermometer in the brewing process had become widespread by this time. But many English brewers were conservative and self-satisfied and were reluctant to embrace the scientific approach. A good example of this was that they used Richardson's 18th century system of brewer's pounds for determining original gravity, rather

than the more straightforward systems of specific gravity or degrees Plato. However, this negative approach certainly did not apply to many of the larger brewing companies, especially those from Burton-on-Trent, who had employed chemists since as far back as 1845. Many of these were men of high scientific standing and actual head brewers, not just men in back-room laboratories isolated from day-to-day brewing procedures.

In our period several clubs for brewing scientists were formed, such as the Bacterium Club, the Country Brewers Society, and the Laboratory Club, which later evolved to become the Institute of Brewing. A good deal of fundamental work was carried out in Burton, as well as the adoption of routine quality testing on brewing ingredients and ale samples. But perhaps the most important scientific advance (though not developed in England) was the introduction of refrigeration in English breweries in this period. Before this, brewing in the summer months was problematic since beer spoilage was common. Refrigeration made year-round brewing possible, permitting an increase in output for the bigger breweries,

as well as improving the quality of the beer.

The malting industry on the other hand was very conservative and there were few advancements in this area during this period. Floor-malting remained the procedure of choice, and the advent of pneumatic malting in European practice was largely ignored in England. One important development was the invention of crystal malt somewhere around 1880. This does not seem to have been readily taken up by brewers until later in the 20th century when it became, as it is today, a ubiquitous ingredient in English bitter and pale ales. For the period I am discussing the malts available to the brewer remained only pale, amber, brown, and black until 1880. However, I recently came across a book (courtesy of Todd Sakowski of the Niantic Public House and Brewery) written in 1853 for homebrewers. The author quotes the use of roasted barley in brewing porter — suggesting making this by roasting barley in a frying pan or in a coffee-roaster. It was not used by commercial brewers, because it would have been illegal to do so before 1880.

So what happened in 1880? Well,

the English Government in the form of Gladstone passed a bill in Parliament known as the Free Mash Tun Act. Prior to that time, beer itself was not taxed but malt was, and up to 1861 hops were also taxed. That could be construed as England actually having a Pure Beer Law, for the Excise would not generally allow the use of malt substitutes. Sugar was an exception and had been allowed in brewing from only 1847 to 1854, otherwise the brewer could use only barley malt. What the act did was allow the use of any source of fermentable material, with the duty to be paid on the wort according to its specific gravity. Brewers were therefore liable for the duty before fermentation and long before they got the beer paid for by the customer. But, they were able to use adjuncts such as sugar, rice, maize, raw and roasted barley, and anything else they thought would reduce their costs. It is worth noting that at just about the same time American brewers were going over to adjuncts such as rice, maize, and sugar as well. But in the States, this move was driven not because of taxation, but because brewers realized that American 6-row malt contained sufficient enzymes to convert the starch of quite large amounts of these adjuncts.

In England the enzyme content of their 2-row malts permitted the use of relatively small amounts of starchy adjuncts, so sugar was a favorite candidate. They opted not for straight cane or corn sugar, but invert sugar, produced by acid hydrolysis of raw sugar. This meant that manufacturers soon produced invert sugars to suit the brewer's specification; some versions would contain unfermentable material and could also be colored. In other words, they could have an effect of the beer's flavor as well as its color. But do not forget that the basic reasons for using such sugars were economic ones. In the context of invert sugar, around the end of the 19th century there was an epidemic of arsenic poisoning in northwest England that resulted in some 70 deaths. Its cause was traced to beer from two breweries that used invert sugar and this was the source of the contamination, as

the sulfuric acid used in the "inversion" procedure had been manufactured not from pyrites as was normal but from arsenopyrite.

The 1880 Act was instrumental in forming the modern brewing approach to most English beers, especially pale and bitter ales, which today are commonly produced with both sugar and adjuncts like flaked maize (usually at less than 20% of the grist). But, that in turn encouraged brewers to use crystal malt as well, and today you would be hard put to find a bitter that has not used one form or other of this malt. The Act played an important role (though it was not the only cause) in the reduction in strengths of beers in England. In 1880 an original gravity (OG) of 1.055 (13.6 °P) was regarded as being the average strength of beer in England, whereas today the figure is more like 1.038 (9.5 °P). The Act decreed that the tax should be based on the OG of beer, which meant as tax rates increased through the 20th century there was a heavier penalty on strong beers than on weaker ones. The result was that brewers produced fewer strong beers, and why, in particular barleywines, are quite rare over there now. Actually, the provisions of the Act have fairly recently been changed, so that duty is now charged according to the ABV content of the beer, but the end result of penalizing stronger beers is essentially the same.

There were some other developments in the brewing industry during this period such as the growth in bottling and the application of filtration procedures so that the bottles could be sediment-free. These did not so much change individual styles but rather marked the beginning of the decline in cask-conditioned beers. And, of course, there was the temperance movement in England too, and it was moderately effective for a while. Fortunately, it was never effective enough to bring about Prohibition. Finally, partly because many of the larger brewers followed Guinness' 1886 lead in becoming public companies, there was a rush by brewers to buy up as many pubs as possible. This was to result in the majority of pub-

lic houses being "tied" to a particular brewer, who would sell only its own beer in its own pub, leading to a local monopoly by the brewer.

BEER STYLES 1850-1900

Porter

Porter had been the most important beer of the 18th century, but in our period it was in decline. It had been a beer with a long-stored component and the flavor this conferred on porter had become less favored, with drinkers preferring "running beers," that is those sent out from the brewery a month or less after brewing. Porter was also being pushed out by the rise in popularity of pale beers. As a result, porter had fallen in gravity to around 1.050 (12.4 °P) as opposed to 1.070 (17.1 °P) in the previous century. It was to continually decline in both strength and popularity and to vanish entirely from England by the mid-20th century.

Stout

Stout, which was originally a strong form of porter, did not die away so readily. In our timeframe Guinness became the world's biggest brewer, topping 1 million barrels by 1890, a good deal of which was exported to England, although English brewers still produced their own versions. Russian imperial stout also came on the scene early in the period being considered. It was not actually a new beer, for Barclay's had brewed it for many years previously at an OG of as much as 1.100 (23.8 °P). But A. Le Coq, a distributor of the beer, had supplied it to Russian troops during the Crimean War and a grateful Tsar had given him an Imperial warrant allowing Barclay's to add "imperial" to the beer's title. This beer continued to be brewed well into the 20th century, although it is no longer available as its successor, Barclay, Perkins, and Courage, is extinct.

Pale Beers

Pale beers came into their own in the last half of the 19th century with the huge growth in consumption of IPA and pale ale brewed in Burton. Bass became the world's biggest brewer

Historic Bitter Ale

I have chosen three examples of beers from the period and have tried to interpret them in the spirit of the times, rather than attempting to make a direct reproduction of any particular brewer's beer.

HISTORIC BITTER ALE

(5 gallons/19 L, all-grain)
OG = 1.052 FG = 1.013
IBU = 64 SRM = 7 ABV = 5.1%



INGREDIENTS

5.5 lbs. (2.5 kg.) Golden Promise pale ale malt
5.5 lbs. (2.5 kg) Briess Ashburne® Mild malt
18 AAU Golding hops (60 min.)
(3 oz./85 g at 6% alpha acids)
SafAle S-04 or Wyeast 1099 (Whitbread Ale) yeast
2/3 cup corn sugar (if priming)

STEP BY STEP

Mash the grains at 152–153 °F (67 °C) with 3.5 gallons (13 L) water. After 60 minutes, run off and sparge with water at 160–170 °F (71–77 °C) to collect 6 gallons (23 L) of wort. Boil for 60 minutes, adding the Golding hops at the start of the boil.

Cool to about 70 °F (21 °C) and pitch the yeast. Ferment 7 days at about 65 °F (18 °C), then rack to secondary for a further 5–7 days before racking to keg or bottling. I chose not to dry hop this beer but there's no reason not to do so if you wish.

HISTORIC BITTER ALE

(5 gallons/19 L, extract only)
OG = 1.052 FG = 1.013
IBU = 64 SRM = 7 ABV = 5.1%



I know Munich malt would not have been used in the late 19th century but I decided to use it for the extract recipe because the pale malt of that time would have been darker than modern pale malts.

INGREDIENTS

6 lbs. (2.7 kg) Maris Otter pale liquid malt extract
1.5 lbs. (0.68 kg) Munich liquid malt extract
18 AAU Golding hops (60 min.)
(3 oz./85 g at 6% alpha acids)
SafAle S-04 or Wyeast 1099 (Whitbread Ale) yeast
2/3 cup corn sugar (if priming)

STEP BY STEP

Dissolve the malt extracts in 6 gallons (23 L) of hot water while off heat. Once malt extract is fully dissolved, bring wort to a boil. Boil for 60 minutes, adding the Golding hops at the start of the boil.

Cool to about 70 °F (21 °C) and pitch the yeast. Ferment 7 days at about 65 °F (18 °C), then rack to secondary for a further 5–7 days before racking to keg or bottling. I chose not to dry hop this beer but there's no reason not to do so if you wish.



XX Mild Ale

XX MILD ALE

(5 gallons/19 L, all-grain)

OG = 1.062 FG = 1.012

IBU = 52 SRM = 11 ABV = 6.6%



INGREDIENTS

11 lbs. (5 kg) Maris Otter pale ale malt

2 lbs. (0.91 kg) amber malt

14 AAU Challenger hops (60 min.)

(2 oz./57 g at 7% alpha acids)

SafAle S-04 or Wyeast 1099 (Whitbread Ale) yeast

½ cup corn sugar (if priming)

STEP BY STEP

Mash the grains at 148–149 °F (64–65 °C) with 4 gallons (15 L) water. After 60 minutes run off and sparge with water at 160–170 °F (71–77 °C) with enough water to collect 6 gallons (23 L) of wort. Boil for 60 minutes, adding the Challenger hops at the start.

When the boil is complete, cool to about 70 °F (21 °C) and pitch the yeast. Ferment 7 days at about 65 °F (18 °C), then rack to secondary for a further 5–7 days before racking to keg or bottling.

XX MILD ALE

(5 gallons/19 L, extract only)

OG = 1.062 FG = 1.012

IBU = 52 SRM = 11 ABV = 6.6%



The Amber DME is made with some crystal malt, which probably would not have been used in the 1880s, but I wanted to keep this recipe simple and to avoid doing a partial mash with amber grain malt. If you wish to, you can partial mash with 2 lbs. (0.91 kg) of the Maris Otter malt, eliminating the amber extract and using 6 lbs. (2.7 kg) of the liquid extract.

INGREDIENTS

7 lbs. (3.2 kg) Maris Otter liquid malt extract

1.4 lbs. (0.64 kg) amber dried malt extract

14 AAU Challenger hops (60 min.)

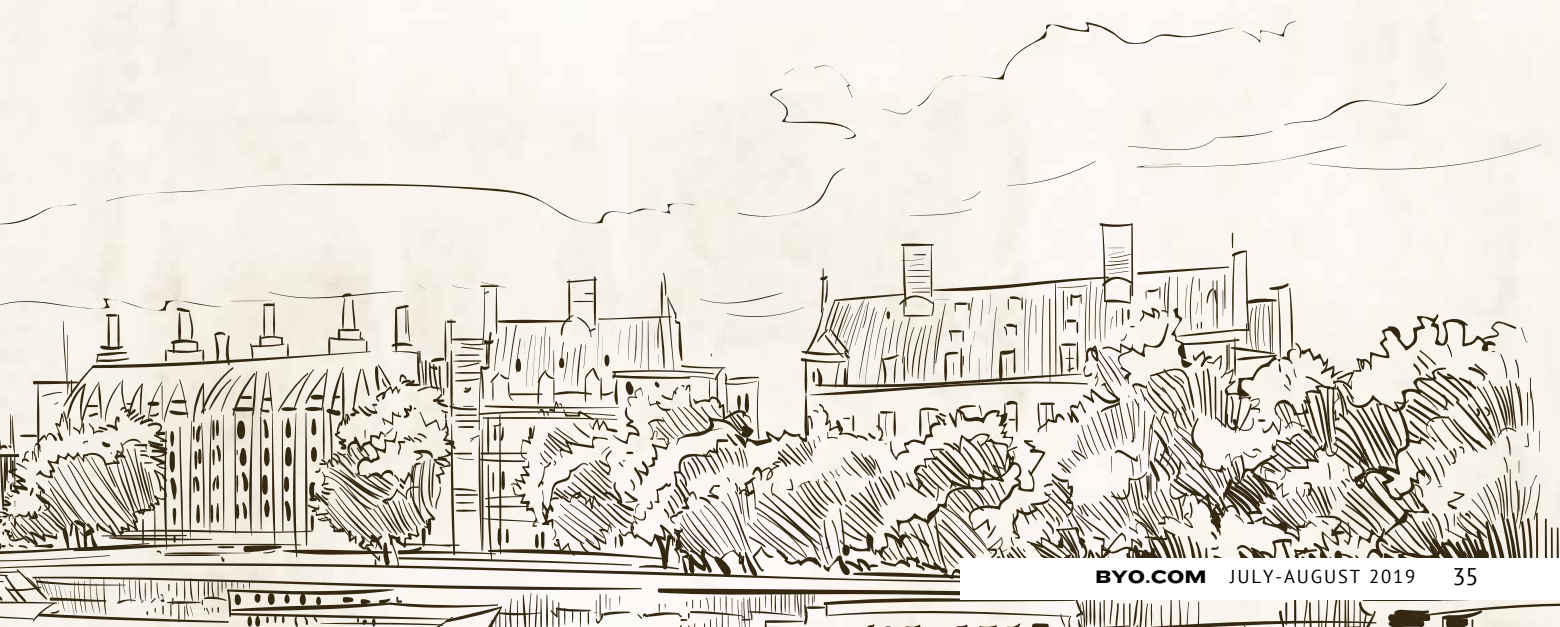
(2 oz./57 g at 7% alpha acids)

SafAle S-04 or Wyeast 1099 (Whitbread Ale) yeast

½ cup corn sugar (if priming)

STEP BY STEP

Dissolve the malt extracts in 6 gallons (23 L) of hot water while off heat. Once malt extract is fully dissolved, bring wort to a boil. Boil for 60 minutes, adding the Challenger hops at the start. Cool to about 70 °F (21 °C) and pitch the yeast. Ferment 7 days at about 65 °F (18 °C), then rack to secondary for a further 5–7 days before racking to keg or bottling.



Big Ben Barleywine

BIG BEN BARLEYWINE

(3.3 gallons/12.5 L, all-grain)

OG = 1.109 FG = 1.030

IBU = 80+ SRM = 10 ABV = 10.5%



INGREDIENTS

15 lbs. (6.8 kg) Maris Otter pale malt

29 AAU Target hops (90 min.)

(2.5 oz./71 g at 11.6% alpha acids)

White Labs WLP007 (Dry English Ale) or Wyeast 1098

(British Ale) or Lallemend Nottingham yeast

½ cup corn sugar (if priming)

STEP BY STEP

Make sure to have enough viable yeast to ferment this beer to completion. Two yeast packets made into a starter or two sachets rehydrated according to manufacturer's instructions are advisable.

Mash grain at 148–150 °F (64–66 °C), using 18 qts. (17 L) water (ratio 1.2 qts./lb., 2.5 L/kg). After a 90-minute mash, run off and sparge with water at about 170 °F (77 °C) to collect 6 gallons (23 L) of wort (SG about 1.062). Bring to a boil, add the hops after about one hour (with 5 gallons/19 L of wort remaining), and boil down to 3.3 gallons (12.5 L).

Cool to about 70 °F (21 °C) and pitch the yeast starter with oxygenation. Ferment 10–14 days at 70 °F (21 °C), rack to secondary for 4 weeks, rack again and leave for 6–8 months. Keg or bottle as usual and age at least a further 6 months.

BIG BEN BARLEYWINE

(3.3 gallons/12.5 L, extract only)

OG = 1.109 FG = 1.030

IBU = 80+ SRM = 10 ABV = 10.5%



A long boil as found in the all-grain recipe would make this beer too thin, while the short boil will result in the limited formation of Maillard reaction products, so I opted to use a Munich malt extract to add extra flavor and body.

INGREDIENTS

9 lbs. (4.1 kg) Munich liquid malt extract

1 lb. (0.45 kg) extra light dried malt extract

29 AAU Target hops (90 min.)

(2.5 oz./71 g at 11.6% alpha acids)

White Labs WLP007 (Dry English Ale) or Wyeast 1098

(British Ale) or Lallemend Nottingham yeast

½ cup corn sugar (if priming)

STEP BY STEP

Bring 4 gallons (15 L) of water to a boil. Remove from heat and stir in both malt extracts. When completely dissolved add the hops and bring back to a boil. Boil down to 3.3 gallons (12.5 L), about 45 minutes.

Cool to about 70 °F (21 °C) and pitch the yeast starter with oxygenation. Ferment 10–14 days at 70 °F (21 °C), rack to secondary for 4 weeks, rack again and leave for 6–8 months. Keg or bottle as usual and age at least a further 6 months.



in 1876 (deposed as such by Guinness as mentioned earlier), but other Burton brewers were almost as big, and several London brewers established themselves in Burton in order to be able to compete. At first the only distinction between IPA and pale ale was that the former was brewed for export to India, but gradually pale ale came to be seen as the lesser of the two, and, in the 20th century pale ale was mostly applied only to bottled beers in my experience. Ironically, in view of its current popularity in this country, IPA became a less distinctive beer over the years, with the title being attached to brews as low as 3.6% ABV.

A development during this period was the arrival of lighter-strength pale beers with titles like “dinner ale,” “family ale,” and “bitter ale.” The latter could be quite strong, at around 1.060 OG (14.7 °P), but in the 20th century the title became more established as representing a style of its own. It has become the ubiquitous bitter, dumbed down in strength (largely as a result of increasing taxation), so that most modern versions are around 4% ABV, and brewed with 5–10% crystal malt.

Mild Ales


Mild ales came to the fore in the 19th century, but at that time “mild” meant new or fresh. In this time-frame mild ales could be stronger than pale ales, although London mild ales were more often around OG 1.050 (12.4°P). They were mainly dark from the use of roasted malts (black and brown) but could be pale. As with bitter ales, milds declined in strength during the 20th century to as low as 3.0–3.2% ABV. They were gradually pushed from popularity by pale beers and are now a rarity on the English scene, although Campaign for Real Ale (CAMRA) has made much effort to revive them.

Barleywine

Barleywine was a term first used officially by Bass in 1903, which would seem to put it beyond my remit. However, this beer had been produced previously as Bass No. 1, and there

were several other similar strength beers brewed in Burton and other places in the late 19th century.

Indeed, in earlier centuries it was common to carry out several mashes and to treat the runnings from the first mash separately to those from later mashes, which would have resulted in a beer strong enough to fit this category. The definition of barleywine is somewhat hazy but generally it means a beer brewed

largely from pale malt and with an alcohol content of 8% ABV or more. In 19th/20th century England these were never high volume beers, in part because the method of taxing on OG meant they were expensive to brew and buy. In the 21st century the tax system changed somewhat so there are few such beers brewed anymore, because there is now a huge jump in duty when going from 7.5% ABV to 8% ABV. 



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2019 LABEL CONTEST WINNERS

The BYO Label Contest has truly gone international! In our 24th year of running this contest, we attracted entries from all over the globe — with winning labels coming every region across the US as well as England, Italy, Brazil, and Australia. That’s not even to mention the other countries represented with labels that didn’t quite make the cut. With hundreds of labels entered this year, the competition was stiff — making for lots of debate among the magazine staff during a grueling afternoon of judging! This competition always brings great enthusiasm among staff, and we hope all of our readers enjoy the experience of entering labels, debating their favorites among themselves, or at least getting inspiration for their own labels from other homebrewers who shared their best designs.

As always, a huge thank you to the tremendous sponsors who make this competition possible, as well as the creative homebrewers who have proven, once again, that there’s more to beer than just what’s inside of the bottle.

GRAND

KENNY HIGHMAN AND JAMIE ROCKWELL
SEVILLE, OHIO

The Resurrection of Stay Puft is a barrel-aged S'mores milk stout that is a sequel to a beer from 2017 called The Death of Stay Puft. "Like a Phoenix rising from the ashes, The Stay Puft Marshmallow man has risen from his creamy grave only to return with some down right ass kickin flavor," says homebrewer Kenny Highman. Brewed by Kenny, the label was designed by his friend Jamie Rockwell.

Prizes: Schwag bag from **American Brewers Guild Brewing School**; Gift card from **Bader Beer & Wine Supply**; Gift card from **GrogTag**; 8-gallon Brewer's Best® Basic Brew Pot from **LD Carlson Company**; 1.75-gal. Corny keg from **PicoBrew**

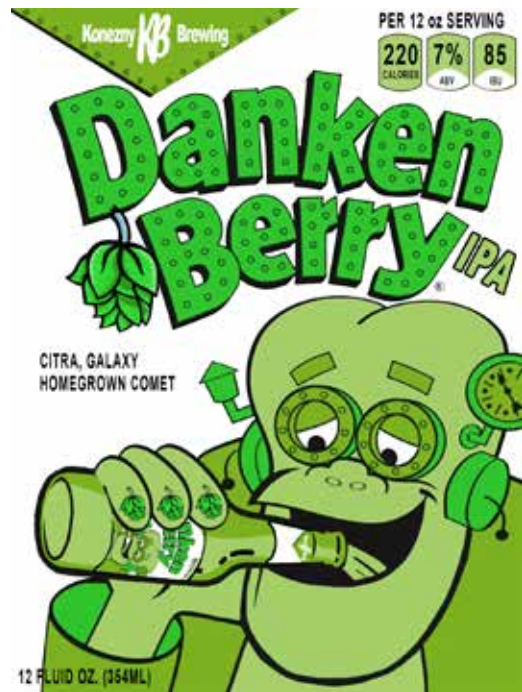


GOLD

STEVE KONEZNY & JAY VELTZ
WOODBRIDGE, CONNECTICUT

This New England IPA brewed with Citra®, Galaxy™, and homegrown Comet hops is “super fruity with wonderful dank notes, worthy of the name ‘Dankberry IPA,’” says Steve Konezny. Mmm ... sounds tasty! The label is a play off of one of our favorite cereals, Frankenberry, with several key alterations. The label was designed by Steve’s cousin, Jay Veltz. The hop fingernails is what put this one comfortably on the medal podium for us.

Prizes: Gift card from **Bader Beer & Wine Supply**; Two Hearted Ale clone recipe kit from **Bell’s Brewery and General Store**; Stainless steel BrewSSSiphon™ from **BrewSSSential**; Gift card from **GrogTag**



SILVER

MIKE MAAS
PRESCOTT, ARIZONA

“Infidel IPA is a less hop-forward IPA, making it a heretic among hop heads,” said Mike Mass, who designed the label. “The brewer and I decided to go with the image of clenched fists to symbolize rebellion and going against the grain. I took color and font inspiration from old Cold War-era Soviet propaganda posters.” The label is vector art done in Adobe Illustrator.

Prizes: Gift card from **Bader Beer & Wine Supply**; Gift card from **GrogTag**; Hop filter from **Ruby Street Brewing, LLC**



BRONZE

CASEY MOECK
CAPE CARTERET, NORTH CAROLINA

This hefeweizen was brewed by Casey Moeck as a celebration of the wedding of his sister and brother-in-law. The wheat and yeast rings represent the wedding rings. “Much like a human marriage, a hefeweizen is a marriage between wheat and yeast, where the two must work together in harmony to thrive. Alles Gute, meaning ‘all the best,’ is a toast to marriage, as well as a declaration of what goes into it.”

Prizes: Gift certificate from **Beer and Wine Hobby, Inc.**; Gift certificate from **The CHI Company**; Gift card from **GrogTag**





READER'S CHOICE

BRIAN MEYER AND JAIME CONLEY
CHEEKTOWAGA, NEW YORK

Chosen by BYO readers on Facebook, Brian and Jaime's label received nearly 150 votes in less than two days to take home the coveted Reader's Choice award this year. The artwork for this Mexican hot chocolate stout was inspired by the name, Lengua del Diablo, "the tongue of the devil." "I wanted fire, I wanted a devil, I wanted some hops (see the fire) and I wanted it to be pretty badass," says Brian Meyer. Badass, indeed!

Prizes: Gift certificate from **Beer and Wine Hobby, Inc.**; Gift card from **GrogTag**

HONORABLE MENTION

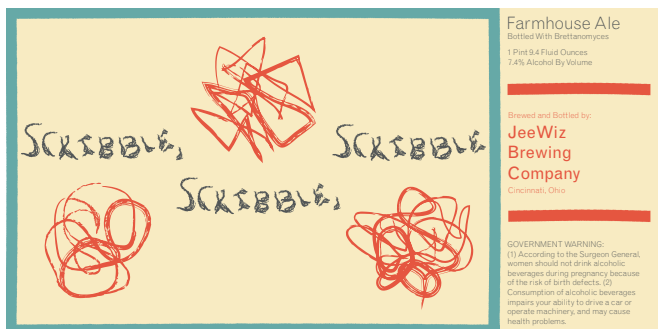
All Honorable Mention winners receive: Gift card from **GrogTag**



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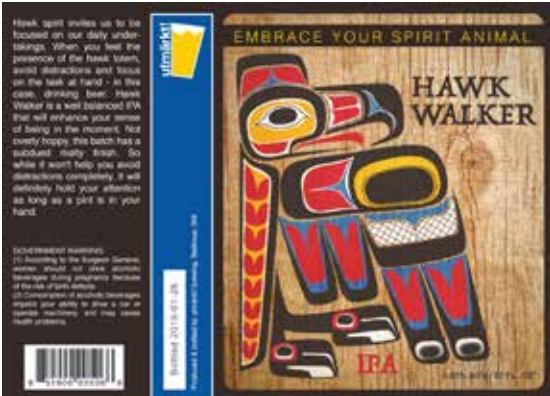
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STEFANO CAPONE
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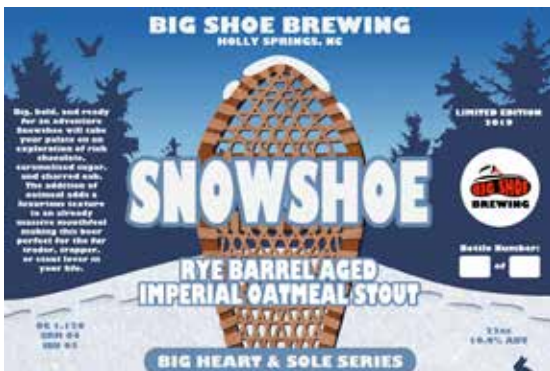
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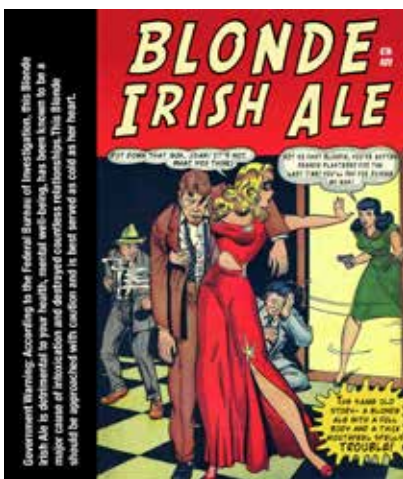
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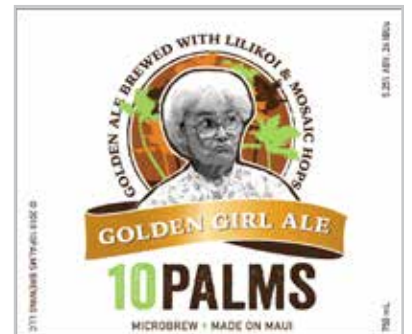
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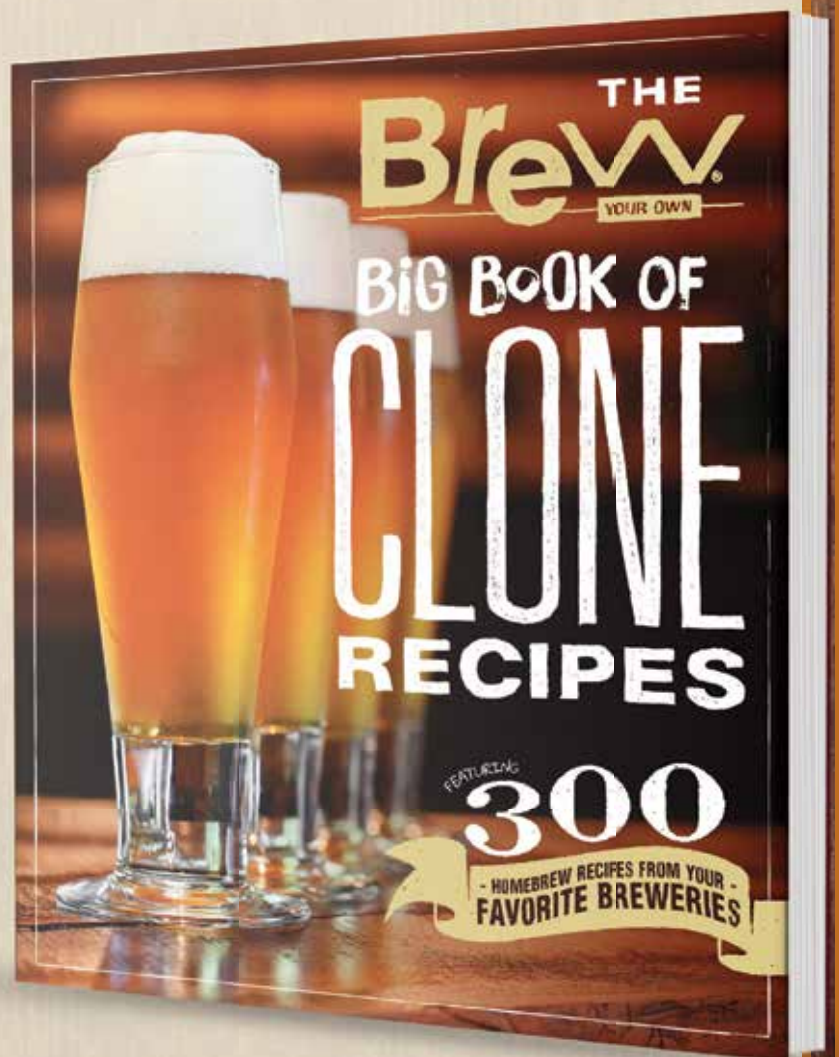
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SEAR & Beer

Most of us have go-to beers that we like to drink on summer evenings. If the menu includes barbecue, those beers usually go along for the party. But as homebrewers, we have much more control than that. We can make or select beers for a particular barbecue supper and enjoy the heightened pleasures of well-matched pairings.

In food-beer pairings, there are two basic strategies that can work very well. The first of these is to provide deliberate contrasts between the beer profile and the food. The second is to look for complementary or matching characteristics between the two. These characteristics can include aromas, flavors, and mouthfeel elements that all combine to make the whole greater than the sum of the parts. A well-chosen pairing of great beer with great barbecue brings pleasure that is a kind of synergy, better than you would have expected tasting the components separately.



Tips for pairing beer with **BBQ**

by Bob Peak

Photos by Shutterstock.com

For this article, I will use a very broad consideration of “barbecue.” As a signature food style throughout North America, barbecue has local and regional partisans who passionately defend their version as *true barbecue* and dismissing others. Since I cannot predict what you might be cooking on the patio or deck this summer, I’ll go with this line from Wikipedia’s article on the subject: “Barbecuing techniques include smoking, roasting or baking, braising and grilling.” Although beef, pork, and chicken are very popular, I also grill or smoke turkey, lamb, sausages, seafood, portabello mushrooms, and other vegetables.

Despite the diversity of ingredients and techniques, barbecued foods exhibit common characteristics that allow this kind of consideration. Smoke aromas and flavors are defining characteristics. All the way from long, low-temperature smoking over hickory or cherry wood to the quick grilling of a fish fillet on a charcoal or gas grill, smoke plays a part in most barbecue. From the wood, of course, the addition of smokiness is deliberate. With fish, vegetables, and meats on a grill, the smoke character comes about from direct charring of the food on the grill bars and smoke that rises from drippings sizzling on the burner shields or hot coals. Evaluate your smoke for source, aroma, and intensity and pair your beers accordingly.

Another common theme in barbecue is fat. Fatty foods smoke and braise to tender perfection and — if you keep them from igniting — grill to a deliciously juicy outcome. More a mouthfeel issue than a flavor, the fattiness of your barbecue becomes a factor in comparison with the mouthfeel of your beer. Other barbecue factors often come into play and might affect your beer pairing. These include a variety of spices and rubs, frequent use of tomato sauce in barbecue bastes, vinegar-based sauces, use of honey or brown sugar, and even grilling fruits such as pineapple or peach to garnish barbecued meats. As you contemplate the widest possible range of barbecue, let’s think about beer.

To engage with both complement and contrast, I have selected five beer strategies to plan with your barbecue. These are groups of beer styles that share some common features that promise pleasurable pairing. Group one is pale and amber ales, two is pale and amber lagers, and three is dark beers. Groups four and five stretch the boundaries a bit further, with smoked beers comprising group four and a combination of beers with fruits, spices, herbs, and vegetables making up group five.

For each grouping I will include references to styles as described in the 2015 Style Guidelines of the Beer Judge Certification Program (BJCP). I am a certified judge and I wholeheartedly endorse their point that style guidelines are not specifications. They do, however, provide a useful point of reference in communicating about beers, and these descriptions can be very helpful when considering the food to pair with each beer style.

So, let’s get pairing!



GROUP 1 PAIRINGS:

Pale & Amber Ales

For this group, the pairing characteristics can be seen clearly in the American pale ale style. The first sentence in the BJCP category description captures my concepts for pairing this group: “A pale, refreshing and hoppy ale, yet with sufficient supporting malt to make the beer balanced and drinkable.” Other styles that share similarities with American pale ale include American blonde ale, American amber ale, and California common. We can also find the hoppy notes, refreshing character, and malt support in ales with European origins. Among them are British bitters, golden ale, lighter Scottish ales, and Irish reds. Going a bit further into hop bitterness and higher in alcohol, American and British IPAs carry a bigger punch than pale ale, but the overall balance will allow similar considerations for barbecue pairing.

Pairing in this group is mostly about contrast, with crisp mouthfeel and clean bitterness balanced opposite food features like fat and smoke. After a bite of fatty pulled pork or smoked beef brisket, the hop bitterness clears the palate and provides a refreshing break. At the same time, the malt backbone of the beer can come into play to heighten the pleasure of the match further. If your particular barbecue has fruity notes or brown sugar in the sauce, the malt flavor in the mid-palate of the beer can complement and enhance those flavors, highlighting the food and the beer. If you are leaning in that direction, the British and amber styles are likely better suited than pale and dry. If you are trying specific beer pairing with barbecue for the first time, a hoppy pale ale will likely work with just about any fatty, meaty, or smoky meats on the menu. For chicken, fish, or vegetables, you might get more enjoyment with my second group: Pale and amber lagers.



GROUP 2 PAIRINGS:

Pale & Amber Lagers

This group of beer styles shares some characteristics with group one: They are crisp and refreshing, with various levels of hops and malt. My favorite of these to homebrew doesn't have its own category any more. In the 2008 BJCP guidelines, it was Category 2C, Classic American Pilsner. It can still be found in the 2015 guidelines, but you need to search for it within Class 27, Historical Beer. Now called pre-Prohibition lager, it is still a beer I love to brew, described as "A clean, refreshing, but bitter pale lager, often showcasing a grainy-sweet corn flavor." Included with this article is a recipe for one of my favorite homebrews of this kind, Western Hills Pre-Prohibition Lager, on page 48. It uses traditional six-row barley malt, corn, and rice — offset with a modern American hop, Simcoe®, for a piney and citrusy aroma. The name was inspired by the coastal hills between my house and the Pacific Ocean in Sonoma County, California. Brew it, and fire up the grill!

The other lagers in this group for pairing with barbecue include the very popular commercial styles American light lager and American lager. With a bit more complexity, there are international pale and amber versions as well. These range from Czech pale lager, through German helles, to another personal brewing favorite, amber Vienna lager.

For barbecue pairing, Vienna and other amber lagers bring what the guidelines describe as "a soft, smooth maltiness and moderate bitterness, yet finish relatively dry." For me, that makes a perfect companion to spicier barbecue, with the sweet malt offering a cooling refreshment on the palate. Whether it is heavily black peppered chicken wings, Louisiana hot links, or Mexican-style carne asada with jalapeño salsa, that slightly sweet maltiness will cool off your mouth. The dry finish returns us to refreshment and you are ready for another bite.

The lighter colored lagers also have potential sweetness, as noted for corn notes in the pre-Prohibition lager. Helles is described as having "a smooth grainy-sweet malty flavor and a soft, dry finish." It has sufficient hops to balance and keep it in the category of refreshing beers.

Lager characteristics allow us to go in two directions with our pairings. On the one hand, we have a fairly light body and a crisp, clean finish. The seafood, chicken, or vegetables mentioned earlier, especially if simply prepared on the grill, will match that lighter character with flavors allowed to shine in both beer and food. The second is the spiciness noted above. With that, look particularly for the lager styles with some notable maltiness in your pairing.

BBQ-Friendly Recipes



WESTERN HILLS PRE-PROHIBITION LAGER

(5 gallons/19 L, all-grain)
OG = 1.060 FG = 1.014
IBU = 42 SRM = 7 ABV = 6.2%

INGREDIENTS

6 lbs. (2.7 kg) German Pilsner malt
3 lbs. (1.4 kg) US 6-row malt
1 lb. (0.45 kg) Victory® malt
1.25 lbs. (0.57 kg) flaked maize
1.25 lbs. (0.57 kg) flaked rice
1 oz. (28 g) acidulated malt
7 AAU Simcoe® hops (60 min.)
(0.5 oz./14 g. at 14% alpha acids)
4.2 AAU Simcoe® hops (30 min.)
(0.3 oz./8 g at 14% alpha acids)
½ oz. (14 g) Simcoe® hops (0 min.)
Whirlfloc tablet (15 min.)
Wyeast 2007 (Pilsen Lager) or
White Labs WLP840 (American Lager)
or SafLager W-34/70 yeast
¾ cup corn sugar if priming

STEP BY STEP

Be sure to make an appropriate-sized yeast starter a day or two prior to brew day if using liquid yeast. If using dried yeast, be sure to pitch two sachets of yeast.

Mash grains in 4 gallons (15 L) of water at 148 °F (64 °C) for 90 minutes (including flaked maize and rice). The mash duration and temperature are key to assuring proper attenuation by the yeast. Mash out and sparge at 170 °F (77 °C) to collect 6 gallons (23 L) of wort in the kettle. Boil for 60 minutes, adding hops as indicated. Cool to 70 °F (21°C) to pitch yeast, then gradually cool to 50–60 °F (10–16 °C) for primary and secondary. Apply a 24–48 hour diacetyl rest at 70 °F (21°C) prior to lagering.

Lager at 30 to 34 °F (-1 to 1 °C) for 3 to 6 weeks prior to packaging.

WESTERN HILLS PRE-PROHIBITION LAGER

(5 gallons/19 L, partial mash)
OG = 1.060 FG = 1.014
IBU = 42 SRM = 7 ABV = 6.2%

INGREDIENTS

3.5 lbs. (1.6 kg) Pilsen dried malt extract
3 lbs. (1.4 kg) US 6-row malt
1 lb. (0.45 kg) Victory® malt
1 lb. (0.45 kg) flaked maize
1 lb. (0.45 kg) flaked rice
1 oz. (28 g) acidulated malt
7 AAU Simcoe® hops (60 min.)
(0.5 oz./14 g. at 14% alpha acids)
4.2 AAU Simcoe® hops (30 min.)
(0.3 oz./8 g at 14% alpha acids)
½ oz. (14 g) Simcoe® hops (0 min.)
Whirlfloc tablet (15 min.)
Wyeast 2007 (Pilsen Lager) or
White Labs WLP840 (American Lager)
or SafLager W-34/70 yeast
¾ cup corn sugar if priming

STEP BY STEP

Be sure to make an appropriate-sized yeast starter a day or two prior to brew day if using liquid yeast. If using dried yeast, pitch two sachets of yeast. Due to the large partial mash, be sure to use an appropriately-sized pot/cooler. At a minimum you will need about 2.5 gallons (10 L) of space for the mash.

Place crushed and flaked grains in a large mesh grain bag. Mash grains in 2 gallons (7.8 L) of water at 148 °F (64 °C) for 60 minutes. When conversion is complete, remove the grains and if possible wash with 2 gallons (7.8 L) of hot water. Top kettle off to 6 gallons (23 L) and bring to a boil. Remove kettle from heat and stir in the dried malt extract. Once all the extract is dissolved, bring wort back to a boil. Boil for 60 minutes, adding hops as indicated. Cool to 70 °F (21°C) to pitch yeast, then gradually cool to 50–60 °F (10–16 °C) for primary and secondary. Apply a 24–48 hour diacetyl rest at 70 °F (21°C) prior to lagering.

Lager at 30 to 34 °F (-1 to 1 °C) for 3 to 6 weeks prior to packaging.



GROUP 3 PAIRINGS:

Dark Beers

My third group may surprise some barbecue fans as pairings: Dark beers. Here I am including dark lagers and dark ales, as the dark malt character forms so much of the impression on these beers. Lager styles include international dark lager, Czech dark lager, Munich dunkel, and schwarzbier. English porter, Irish stout, oatmeal stout, and tropical stout are among the dark ales.

In pairing with barbecue, dark beers stand out for providing complementary toast, roast, and slightly burnt flavors and aromas. While often described as coffee, chocolate, or mocha notes, these beer characteristics also reflect the burning and roasting of barbecue meat preparation. Burnt ends from smoked brisket, blackened salmon, and rotisserie chicken all have notes that are well-balanced in a dark, roasty beer. Especially with spicier barbecue, the sweeter versions of dark beer, like porter or sweet stout, can provide the same cooling contrast as amber lagers. In tropical climates, heavy use of chili peppers can be found alongside an appreciation of sweet stouts. A long time ago in West Africa I enjoyed some spit-barbecued goat, turned over hot coals and mopped with red chili flake oil. Spicy and burnt notes combined perfectly; I now think a tropical stout would have

been a delightful pairing. (The international style lager that was available then was not bad, either). The same malty sweetness that balances against heat in your barbecue can enhance a sweet note, as from maple sugar or honey in a sauce.

Most of the dark beers are not very hoppy and do not provide a bitter contrast to fatty foods. Some, however, can be surprisingly refreshing and rise to the pairing. One of these is the black lager style schwarzbier, which my wife considers her favorite style. With her taste in mind, I have homebrewed a number of schwarzbiers. These beers have some of the roasty malt notes of the porters and stouts, but have the lighter body and crisp mouthfeel of a typical lager. In this case, rather than having a sweetness for the cooling affect on spicy foods, you get the pleasant contrast character of the other lagers. All the while, you have the underlying roast character that echoes cooking with fire. If you haven't tried dark beers with barbecue, I recommend giving it a go.

To help you along, I have included my recipe for Sailing Away Tropical Stout on page 50. This malty, roasty beer uses chocolate malt and black patent for dark character and non-fermentable lactose to keep it sweet.

BBQ-Friendly Recipes



SAILING AWAY TROPICAL STOUT



(5 gallons/19 L, all-grain)
SG = 1.072 FG = 1.020
IBU = 54 SRM = 35 ABV = 6.8%

INGREDIENTS

10 lbs. (4.5 kg) English pale ale malt
8 oz. (0.23 kg) wheat malt
8 oz. (0.23 kg) Carapils® malt
8 oz. (0.23 kg) caramel malt (40 °L)
4 oz. (113 g) black patent malt
12 oz. (0.34 kg) British chocolate malt
1 lb. (0.45 kg) dried rice extract
4 oz. (113 g) lactose powder
7.2 AAU Willamette hops (60 min.)
(1.5 oz./ 43 g at 4.8% alpha acids)
5 AAU Fuggle hops (60 min.)
(1 oz./28 g at 5% alpha acids)
2.5 AAU Fuggle hops (30 min.)
(0.5 oz/14 g at 5% alpha acids)
0.5 oz. (14 g) Willamette hops (dry hop)
3 Whirlfloc tablets (15 min.)
Wyeast 1968 (London ESB) or
Wyeast 1084 (Irish Ale) or
SafAle S-04 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Be sure to make an appropriate-sized yeast starter a day or two prior to brew day if using liquid yeast. If using dried yeast, you may opt to pitch two sachets of yeast.

Mash grains in 4 gallons (15 L) of water at 155 °F (68 °C) for 60 minutes. Mash out and sparge at 170 °F (77 °C) to collect 6 gallons (23 L) of wort in the kettle. Boil for 60 minutes, adding hops as indicated. Add rice extract, whirlfloc, and lactose directly to the boil with 15 minutes left.

After the boil is complete, cool to 70 °F (21 °C) to pitch yeast, then ferment at 68 °F (20 °C) for two weeks. Rack the beer into a secondary vessel with the dry hops. Allow 3–7 days contact then bottle or keg as usual.

SAILING AWAY TROPICAL STOUT



(5 gallons/19 L, extract with grains)
SG = 1.072 FG = 1.020
IBU = 54 SRM = 35 ABV = 6.8%

INGREDIENTS

6 lbs. (2.7 kg) extra light dried malt extract
8 oz. (0.23 kg) Carapils® malt
8 oz. (0.23 kg) caramel malt (40 °L)
4 oz. (113 g) black patent malt
12 oz. (0.34 kg) British chocolate malt
1 lb. (0.45 kg) dried rice extract
4 oz. (113 g) lactose powder
7.2 AAU Willamette hops (60 min.)
(1.5 oz./ 43 g at 4.8% alpha acids)
5 AAU Fuggle hops (60 min.)
(1 oz./28 g at 5% alpha acids)
2.5 AAU Fuggle hops (30 min.)
(0.5 oz/14 g at 5% alpha acids)
0.5 oz. (14 g) Willamette hops (dry hop)
3 Whirlfloc tablets (15 min.)
Wyeast 1968 (London ESB) or
Wyeast 1084 (Irish Ale) or
SafAle S-04 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Be sure to make an appropriate-sized yeast starter a day or two prior to brew day if using liquid yeast. If using dried yeast, you may opt to pitch two sachets of yeast.

Place the crushed grains in a large mesh bag and submerge in 6 gallons (23 L) of water. Heat the water and when the temperature hits 170 °F (77 °C), remove the grains allowing the liquid from the bag to drip back into the kettle. Remove from heat and stir in the dried malt extract. When all the extract has dissolved, bring wort up to a boil for 60 minutes, adding hops as indicated. Add rice extract, whirlfloc, and lactose directly to the boil with 15 minutes left.

After the boil is complete, cool to 70 °F (21 °C) to pitch yeast, then ferment at 68 °F (20 °C) for two weeks. Rack the beer into a secondary vessel with the dry hops. Allow 3–7 days contact then bottle or keg as usual.



GROUP 4 PAIRINGS:

Smoked Beers

The smoked beer category offers homebrewers lots of room for creativity. In the BJCP, we find Classic Rauchbier Style (6B). More broadly, there is Category 32 Smoked Beer that contains classic style smoked beer and specialty smoked beer. In some cases, the wood beers of style 33 also show smoky character, depending on the wood used and how it is prepared. The BJCP says of rauchbier that it is “an elegant, malty German amber lager with a balanced, complementary beechwood smoke character.” Beechwood smoked Vienna-style malt makes from 20% to 100% of the grist and brings very characteristic aromas and flavors to this otherwise Märzen-style beer.

For brewers who want to explore smoke with fewer limitations, the smoked beer category awaits. In subcategory A, you can add smoked malt to any classic style. As always, the beer should remain balanced and pleasant to drink. In B, you make it a specialty smoked beer by either not using a classic style as the base, or adding other ingredients such as spices or fruits. Beyond beechwood, commercial smoked malts are made with cherry wood, apple wood, mesquite, peat, and others. If you have a smoker (or can improvise one), you can smoke your own malt at home (see sidebar to the right). Beers that result have the strong common element of smoke aroma and flavor.

For pairing, smoke is clearly the main point. Smoked fish, smoked cheese, and cured ham all pair beautifully with a classic rauchbier. With the specialty smoked beers, you might brew a smoked porter to pair with something spicy and smoky, like a chipotle-based barbecue sauce (a chipotle is a dried, smoked, ripe jalapeño pepper). Fatty smoked meats? You might try a crisp, refreshing smoked Pilsner. With any of these, the smoked malt provides a complementary smokiness, while your other beer features can either match or contrast with the barbecue food.

SMOKING MALTS AT HOME

Smoked malts are available from numerous suppliers, but if you want to put your own touch on your homebrew, smoking your own is a chance to indulge those experimental urges and produce a truly unique beer.

The first decision is what wood to use in smoking the malt. Beech is classic for Bamberg Rauchbier, but almost any hardwood will serve and brewers have had success with applewood, hickory, mesquite, alder, oak, and many others. Each wood will give a different smoked character. Smoking woods in the form of pellets, chips, or chunks can often be found at retailers that sell barbecue equipment or online. You could also source other forms of untreated wood from lumberyards, or if you have a fallen hardwood tree nearby.

As far as equipment goes, all you need is a smoker where the malt can sit well above the fire since you want to smoke the malt, not burn it! Bearing this in mind you could use a grill, but a purpose-built smoker is obviously ideal. You want to have as little fire as possible because you want to cool-smoke the malt, just as is done in making smoked salmon. This is especially true if you want to make the smoked malt your base grain since heating it will destroy the enzymes you will need to be present to get good conversion in the mash. To limit the flames, many home smokers treat the wood to a water bath prior to burning. Let it soak long enough for the water to penetrate. This will cause the wood to burn slowly and create more smoke when ignited. Another option to limit flames and create a lot of smoke is focusing on oxygen control. Or, you can do both approaches.

The exterior of the malt should also be wetted prior to smoking. This will help the smoke stick to the malt, as smoke molecules will dissolve into the water and then remain on the malt once it is dried. The amount of water used to wet the malt will be dependent on how long you plan to smoke the malt (based on how much smoke flavor you want the malt to have). For a quick smoking session, 3–4 oz. per lb. (198–262 mL/kg) of grain should be sufficient, but use up to twice that for longer smoking sessions. It may also be desirable to dampen it with water at intervals during smoking. Use distilled water for this, as chlorine can react with chemicals in the smoke giving some very unpleasant flavors. The grain can be laid out on a screen, in aluminum foil or aluminum plates with many punctured holes. Layer the grain about an inch (2.5 cm) thick and turn the grains over every 15 minutes or so to allow them to more evenly absorb the smoke. The grains are usually smoked for 30 minutes to two hours, depending on desired characteristics.

Once the malt is dry, store it in a brown paper bag for a few days to let the flavors mellow a bit.

– BYO Staff



Spice, Herb, Vegetable, Fruit Beers

GROUP 5 PAIRINGS:

My final group is the adventurous collection of beers with spices, herbs, vegetables, or fruit. Officially, BJCP breaks these beers into multiple categories: Fruit Beer, Fruit and Spice Beer, Specialty Fruit Beer, Spiced Beer (including A, spice, herb, or vegetable beer; B, autumn seasonal beer; and C, winter seasonal beer).


Throughout this diverse group, the emphasis is on making a balanced, drinkable beer that showcases the specialty ingredients. With that in mind, you can take your barbecue pairings to new levels of matching and contrasting. For instance, a brightly citrusy beer pairs well with grilled fish in the same way lemon juice does.

During a Hawaiian vacation, I helped brew a coconut-lime Saison that paired beautifully with grilled fresh local Ono (Wahoo). We used just salt and pepper on a large fillet of Ono, cooked it on the gas grill, and sliced to serve. The smooth, silky fish presented

a delightful contrast to the brisk, slightly tart saison. Meanwhile, the overall tropical feel of the fresh fish and coconut notes heightened the experience.

Similar matches could be made by making, say, a fresh peach brown ale and then grilling peaches alongside pork chops. I have brewed a black pepper Pilsner that would make a nice companion to a home-smoked peppery pastrami brisket.

I have even combined these last two groupings in one beer when I made a smoked chipotle American wheat beer, using cherry wood smoked malt as part of the grist along with wheat malt. With smoked chilies and smoked malt in the combination, I got a spicy/smoky/fruity beer. I didn't try it at the time, but I will have to brew it again and pair it with grilled sweet peppers and fatty grilled lamb chops.

OK, now I'm hungry. Time to go grill something and choose a beer to match! 




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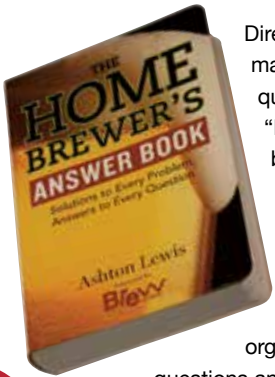
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BARBECUING WITH BEER

5 RECIPES PERFECT FOR SUMMER

story and photos by Jill Ramseier



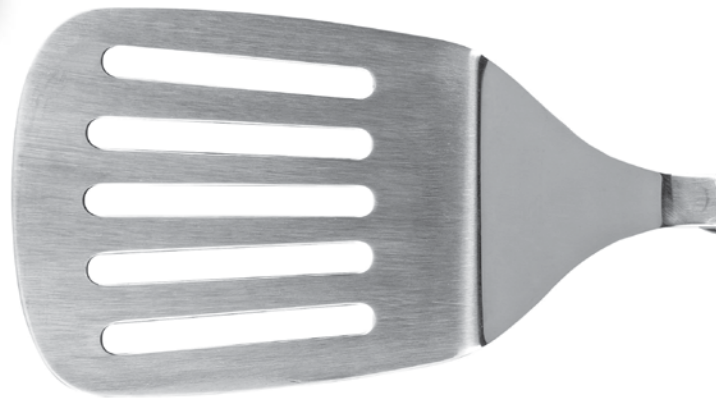
In the heat of summer, there is not much better than opening a cold beer and firing up the barbecue to make dinner and eat outside. However, barbecue and beer don't always have to be two separate things — beer can be used as an ingredient in all sorts of barbecue recipes.

Barbecue can be defined as a style of food, a gathering, or a cooking method. Across the following pages is a col-





lection of some of my favorite recipes that meet all of these criteria — each is intended to be cooked outside, shared with friends, and smoked or grilled with beer. Often, when firing up the smoker or grill, I try to make something extra for later in the week. Sometimes it's a pan of sea salt, smoked over hardwood for as many hours as whatever else is cooking, so that when they come out they are dark brown morsels, perfectly fit for sprinkling over scallops or pasta later. Sometimes it's a couple whole eggplants, smoked in their skins until soft, so that when they cool the pulp can be blended with cream cheese for a dip. Cobs of corn grilled with a hint of char, to make a fire-roasted corn chowder from. A pan of tomatoes, onions and peppers, blended into a smoky salsa. The possibilities are endless, just as summer feels on the hottest days. So keep the heat out of the house, fire up the grill and invite your favorite people over to share a delicious homebrew or two.





CANDIED SMOKED SALMON

(with IPA)

This recipe is perfect for preparing ahead, and is a perfect snack for you to enjoy with a cold lager on a hot day!

INGREDIENTS

- 3–4 lbs. (1.4–1.8 kg) fillet of salmon
- 10 oz. (283 g) kosher salt
- 10 oz. (283 g) brown sugar
- 1 oz. (28 g) coarse ground black pepper
- 1 bottle IPA (reserve 2 Tbsp.)
- $\frac{2}{3}$ cup maple syrup

STEP BY STEP

1. Mix the salt, pepper, and brown sugar together.
2. Cut Salmon into 1-inch (2.5-cm) strips (skin on), toss them well with the seasoning, and then place into an airtight dish. Pour extra seasoning over them so that they are surrounded by it on all sides and refrigerate for an hour. The cure will pull liquid from the salmon to create a syrup.
3. Remove salmon from syrup and rinse in IPA (easiest to put it in a bowl and dip salmon slices). Then pat salmon dry and put the salmon on a drying rack skin side down. Let this air dry overnight if possible, or at least for a couple of hours, uncovered in the fridge.
4. Put salmon in a smoker. I like to use mesquite or applewood chips, and keep the smoker's temperature low, around 200 °F (93 °C).
5. Mix maple syrup and reserved (2 Tbsp.) IPA. Every hour, brush the salmon with maple syrup mixture. Do this several times, until salmon is nice and dry and not absorbing syrup, usually about 3 times (3–4 hours).
6. Pull salmon out of smoker, baste one last time with any remaining syrup, and cool to room temperature. I like to peel the skin off at this point. Keep refrigerated or frozen, if you don't eat it all right then and there!

INGREDIENTS FOR RABBIT BEER BRINE

- 1 orange
- 1 small red onion (sliced)
- ¼ cup garlic cloves
- 3 cups water
- ¼ cup salt
- 4 cups light lager
- 2 cups ice

INGREDIENTS FOR MUSTARD BEER GLAZE

- ½ cup mayonnaise (optional, but this helps sauce adhere better to skewers since beer thins it)
- ½ cup honey
- ½ cup yellow mustard
- 2 oz. (59 mL) lager
- 1 Tbsp. minced ginger
- 1 Tbsp. whole grain mustard
- ½ tsp. salt

INGREDIENTS FOR SKEWERS

- 1 rabbit
- 8 oz. (227 g) bacon, pre-cooked until still soft but done through (too crispy and it won't stay on skewer)
- 1 red bell pepper
- 1 large red onion
- Optional additions (zucchini, pineapple . . . any additions turn this from a simple appetizer into more of a meal)

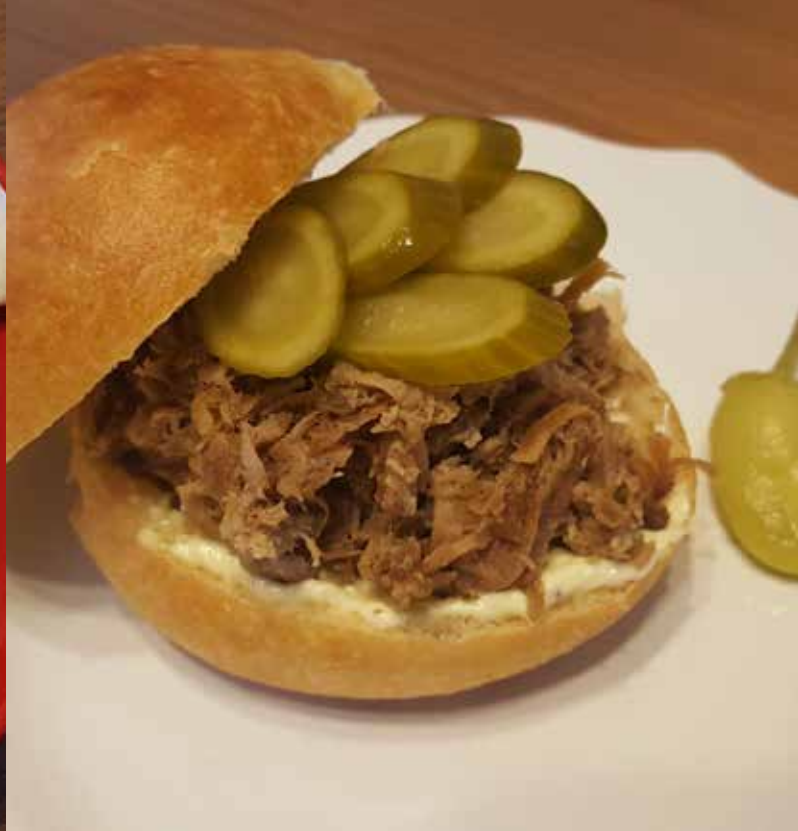
STEP BY STEP

1. Make the brine the day before. Bring water to a boil with sliced orange, red onion, garlic, and salt. Simmer until there is only about 1 cup of liquid left. Remove from heat and then pour in beer and ice.
2. Debone rabbit, cutting leg meat and loins into 1.5-inch (3.8-cm) chunks (or desired size for skewers). Add rabbit meat to brine and refrigerate covered for 24 hours.
3. On barbecue day, mix ingredients for the mustard beer glaze together with a whisk or immersion blender until smooth.
4. Chop veggies into bite size pieces large enough to stay on skewers (about 1-inch/2.5-cm each).
5. Preheat the grill to 350–375 °F (177–191 °C).
6. Thread veggies and rabbit chunks alternating onto skewers (preferably metal, or pre-soak wood skewers over night). Season skewers with salt and pepper.
7. Place skewers onto the grill, let cook 2–3 minutes, then flip. Brush mustard sauce onto cooked sides of skewers, coating well. Cook another couple of minutes, continuing to turn and brush until veggies are cooked and meat is done through.
8. Remove from grill and serve warm.



GRILLED RABBIT SKEWERS & VEGGIES (with Light Lager)

*This easy **appetizer** or **light lunch** only requires the legwork of sourcing **rabbit**, which if needed you are welcome to substitute chicken, but rabbit is **well worth the effort** in this delicious dish!*



SMOKED PORK IN BEER BROTH

(with Amber Ale)

Perfect for *large gatherings*, this whole smoked pork shoulder can then be *chopped up* and *tossed* with *beer* as the star of the show for picnics, potlucks, or any meal where you want *juicy pulled pork*. I love it served on rolls, or on a bed of grits or baked beans; honestly, this goes with nearly anything!

INGREDIENTS

- 1 pork shoulder (6–8 lbs./2.7–3.6 kg, ideally)
- ½ cup salt
- ½ cup brown sugar
- 1 Tbsp. smoked paprika
- 1 Tbsp. onion powder
- 1 Tbsp. cayenne pepper
- 1 Tbsp. black pepper
- 1 Tbsp. garlic powder
- ½ cup amber beer
- ½ cup BBQ sauce

STEP BY STEP

1. Mix together spices, rub them all over the pork until heavily coated. Place pork onto a pan with shallow sides. This can be done ahead and refrigerated until time to smoke, or you can let it rest at room temperature for up to an hour as you preheat the smoker.
2. Set smoker to 225 °F (107 °C), and when pre-heated, put pork inside. Smoke for at least 12 hours. After 12 hours, check internal temperature; it should be at least 190 °F (88 °C). A large shoulder could take a couple extra hours.
3. When finished, let rest for 30 minutes at room temperature.
4. Make the BBQ beer broth by mixing a half-cup of your favorite BBQ sauce and half-cup amber beer.
5. Cut pork shoulder into chunks and for immediate serving toss in a bowl with the broth (or put into a crock pot for gatherings to keep hot).



INGREDIENTS

- 1/3 cup porter
- 3 Tbsp. honey
- 2 Tbsp. sugar
- 1/2 tsp. white pepper
- 1/2 tsp. black pepper
- 1 tsp. vanilla paste (or extract if paste is not available)
- 4 duck breasts
- 2–3 eggplants, sliced into half if slender or 8 strips lengthwise if large
- 2 Tbsp. kosher salt

STEP BY STEP

1. Preheat the grill with coals to about 375 °F (190 °C). Keep coals to 1/3–1/2 of grill so you have hot areas and cooler areas.
2. Mix first 6 ingredients together, stirring gently to blend into a syrupy consistency.
3. Sprinkle half of the salt onto eggplants, let sit for a few minutes: They should emit liquid, let it drain off but do not rinse.
4. Score the skin of the duck breasts with a crosshatch pattern, and season skin side with the remaining 1 Tbsp. salt.
5. Place duck breasts skin side down onto the hot side of the grill, watching carefully as they will drip fat and ignite flames. I prefer the skin a bit crispy and charred, so I baste them with the syrup and move them around in the hot areas for a few minutes until the skin is well browned and crisp, then flip them onto a medium heat area and continue basting regularly.
6. Lay eggplants into high heat area, and begin basting them as well. Turn them regularly and continue basting until they also have a good amount of char and tenderness to them, then you can move them onto a clean side plate.
7. Check temperature of the duck breasts. At 135 °F (57 °C) they are medium-rare, or cook to your preferred doneness.
8. Serve Duck sliced thinly with the eggplant, sticky rice and/or a salad.

VANILLA PORTER GLAZED DUCK & EGGPLANT (with Porter)

*This dish is lovely for **special occasions**, especially a **hot evening** when you want to cook outside, and it pairs great with a **salad** and some **sticky rice**.*



BARBECUED BUCKLE CAKE WITH BERRIES


(with Sour Ale or
Fruit Lambic)

*This **dessert** is perfect for when you are already making dinner on the grill and you want to throw something **special** in with it. Great with **summer berries** or even **grilled peaches!***

INGREDIENTS

- 1½ cup flour
- 1 cup sugar
- ¾ tsp. kosher salt
- 2 tsp. baking powder
- ¼ tsp. nutmeg
- 6 Tbsp. melted butter
- ¼ cup cream
- ¼ cup sour ale or fruit lambic
- 1 large egg
- 1½ cup raspberries or other seasonal fruit (divided)
- 3 Tbsp. coarse sugar, such as demerera or turbinado

STEP BY STEP

1. Pre-heat grill to 350 °F (177 °C), give or take 25 °F (13 °C). Make a cool spot to one side of coals/flames so that the cake can bake without being directly over flames.
2. Mix flour, sugar, salt, nutmeg, and baking powder well.
3. Dump butter into dry mixture and stir well with a fork until a crumbly texture with pea-sized clumps is formed.
4. Stir in cream, beer, and egg just until a smooth batter is formed.
5. Divide into greased shallow baking dishes, or one 9x9-inch (23x23-cm) pan. Press 1 cup of berries into cake. Sprinkle with coarse sugar.
6. Place cake into grill, away from direct flame. Keep grill as close to 350 °F (177 °C) as possible. If temperature is kept even, cake should take about 35–40 minutes. When checking, turn dish so that sides cook evenly. Cake is done when the edges are puffed and golden, and the center is firm.
7. Top with ice cream or whipped cream, and remaining berries. Enjoy with a glass of sour ale. 

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PREPARING FOR THE BJCP EXAM

Get the most from your study group

by Rob Friesel

If you've ever entered any of your homebrews into a competition, then you've likely asked yourself, "How did these people train to evaluate my beer? Who are these judges?"

Well, one of them could be you!

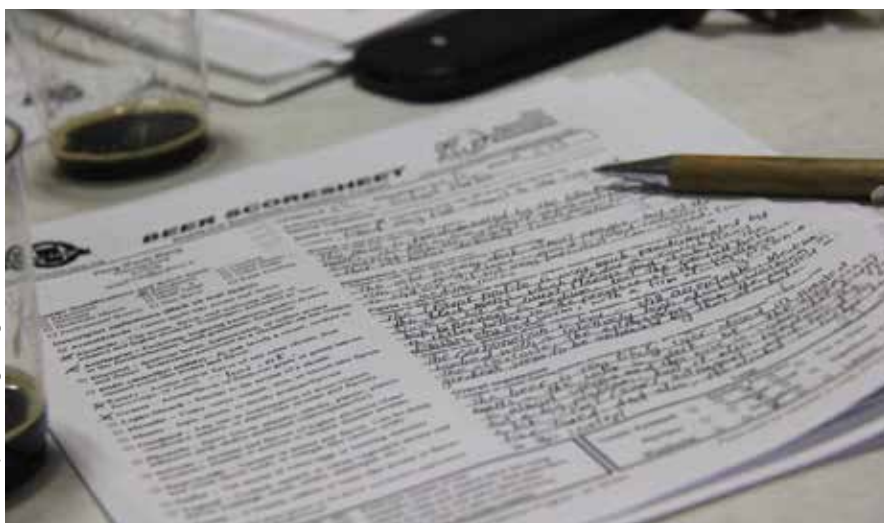
The benefits of becoming a beer judge are many. Rigorous study of the styles gives you a deeper understanding of what beer styles and flavors are possible. Proficiency in sensory evaluation can help you better critique your own beers. Developing expertise in ingredients and process can lead to better recipe formulation. These are some of the benefits to your own homebrewing, which don't even touch on the fact that tasting and judging beers is just plain fun.



SERIAL PRODUCT

SERIAL PRODUCT

Photo by Shutterstock.com



Fill out score sheets with as much sensory details as possible, offering specific feedback.

Becoming a Beer Judge Certification Program (BJCP) judge involves studying the styles, developing sensory evaluation skills, and learning how to quickly and thoroughly fill out a scoresheet complete with useful feedback. The road to beer judge is a long one: You'll need to pass an online qualifying exam where you demonstrate your knowledge. After that, it's time to apply your senses with the tasting exam. And assuming you pass with a high enough score, that just earns you a "Recognized" rank! But just because it is a lot of work doesn't mean it has to be a slog.

This article will offer methods to improve your chances of success and offer proven strategies to ease some of the burden with group activities.

OVERVIEW OF THE BJCP

When we talk about homebrew competitions, we're usually talking about BJCP-sanctioned events with BJCP-certified judges.

The BJCP is a non-profit organization that was formed in 1985 to (quote from their website):

- Encourage knowledge, understanding, and appreciation of the world's diverse beer, mead, and cider styles;
- Promote, recognize, and advance beer, mead, and cider tasting, evaluation, and communication skills; and
- Develop standardized tools, methods, and processes for the structured

evaluation, ranking and feedback of beer, mead, and cider.

With that mission in mind, the BJCP curates the style guidelines for competition and evaluates judges for their competencies in beer evaluation and feedback communication.

As mentioned earlier, the BJCP has a series of exams that aspiring judges must pass to demonstrate their competencies before earning their ranks. The first exam is online and consists of a 60-minute test with a mix of 180 true/false and multiple choice questions. This entrance exam is pass/fail; passing earns you a "Provisional" rank and the opportunity to sit for the tasting exam. The tasting exam involves scoring six beers over 90 minutes. A high enough score on the tasting exam earns you a "Recognized" rank and, with enough judging points from competition participation, up to "Certified." Ascending from there (to "National" and above) means more judging points, potentially re-taking the tasting exam for a higher score, and also passing the written exam.

This article focuses on forming and running study groups to prepare for the tasting exam. These same techniques, with a sufficiently disciplined group, could also work toward the written exam.

STUDY GROUP BASICS

Although it's possible to study solo for the BJCP tasting exam, most experienced judges would agree that a

group or class is helpful.

"For the tasting portion, studying in groups is a must," said Ryan Cochrane, of South Jersey's Barley Legal homebrew club.

BJCP President Gordon Strong agrees: "Study groups are useful since you can have discussions and share experiences with others, particularly when tasting. But they have to be well-led."

The benefits of forming a study group include:

Spread out the cost

Purchasing examples of all 91 classic styles across the 26 categories gets pretty expensive. Especially if you're being diligent and comparing multiple examples of a given style. Better to defray the cost across more people.

Spread out the responsibilities

With a group, you can distribute the load of coordinating the meetings. Take turns presenting on different styles, techniques, and other topics.

Hold each other accountable

The journey toward the BJCP exam is a marathon. Depending on your temperament, it might be too easy to let your discipline slip if you go solo. You may find yourself more likely to "do the work" if you know other people are counting on you.

Maximize mentorship

Recruit experienced judges to mentor during your sessions. (Who among us would refuse an offer of free beer in exchange for talking about beer?) You're learning not just the styles, but also how to apply your descriptive and feedback abilities to the scoresheet. Gordon Strong put it this way: "You also need some feedback and reinforcement, otherwise you may be learning things incorrectly or just guessing."

Fill in each other's blind spots

The study group is a great way to discover where you have gaps or have picked up mistakes. Perhaps you have trouble telling apart a Munich helles from a German helles exportbier, but someone else can explain it so it

sticks. Maybe you compare all saisons to Dupont and a group member illustrates the diverse range. Or you discover that your perception threshold for acetaldehyde is unusually high.

Granted, there are some challenges that come with forming a group. You need to find a reliable space to meet. You need to sustain the pace of the meetings over weeks or even months. It can be tedious to accommodate everyone's schedules.

In comparison to the substantial benefits of working together, these challenges are trivial, and worth the effort to overcome.

A PORTRAIT OF A STUDY GROUP

Now that you're bought in on the idea of a study group, how do you go about arranging one? What format should you use? How often should you meet? There are many choices to make, and while there's no one-size-fits-all approach, here's a proposal that provides a framework for organizing one.

Commit to a specific exam

The first order of business should be to give yourself some marching orders. Almost every tasting exam is going to fill up quickly and have a waiting list. When you start pulling together your study group, try to get everyone signed up for the same upcoming exam, knowing that it could be a year away. This helps to figure out who is the most committed, and puts everyone on the same timeline.

Find a meeting space

Find a physical space that works for your group. You want someplace that is large enough to comfortably accommodate the group, and where you can be relatively undisturbed by noise or interfering aromas. Ideally, you'll have a consistent meeting place, but if that's not possible, just make sure to communicate the location details early and often!

Establish a cadence

If you commit to a specific exam, you can do a little math to work out how much time you have to get through

the material. By starting a year in advance, you can meet every other week and comfortably work through all the categories. This also leaves some slack to adjust for scheduling conflicts, holidays, inclement weather, etc.

Work out a meeting format

Determine a format for each meeting that allows the group to accomplish its learning objectives in an incremental fashion. Depending on how often you meet (and how disciplined the group), a two-hour block should allow enough time for:

- **Short presentations on ingredients, brewing process, or judging mechanics.** It's critical that aspiring judges learn how ingredients and process affect the finished beer so that they can provide appropriate feedback on scoresheets. It's also important to understand different approaches to sensory evaluation and scoresheet completion; building confidence in these skills helps with time management on exam day. Ideally your group will draw from the BJCP's Beer Judge Training & Study Program (see the "Resources" section at the end of this article), rather than trying to invent all of the material from scratch.

- **Overview of the category and styles in that session.** If you dedicate each study session to one or two categories, consider reviewing the styles un-

der scrutiny. It's a good opportunity to brush up on specifics, but also to compare notes and observations leading into the session, as well as how those styles compare to others in the style guide.

- **Structured evaluation and scoresheet practice.** Perform full sensory evaluations and practice filling out scoresheets with the session's relevant beers. Time your performance and see how complete you can be with 10 minutes per beer. Compare scores and notes. Make sure that everyone feels comfortable expressing their impressions freely! Doug Brown of Quality Ale and Fermentation Fraternity (QUAFF) homebrew club urged: "Do [your scoresheet practice] with people with whom you will feel comfortable sharing your honest impressions of what you taste, without fear of being 'wrong' or describing a taste that you think will sound 'silly.'"

- **Rotating skill-building exercises.** If your group is ambitious, allocate the last 15 minutes or so for other exercises that develop your sensory and descriptive abilities. (Suggestions for this under "Skill Building" later in the article.)

KNOWLEDGE BUILDING

Of the segments described for meeting formats earlier, two of them (overview of category/style, and structured



Photo by Paul Peng Wang

When practicing, make sure to set a clock to limit the amount of time for written feedback. Comparing notes with others in your study group allows you to expand your knowledge.



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evaluation and scoresheet practice) are self-explanatory. But what about those "short presentations"?

John Aitchison of the Maltose Falcons homebrew club advises, "The judge's job is to carry on a one-way conversation with the brewer about the beer being judged. That brewer wants the details about their beer and how it can be improved . . . how can you best help him?"

"Study the brewing process, reading articles from *BYO* and *Zymurgy*, and brewing books," suggests Larry Reuter from Society of Akron Area Zymurgists (SAAZ) homebrew club. "How does this help on the tasting exam? It gives you the understanding of what the brewer needs to accomplish to make that specific style of beer."

Combine that with Aitchison's comments and you get the picture. As a judge, you need to provide knowledgeable, actionable feedback to the people who paid to enter the competition. So you better believe that the tasting exam is going to evaluate you on your ability to provide that kind of feedback.

And that's what these short presentations are about: Developing "brewing book smarts."

Luckily we can refer to the BJCP's Beer Judge Training & Study Program. That document provides outlines for discussions on:

- BJCP process and guidelines
- Perception and descriptive ability
- Feedback and troubleshooting
- Beer judging exam and application to scoresheets
- Grains and malting
- Mashing and water
- Hops, boil, adjuncts, and specialty ingredients
- Yeast and fermentation
- Conditioning and packaging

These discussions help you develop your mastery in the long-term, but thinking ahead to the tasting exam in the short-term:

- What tactics can you use to ensure a thorough and complete scoresheet?
- What strategies can you use to place a beer in the correct scoring bracket?
- Can you map certain ingredients and processes onto specific styles for sty-

listic feedback?

- Can you trace certain technical faults to brewing process? To fermentation process? To packaging/storage process? Can you recommend appropriate remedies for each?

SKILL BUILDING

The absolute minimum for building your tasting skills is to fill out scoresheets (with time constraints!) for classic commercial examples. The classic examples will familiarize you with the styles. Working through scoresheets gets you into the habit of critically evaluating each beer, as well as preparing you for the pressure of the actual tasting exam.

But this kind of tasting exercise has its limitations. First, by using classic examples, you can be reasonably confident that the beer you're evaluating aligns well with the style — so they may not help you identify when a beer is in the wrong category. And given that they're commercial examples, *most of the time* (but certainly not always) they won't have severe faults or off-flavors — so they won't help you there either.

In other words, non-blind tastings of classic examples will only help you so much. Fortunately, there are plenty of other exercises you can do with your study group to round-out your evaluation capabilities.

Calibration scoring

"Scoring accuracy" is one of the dimensions you'll be graded on as part of the tasting exam. Here, the graders look at the arithmetic difference between the score you assigned and the proctors' consensus score. While your performance on scoring accuracy is largely out of your control (at least it feels that way), there are still some measures you can take to narrow the gap.

If "National" ranking (or above) judges regularly attend your sessions, take advantage of their mentorship. Compare scoresheets with them. What scores did they assign and why? What feedback can they give you about your own assessment? Apply that feedback and do it again. See if you can reliably get within 2–3 points

of them.

Off-flavor workshops

Part of judging is recognizing the flaws in a given beer and providing feedback to the brewer on how to correct them. That said, it's important to learn how to recognize the off-flavors in beer because they provide clues about what those faults are.

By using an off-flavor kit (sometimes called *flavor standards*), you can start to train your senses to perceive the aromas and flavors associated with these compounds. Training with your group against a common standard can illuminate the different associations that people have and descriptors that they use to communicate about those compounds. For example, people often describe acetaldehyde as "green apple" but it wasn't until I attended an off-flavor workshop that I learned that I perceive it more like Play-Doh or latex paint.

A typical workshop includes a control beer that is relatively neutral in flavor (e.g., an American light lager), and then a number of samples of that beer that have had the flavor spike added to it. As you work through the spiked beers, be sure to compare them to the control so that you get an idea of how they differ. Compare notes with other group members; find out what descriptors they used (this is especially helpful when seated across from a judge that might perceive it differently) and at what intensity they perceived it (to get an idea of where on the threshold curve you are).

Several different off-flavor kits are available on the market. Basic kits usually contain six different spikes, but more advanced kits with more off-flavors are also available. If your group conducts a workshop like this, check the target volume for the kit you choose; you want to have enough spiked beer for all the people in the group. That said, as these kits can be quite expensive, this is a great way for a study group to pool its resources.

Blind "name-that-style"

A fun way to test your style knowledge is to go blind into a beer and see if you can place it. Someone at the session

can either cover up the container (aluminum foil works well) or pour samples out of sight before serving them. Take a minute or two to narrow the possibilities, using your perceptions about the beer to place its style. Try to commit to one or two options before discussing as a group. Can you build consensus? Or do people have diverging opinions? Reveal the beer and its style. How close did you get? If you got it, what elements helped you to identify it? If not, what threw you off?

Triangle tests

Running a series of triangle test tastings can sharpen your ability to differentiate beers through applied sensation. The general format of a triangle test is to present tasters with three samples (usually in three different colored opaque cups); two of those samples are the same beer, while the third is different in some way. The goal is to identify the odd beer out using your senses alone. Some example combinations:

- Different examples of the same style (e.g., Bud Lite vs. Miller Light)
- Similar styles (e.g., Munich helles vs. German helles exportbier)
- The same beer but handled differently (e.g., an IPA stored cold vs. warm for a few weeks)

Sensory cross-training

When asked about his top recommendations for aspiring judges, part of Gordon Strong's response was: "Sensory training involves a lot of practice, including tasting non-beer items (foods, etc.). Learning vocabulary helps, but you have to actually sense it and internalize it before you can recall it."

To cultivate your descriptive abilities in this way, try sampling other foods and beverages to create a confident mental catalog of comparisons.

For example, get citrus fruits and compare the aromas and flavors. How does the grapefruit flesh differ from the rind? How does an orange compare to a tangerine? Try some citrus fruits that you might never have had like a pomelo or a cara cara. Do it again with tropical fruits like guava, mango,

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papaya, pineapple, etc. And again with different breads. Try toasting some of those breads. How about different kinds of nuts?

This kind of sensory cross-training can easily be done solo, but again: I can't understate the benefits of comparing notes with your peers.

Steward or judge a competition

Brian Pylant from Barley Legal put it this way: "Judge as often as you can. This is a skill that takes a lot of practice to improve, and there is no better practice than sitting across the table from another judge, evaluating, and discussing the beer in front of you." I couldn't agree more.

Keep an eye out for competitions that are near you and register as a steward or, if you've earned your "Provisional" rank, as a judge. As valuable as your study group is, sitting across from a seasoned judge with a real homebrew in front of you and actually putting your pencil to the scoresheet is the best lesson. You'll start to establish a real sense of the time constraints, the threat of palate fatigue, and the work that goes into filling out a thorough scoresheet.

Plus, there's nothing quite like the judging experience to mobilize your motivation and focus on the upcoming exam.

MAXIMIZING YOUR CHANCES

Let's assume you're going to do all of the advice in this article and pull off the ideal scenario: A good-sized study group with a stable meeting schedule and location; regular mentorship from "National" and "Master" level judges; samples of every style; meetings that lead with a knowledge-building presentation and end with skill-building exercise; an off-flavor workshop; and a field trip or three to competitions to serve as stewards and judges.

What else can you do to maximize your score on the tasting exam?

Understand how you'll be graded

Recall that the tasting exam consists of six beers judged over 90 minutes. The scoresheet for each beer will be compared to the scoresheets from

your exam proctors. BJCP "exam graders" will assess you on five judging skills: **Perceptive Accuracy, Descriptive Ability, Feedback, Completeness, and Scoring Accuracy**. As you study and practice, ask yourself how you're performing on those five areas, focusing first on your weakest areas, and constantly striving to improve.

Focus on completeness

Being able to describe what you are evaluating is critical. From my own perspective, scoring well on every other skill (except "scoring accuracy") is directly related to filling in an as-complete-as-possible scoresheet. If you describe every sensory impression and its intensity, make specific comparisons, comment on the stylistic components, and give actionable feedback about the beer, then you should be able to fill out the entire scoresheet.

Stressing this point, John Aitchison said, "Not being able to write completely and concisely might prevent a 'National' score."

If you find that you have blank lines, ask yourself what you forgot to mention. The scoresheet literally tells you what to say (e.g., "Comment on malt, hops, esters, and aromatics") — make sure not to forget any of those elements, even if all you say is "no perceptible esters."

Do your homework

Although your study group is essential, it cannot be your only learning instrument. Read books and articles about brewing and beer styles. Read each style description 2–3 times. Make flashcards. Score beers at home and review your scoresheets. Brew a beer and take copious notes. Score more beers and limit yourself to 15 minutes. Score beer styles you don't like or have never had. Take notes at the study group. Keep a tasting journal. (Brian Pylant even suggested taking tasting notes on your lunch.) Score even more beers and limit yourself to 10 minutes.

Did I mention practice scoresheets? Doug Brown suggests: "Filling out a scoresheet a couple times a week while enjoying a drink after work is not

something most people would ordinarily think to do, but it requires only a modest commitment of time, and over a 3-month period would lead to quite a bit (over 25 scoresheets) of practice."

Go beyond the style guide

Although a functional command of the BJCP styles is imperative for the exam, that knowledge is not sufficient for mastery. When asked about common stumbling blocks for aspiring judges, Ryan Cochrane replied, "Trying to memorize styles rather than understand the basis and building blocks of a style . . . you have to be able to understand how to get flavor profiles you may not work with on a regular basis."

This brings to mind the famous dictum by Alfred Korzybski, "The map is not the territory." The style guidelines are the map; ingredients, process, balance and drinkability, that's the territory.

Balance your feedback

Don't fall into the trap of relying on a certain kind of feedback. Perhaps you over-index on technical faults, commenting on fermentation management or packaging. Or perhaps you focus on stylistic concerns, remarking on out-of-balance elements or whether a beer would have scored better if entered as something else. As you practice judging, periodically review your scoresheets to see if you're skewing one way or the other. The same goes for positive (reinforcing) vs. negative (constructive) feedback; if something was particularly good, say so — especially if it's a 40+ beer.

Vocabulary & communication development

Almost every experienced judge that I asked mentioned this as a crucial skill, and one that is often neglected by aspiring judges.

"The main challenge is writing the right descriptor and the strength of that descriptor on your exam," said Larry Reuter.

Brian Pylant described it like this: "Learn how to apply your senses to the objective evaluation of beer . . . Then you have to learn how to make


the connection between what you're perceiving and how to express that in writing. It's a LOT harder than it sounds, and it's much more involved than simply learning some new vocabulary. Making that connection takes a lot of time and practice . . . As you build your vocabulary and the connection between your senses and your writing, your scoresheets will get better and more detailed."

John Aitchison put it in these terms: "Grand Master Jim Wilson has stressed learning things like reading *How to Write with Style* by Kurt Vonnegut and really developing a 'beer vocabulary.' I agree . . . Don't write 'malty aroma,' write 'moderate to strong crackery aroma with melanoidins in the background.'"

Don't neglect the physicality

With all the emphasis on studying and knowledge, don't forget about the physicality of judging. Remember that the tasting exam involves evaluating six beers over 90 intense minutes. Figure out some comfortable clothing for this. Learn some stretches to prevent your back from getting stiff. Develop strategies for palate fatigue. And invest in a mechanical pencil that's comfortable to write with for an hour and a half straight.

Be skeptical

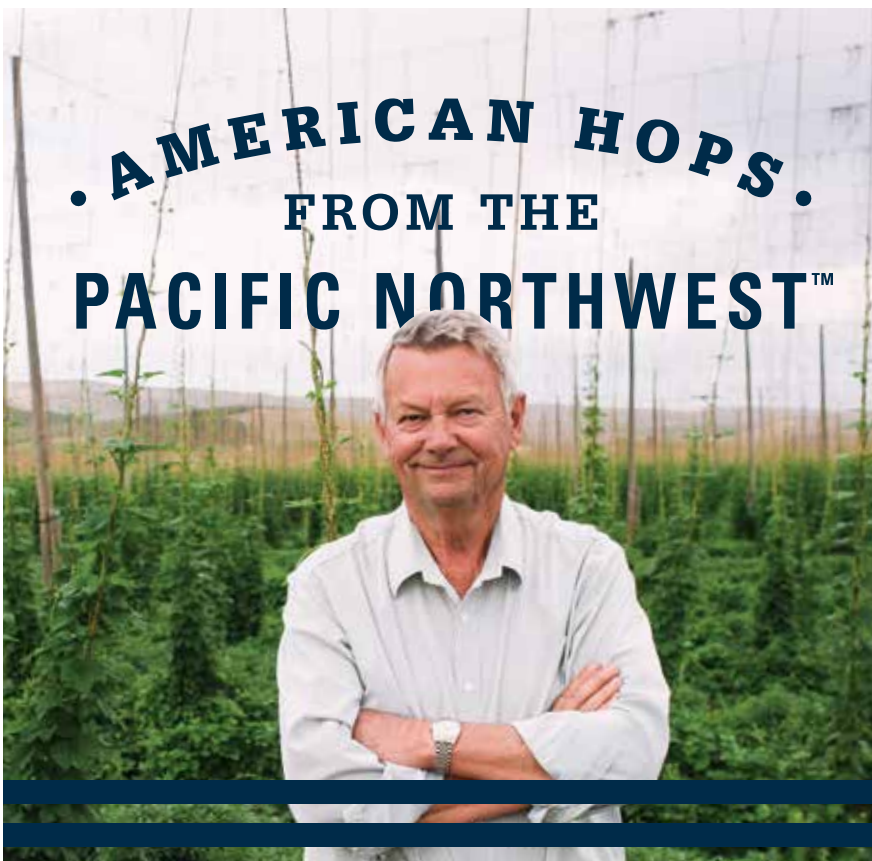
Read the style guide closely, but look for the exceptions and fuzzy edges. Investigate ingredients and process, but understand that you don't actually know how the beer in front of you was made. Someone might put a Schwarzbier in front of you and insist that it's an American porter. Read broadly, compare notes, and trust your senses. 

RESOURCES

- "Become a Homebrew Judge" (Russell, 1996). <https://byo.com/article/become-a-homebrew-judge/>
- Beer Judging and the BJCP Exam. www.bjcp.org/docs/mastering.pdf
- BJCP Beer Exam Study Guide. https://bjcp.org/docs/BJCP_Study_Guide.pdf
- BJCP Beer Judge Training & Study Program. <http://dev.bjcp.org/education-training/exam-preparation/beer->

- [BJCP Membership Guide](http://dev.bjcp.org/member-services/member-ship-guide/). <http://dev.bjcp.org/member-services/member-ship-guide/>
- [Brewing Better Beer: Master Lessons for Advanced Homebrewers](http://dev.bjcp.org/member-services/member-ship-guide/) (Strong, 2011; esp. chapters 5 & 7)
- "Judging Beer for Homebrewers" (Smith, 2012). <http://beersmith.com/blog/2012/01/19/judging-beer-for-homebrewers/>
- [Tasting Beer: An Insider's Guide to the World's Greatest Drink](http://dev.bjcp.org/member-services/member-ship-guide/) (Mosher, 2017)
- [BJCP Exam Scoresheet Examples](http://dev.bjcp.org/examscores.php). <https://www.bjcp.org/examscores.php>
- [BJCP Exam Scoring Guide](http://dev.bjcp.org/exam-certification/exam-grading/exam-scoring-guide/). <http://dev.bjcp.org/exam-certification/exam-grading/exam-scoring-guide/>
- [BJCP Exam Structure](http://dev.bjcp.org/exam-certification/exam-program-overview/bjcp-exam-structure/). <http://dev.bjcp.org/exam-certification/exam-program-overview/bjcp-exam-structure/>
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- [Brewing Better Beer: Master Lessons for Advanced Homebrewers](http://dev.bjcp.org/member-services/member-ship-guide/) (Strong, 2011; esp. chapters 5 & 7)
- "Judging Beer for Homebrewers" (Smith, 2012). <http://beersmith.com/blog/2012/01/19/judging-beer-for-homebrewers/>
- [Tasting Beer: An Insider's Guide to the World's Greatest Drink](http://dev.bjcp.org/member-services/member-ship-guide/) (Mosher, 2017)



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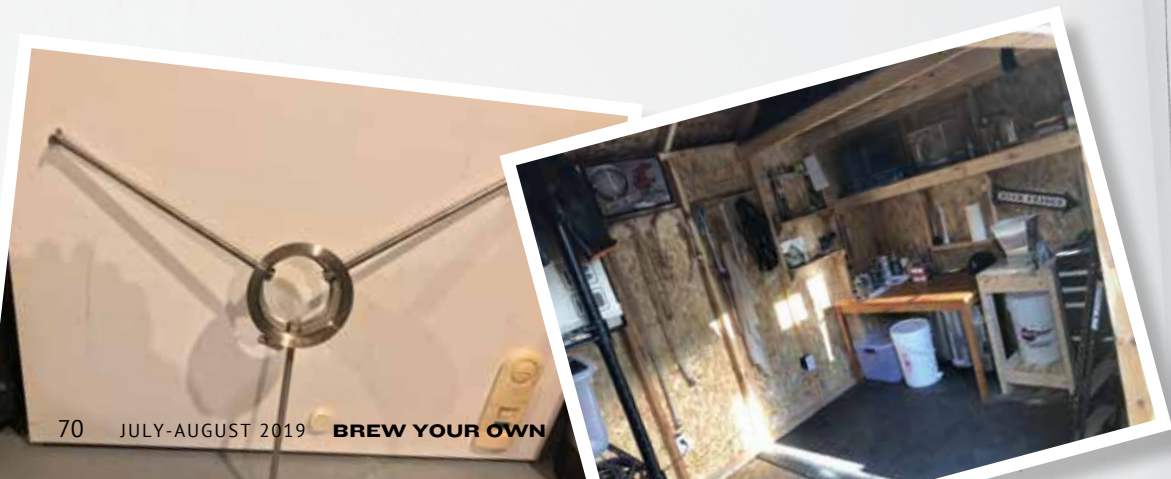
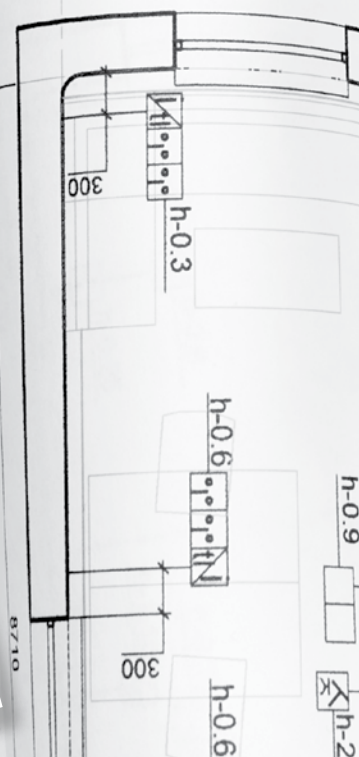
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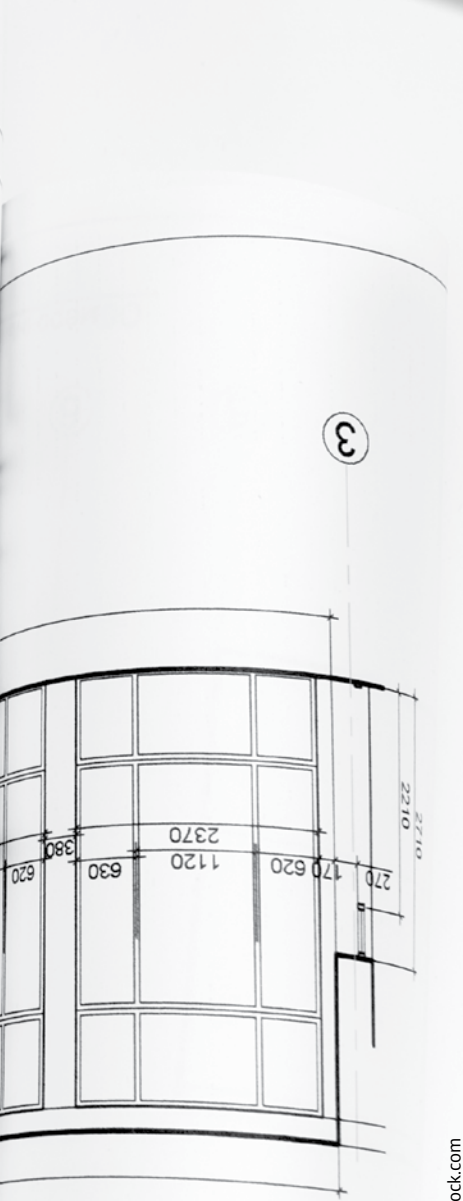
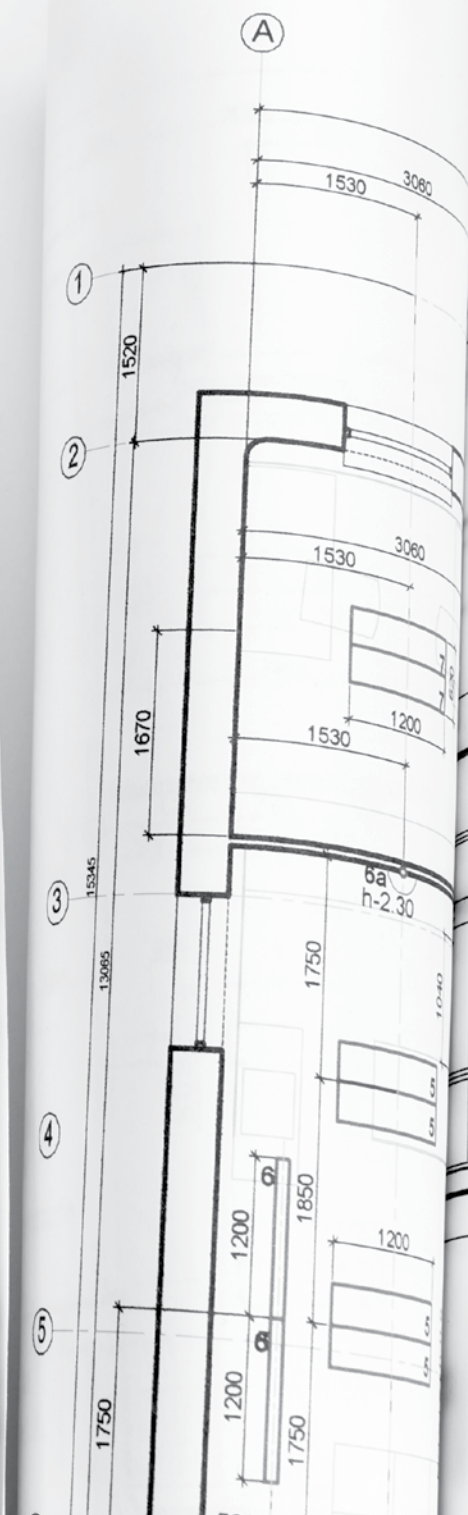
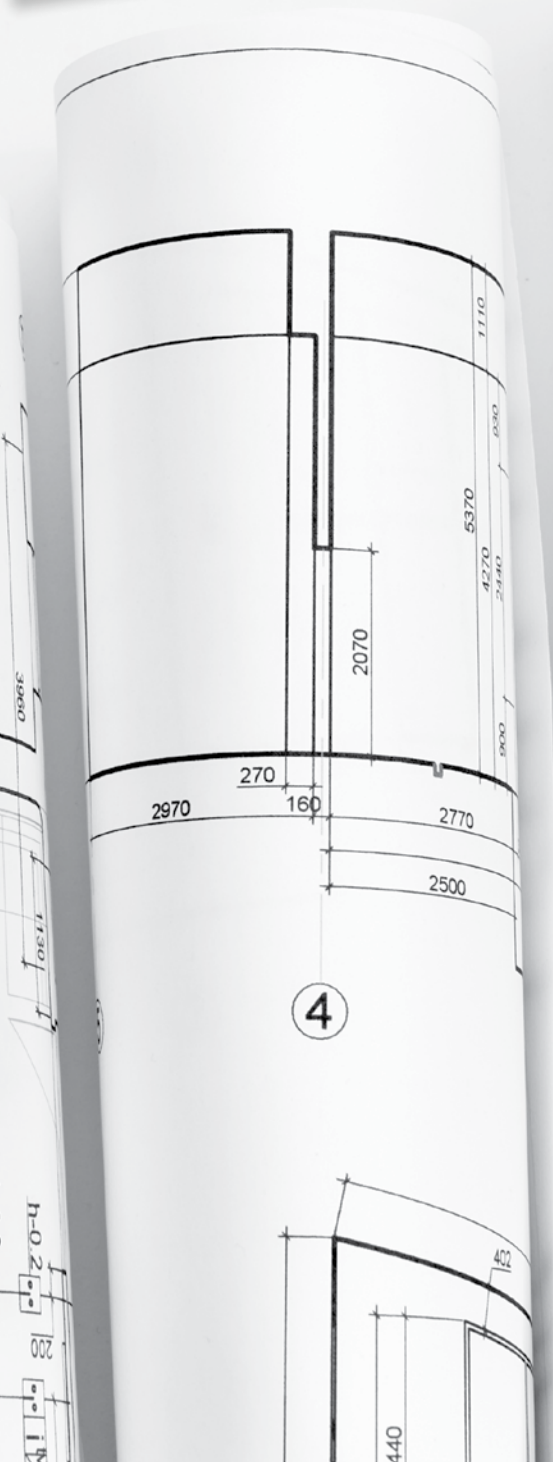
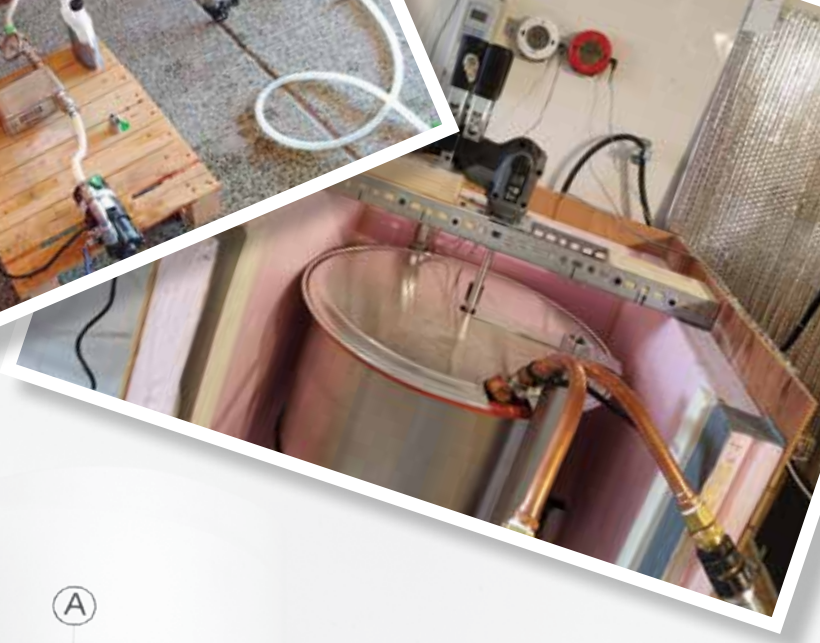
by Dave Green

It took me roughly 12 months with lots of late nights in the barn while a newborn and a 4-year-old made sleep a luxury in the house. But the night I flipped the switch on my RIMS (recirculating immersion mash system), 2-tier homebrew system is a night that I still remember 9 years later. Now, not every homebrewer is a gearhead, but I do think every homebrewer is a tinkerer at heart. By nature, homebrewers are always trying to improve upon the craft of brewing. They are not happy simply purchasing beer found on store shelves, they want to improve upon those creations and make it their own. Likewise, they often are not happy with just the basic, rudimentary equipment that they started in on either: They want to modify.

So these impulses give rise to system upgrades . . . for many homebrewers this is more than just a single desire for an upgrade but rather it's a laundry list of wants. Some of these modifications can be simple and with one item the upgrade can be complete. Other DIY upgrades can take weeks, months, or even years to complete. Over the next several pages, we've compiled several modifications and projects that just about any homebrewer can handle. Some of these may not be for everyone, but hopefully there will be something in the following pages that inspires you to modify. Embrace the tinkerer found inside you. My homebrew system was a giant leap forward for me and still brings me joy. I'm constantly adjusting and modifying it to this day and as fellow gearheads might appreciate . . . it's currently scheduled for an upgrade.

(E)





FERMENTER-CHILLER SYSTEM

BRIAN BUDRIS
WAYNE, NEW JERSEY



I used to chill my wort with a counterflow chiller while pumping from the kettle to my 12.5-gallon (47-L) MoreBeer! stainless steel conical fermenter. Over time, the chiller became less and less effective, and I would have to pump very slowly to hit my target temperature. When I looked inside of the wort chiller with a small flashlight, I found that the inside coil was coated with beerstone, which was acting as insulation against heat transfer and causing a major contamination risk. Unfortunately, the strong acids that would have been required to remove the beerstone would also eat away at my copper chiller, so that was not an option.

My solution was to chill the wort inside of my fermenter using a JaDeD King Cobra, an angle drill with an external speed controller, and a Jaybird Whirlpool Paddle. The coils on the King Cobra are very low profile, so they sit perfectly in the fermenter's cone, and are fully submerged even when I brew 5-gallon (19-L) batches. The whirlpool created by the drill and paddle make the immersion chiller work just like a counterflow chiller, without having to worry about what's hiding inside of it. The coils of the King Cobra are held apart by spacers, which allows for fantastic circulation around them. I can cool 10.5 gallons (40 L) of wort from 200 to 70 °F (93 to 21 °C) in just under 5 minutes using 50 °F (10 °C) tap water.

I built a rig to hold the drill in place using angle irons, angle brackets, and some scraps of 2x4. The drill is held steady with a couple of spring clamps. My rig rests on the top edges of my fermentation chamber, but adding a couple of perpendicular 2x4 scrap boards to the bottom ends would allow it to sit on the rim of the fermenter.

To bring the project to the next level, I made a dust cover out of an aluminum pizza pan to protect against airborne contaminants. The only things that need to be sanitized are the fermenter, chiller, whirlpool paddle, and optional dust cover. No need to sanitize transfer hoses or valves as long as the wort is above 170 °F (77 °C) during transfer.

GRADUATED COPPER SIGHT GLASS

**BROCK AYERS
WEST BEND, WISCONSIN**



Most of my components were purchased from bargainfittings.com. I bought a weldless thermometer sight gauge kit from them and added the copper pipe to it to have volume markings. The kit came with everything I needed to install the weldless bulkhead and polycarbonate tube. The website has the directions for adding the kit to a kettle/keggle. I followed the steps and added it to my 15-gallon (57-L) keggle, but couldn't figure out how to make permanent volume markings on it. That is until I saw a 1/2-in. copper pipe I had on my workbench from a previous project. I fit the pipe over the poly tubing, and it fit perfectly!

I cut a narrow slit in the pipe the long way and tried to keep it as even and straight as I could. I then slid the pipe over the poly tube and began filling my keggle a half gallon (1.9 L) at a time, marking each half-gallon (1.9 L) mark with a Sharpie. After getting the marks all made, I had a homebrew to think about the best way to cut the slits in for the volume markings. I took a die grinder and made even cuts at every Sharpie mark. I then sanded the whole pipe including deburring all the cuts. I then wet sanded the pipe to polish it a little. Next, I slid it down over the poly tubing and admired the work.

I will make another one in a little while and refine the look a little more. A few modifications I may make would be using a hacksaw to make the volume marks so they are more precise and neater looking. Also, I would make the 1/2-gallon (1.9-L) cuts shorter than the full gallon (3.8 L) cuts to be able to distinguish them easier. I've also thought about seeing if I can etch the copper using salt water and a 9V battery to etch numbers at every full gallon mark in the pipe. I also plan on adding a thermometer to the end of the stainless tee as well.

All in all it was a good project, definitely serves a purpose, and will be better with version 1.2!

SPARGE RING SYSTEM UPGRADE

**PRESTON & BRENTON
ANDREINI
FILLMORE, CALIFORNIA**



In our attempt to improve our homebrewery we have recently been focused on improving efficiency and hitting our target gravities more consistently. There are several parts to this equation such as your mill setting, accurate mash temperatures, and pH, but after getting all of those items handled we were left with the even distribution of water/wort over the entire grain bed to wash away all the soluble sugar.

We found a simple yet effective solution at our local hardware store. A stainless steel fire ring commonly used for outdoor fire pits. It was the perfect shape, had an inner and outer ring for great coverage, and was made out of stainless steel for easy cleaning.

To attach this ring we welded it to the kettle lid. The sparge ring conveniently had a 1/2-in. NPT threaded opening. We threaded a 90-degree elbow to a barbed fitting onto the ring for the hose attachment. Our system utilizes a Blichmann Sparge Arm to regulate flow, but a stainless steel ball valve can also be used to regulate the flow.

After several brews we found we had far less channeling occurring and a much more evenly packed mash bed. Our efficiencies came up slightly and are more consistent. We did drill out and enlarge the holes slightly to avoid any clogging up of the sparge ring. If you aren't using a 3-vessel system it also helps to circulate the mash prior to hooking up so the mash bed can filter out some of the larger pieces.

HOMEBREWERY TAP SIGNS

MARK OSBOURNE • ARNOLD'S COVE, NEWFOUNDLAND



I'm sure I'm not alone out there when I say that what started out as a simple idea to make some cheap drinkable beer quickly turned into a hobby intended on making good-quality homebrewed beer, and that then became an obsession with making the highest-quality beer. The simple beginnings of pots and pans on the kitchen stove, then propane burners and Igloo coolers in the garage, to what has now become PID controllers, pH meters, and microscopes in my homebrewery.

The science behind creating beer is quite complex, with an almost endless number of variables contributing to the final product. Temperature control, wort pH, and yeast pitching rates and viability are all crucial elements that are made easier to control with more advanced equipment. However, as important as science is in brewing I believe that the art is equally important. "Craft" beer was born out of this artisanal spirit and creative genius. All you have to do is walk into any craft brewery and look at the brightly painted tap signs for an imperial hefeweizen aged on tequila and chipotles to see evidence of that.

As homebrewers, we have the freedom of endless creativity. In fact, I spend as much time dreaming up names and creating labels for beer as I do with the science part. A fun little "upgrade" that you can add to your homebrewery if you keg your homebrews is tap signs. My design is pretty simple; basically all you need is a few pieces of board, a couple small eyehooks and J-hooks for each sign, and some chalkboard paint. I used pre-primed flat profile 1x3 MDF molding because it was already primed and the chalkboard paint would adhere well to it and make a good writing surface. You can cut your boards to whatever dimensions suit your area, give them a couple of coats of chalkboard paint (spray paint works really well), put an eye hook on each end of the top of the board, and a J-hook on the bottom of each end and you're done! You can stack as many of these as you like. I find chalk markers work really well on the boards as they allow for cleaner lines on the artwork and they are a lot less messy and wipe off well with just water.

You can now get creative with your beer names and artwork — the only limit is your own imagination!



SIMPLISTIC MOTORIZED GRAIN MILL ED ELLIOTT • MOUNTAIN TOP, PENNSYLVANIA



I have been brewing all-grain for about 10 years and, as I get older, I find it more tedious and cumbersome to mill grain with my hand drill. Squatting down in a catcher's stance and hunching over for 5–10 minutes to mill the grain just wasn't as exciting as it used to be. I had seen other homebrewers (and professionals) motorize their grain mills utilizing a 120v motor, pulley, and belt. While they work great, it just seemed like a lot of work to get the milling speed correct. Plus, guarding the pulley and belt to make it safe seemed like a hassle. I thought, "What if I could use the same drill I had been using to mill my grain, just wired to a dimmer switch?" I went to work designing, measuring, and ultimately building my milling station out of scraps I had around the house from previous projects.

I cut the cord from the drill in half and wired it to a household dimmer switch, which is then wired to the plug that goes in the wall outlet. The dimmer switch is great for controlling the speed of the mill. I mounted the mill itself on a hinged plate, which allows me to tip the mill forward and clean the grain dust out of the chute. I made the chute from some duct work that I picked up at the local hardware store (the only things that I purchased for the build). The chute funnels the crushed grain into an HDPE 15-gallon (57-L) tote. Finally, the entire station is mounted on swivel wheels, so it is easy to move around on brew day.

I am very happy with the way this project worked out. Future plans are to stain and polyurethane all of the wood, as well as build a larger hopper.

SIMPLE BUT EFFECTIVE PUMP SWITCH ADAM DANIELS • WINFIELD, INDIANA



I was reading a homebrew pump article on *BYO's* website (<https://byo.com/project/build-a-better-homebrew-pump/>) where a foot-switch is used to turn the pump on and off (the footswitch is a great idea!). But I have found that a simple power strip with its built-in switch is a simple and effective alternative. I hang the power strip off of a drawer so it stays up high to avoid spills. Plus, it's easier to turn the pump on and off when it's up closer to eye level.

BREWHAUS UPGRADE

JACOB BURNHAM • BREMERTON, WASHINGTON



While growth is a complicated topic that eventually rears its ugly head in the commercial brewing world, homebrewers not only have a choice whether or not to expand their hobby, but can do so for a relatively cheap price. Everybody has their own story of their homebrewery evolution, and for me that path started on the stovetop at my college apartment. I progressed to a living space on the second level of my landlord's house, where I performed the boil in the back yard below (and carried boiling wort up the stairs to my sink to use my immersion chiller).



I finally bought a house and, after two years of making do in the garage, I graduated and bought myself a Brewshed. With no room in the house, I had to get creative so I claimed a corner of the back yard, dug out the existing tree (which you can see in the "before" picture at the bottom of this page), and bought a 12 ft. x 8 ft. (3.7 m x 2.4 m) Yardline Shed. Similar type sheds can be found on display in the parking lots of Home Depot, Lowes, and other home improvement stores. These sheds are spacious, have overhead storage, and a variety of package options (painting and caulking are up to you).



Now with a dedicated brew space, the next thing I needed to figure out was getting power to it. I dug a trench from outside of my house breaker panel and down to the shed, where I installed a separate small breaker panel and wired up some electrical outlets and lighting. It only took 1 boil session in the dirt outside the shed to know that I couldn't wait any longer for the final piece: A deck (which I also constructed to 12 ft. x 8 ft./ 3.7 m x 2.4 m).

Inside of the shed I've added storage shelves, a conditioning mini fridge, beer fridge, work table, my motorized grain mill, and a receiver/speakers. The shed can also accommodate my brewstand and still have plenty of room to work.

STAINLESS STEEL HOP SPIDER JUSTIN KING • HURON, OHIO

I came upon an article on BYO's website for building a hop spider (<https://byo.com/project/build-a-hop-spider-projects>) while I was researching an issue with excessive trub and hop material after the boil and transferring to primary. I tried whirlpooling and a shorter pick-up tube to limit some of these issues. However, if I was brewing a large IPA or DIPA, hop additions can only be coned in a whirlpool so high. I noticed the PVC flange that was used in the article looked warped on the sides and it made me wonder if there was a better way. I wasn't sure if the warping was caused from drilling the PVC flange or if it was from the heat of the boil. Also, PVC is rated to 140 °F (60 °C) and the steam from a boil could top that. So I started researching alternatives.

After recently installing a new garbage disposal, I decided the best alternative would be a stainless steel garbage disposal flange. It would be durable and easy to clean. I found one online for about \$13, 3/8-in. x 10-in. stainless steel, carriage bolts at the local hardware store for \$6, and I already had hex nuts around the house. The length of the



carriage bolt depends mainly on how large of a boil kettle you are using. In addition, a hose clamp large enough for the exterior of the flange and your choice of hop bags (I use a nylon paint bag) are needed.

KETTLE SOURING KEG

MICK SPENCER • MECHANICSBURG, PENNSYLVANIA




Many homebrewers who make Berliner weisse and other “lactic acid” sour beers sour the wort in their brew kettles prior to boiling and subsequent clean yeast fermentation. While this works, it has two disadvantages. First,

it's difficult to exclude oxygen, which can result in undesirable bacteria or wild yeast growing along with the *Lactobacillus* bacteria pitched. Second, with most brew kettles it's difficult to maintain a desired temperature for the *Lactobacillus* to work, e.g. 95 °F (35 °C) for *Lactobacillus plantarum* or 115 °F (46 °C) for other *Lactobacillus* species. This can adversely affect both the time required for souring and the purity of the culture.

With these challenges in mind, I decided to dedicate a Cornelius-type keg for use as a souring “kettle.” The oxygen exclusion challenge is easily solved by purging the wort-filled keg with CO₂, the same way a keg of finished beer can be purged. The temperature control challenge is solved by wrapping the keg with one or two “ferm-wrap” type heating elements and controlling them with one of the many fermentation temperature control units available. And to ensure a good temperature reading for the controller, I converted the keg's liquid dip tube into a thermowell by

having my friend, Dave Naugle, cut off about half of its length and solder a stainless steel slug (about 1/4-in. diameter) into the end. The converted dip tube is installed as normal (including its O-ring), but the liquid side post is then mounted without its poppet, leaving the thermowell open for the controller's probe and wire to come through the top of the post and down to the bottom of the thermowell. With pure *Lactobacillus* souring there's usually no need to relieve any pressure (thus no airlock), but a pressure gauge can be used on the gas post to monitor internal pressure if desired. If unwanted pressure does build for any reason, the keg can be manually “burped” via the pressure relief valve in its lid.

Lastly, to keep the heat wrap(s) from having to work too hard, I built a “Lacto Lounge” out of styrofoam sheeting and construction adhesive. The result is a styrofoam box that can be placed over the whole thing to hold in some of the heat, like a mini-fermentation chamber. 

BYO NANO BC CON

Vancouver, Washington
November 1 & 2, 2019

BIG IDEAS FOR SMALL-SCALE CRAFT BREWING

**Sales & Marketing • Brewing Operations
Start-Ups • Business Operations**

**Save \$200 when you register by August 5 — space
is limited for this conference so don't wait to lock in
your spot and also save!**

**Join Nano Breweries (and Nanos in planning) in the
Portland, Oregon area for two days packed with over
30 seminars, workshops, and events geared just for
you — the small-scale commercial brewery working
on systems under 5 barrels.**

Byo.com/NanoCon

Brought to you by

Brew THE HOW-TO HOMEBREW BEER MAGAZINE
YOUR OWN

HIGHLIGHTS



Vancouver, Washington • November 1 & 2, 2019

The Nano segment of craft brewing is growing fast with the majority of new breweries opening up falling into this small-scale, hyper-local segment working on brewing systems 5 barrels or under. But often this Nano niche can't relate to current educational events for the pro brewing industry because their scale of brewing and distribution models are so different from larger brewery companies.

Now's there's a conference just for you: The small-scale craft brewery. Learn the business, marketing, and brewing strategies targeted for your sized needs. From strategies to maximizing taproom sales to more accurately forecasting future ingredient purchases you'll learn over two days from experts and fellow Nano colleagues about actionable ways to improve – or launch – your brewery with ideas targeted just for your small-scale size and business direction.



30 BIG SEMINARS

Expert speakers will cover topics on brewing operations, sales and marketing, business operations, start-up and lots more all geared to Nano Breweries!

ROUNDTABLE DISCUSSIONS

Peer-to-peer learning bringing full audience discussions on a variety of subjects so you can learn what is working – and what isn't – from others working in the Nano Craft Beer segment.

TWO LUNCHES WITH KEYNOTE ADDRESSES

Learn during lunch with panel discussions on current Nano trends as well as expert tips for success on both the business and brewing side.

NANO-FOCUSED VENDORS

Check out the latest in equipment, supplies, and ingredients from leading companies focused on your Nano market and your specific scale and needs.

OPENING & CLOSING PACIFIC NORTHWEST BEER RECEPTIONS

Wrap up your full day of learning with sampling some of the Portland, Oregon region's finest craft beers served by the breweries on the trade show floor.

OPTIONAL 2-DAY PRE-CONFERENCE START-UP BOOT CAMP

Spend two full days leading into NanoCon learning from Steve Parkes, Lead Instructor and Owner of the American Brewers Guild, about the keys to starting up a new craft brewery both on the business side as well as the brewery side. This popular class has regularly sold out at past events.

OPTIONAL 1-DAY PRE-CONFERENCE BOOT CAMPS

Spend an immersive full-day workshop just before NanoCon starts exploring several key topics: Dr. Chris White on Yeast Management for Nanos, Audra Gaiziunas on Brewery Financials, and Ashton Lewis on Hands-On Nano Brewing Science.

OPTIONAL PRE- AND POST-CONFERENCE PORTLAND-AREA BREWERY TOURS

Here's your chance to easily check out the Portland area's famed craft beer scene. We'll offer different tours on both the day before and the day after NanoCon. One trip will head across the river to explore breweries in Portland while the second tour will stay on the Washington side to visit local craft breweries.

NANO LEARNING TRACKS



BREWERY OPERATIONS

- Reliable Yeast Propagation Techniques
- 10 Mistakes Pro Brewers Make Impacting Beer Quality
- Brewing with Unmalted Adjuncts: From Flaked Oats to Coffee and Beyond
- Dry Yeast Techniques for Nanos
- New (and Classic) Pro Hopping Techniques
- Taproom Draft System Operations & Troubleshooting
- Do's and Don'ts of Mobile Canning & Bottling
- Nano Peer-to-Peer Table Topics

SALES & MARKETING

- Latest Email Strategies to Boost Your Business
- Brewery Branding Through Taproom Events
- Creating a Customer-Centric Nano Business
- Social Media Best Practices for Breweries
- Great Event Ideas to Pack your Taproom
- Leveraging Local Tourism to Boost your Brewery Business
- Training your Taproom Staff
- Nano Peer-to-Peer Table Topics

BUSINESS OPERATIONS

- Planning for Brewery Expansion
- Brewery-Specific Cash Flow Strategies
- 10 Insurance Mistakes Made By Small Breweries
- Your Biggest Legal Risks as a Brewery
- Roadmap to Better Brewery Financial Projections
- You're Never Too Small for Human Resources
- Understanding Taproom-Specific Accounting
- Nano Peer-to-Peer Table Topics

START-UPS

- Keys to a Strong Nano Brewery Business Plan
- 10 Legal Steps to Take Before You Open Your Doors
- Nano Case Study: One Brewery's Journey from Idea to Reality
- Brewery Insurance 101: Protection from Conception to Operation
- 1 Barrel, 5 Barrel, or More? Determining System Size
- Branding Strategies for Start-Up Nanos
- Keys to a Successful Brewery Website
- Nano Peer-to-Peer Table Topics



PRE-CONFERENCE NANO BOOT CAMPS

- Starting Up a Commercial Brewery (2-day class, Oct. 30 & 31)
- Hands-On Nano Brewing Science (1-day class, Oct. 30)
- Yeast Handling for Nano Brewers (1-day class, Oct. 31)
- Brewery Financials (1-day class, Oct. 31)

PRE- AND POST-CONFERENCE CRAFT BREWERY TOURS

- Portland, Oregon Breweries
- Washington State Breweries

RELIABLE YEAST PROPAGATION TECHNIQUES BREWERY OPERATIONS

Knowing how to properly and reliably step up the amount of yeast you need to pitch is a key skill for any professional brewer. And getting your fermentation off to a strong start with the right amount of healthy yeast is key to great beer. Take the guesswork out of this critical step by learning the correct techniques to propagate yeast in your brewery from one of the top experts in brewing yeast, Dr. Chris White, Founder and President of White Labs.

DR. CHRIS WHITE - PRESIDENT, WHITE LABS, INC.

BREWERY-SPECIFIC CASH FLOW STRATEGIES BUSINESS OPERATIONS

Having a healthy cash flow is vitally important to any small brewing business (and helps owners sleep better at night!) As a business there are steps you can take to improve your cash flow to meet your spending needs. And as a brewery business there are industry-specific ways you can maximize cash flow with strategies that use the unique aspects of running a brewery to your advantage. Learn these specialized techniques to boost the amount of cash you have on hand with brewery financial expert Audra Gaiziunas. Who knows, you might even sleep better as a result too!

AUDRA GAIZIUNAS - OWNER, BREWED FOR HER LEDGER, LLC

BRANDING STRATEGIES FOR START-UP NANOS START-UPS

Branding is essentially telling a story about your brewery. But with a start-up brewery you have an empty page of paper. Where do you start? How do you prioritize what you need to do with branding before you even pour a drop of beer? And how do you identify and then translate that story into a marketable package? Brewery branding consultant Ryan Wheaton is luckily here to help you make sure your first steps with figuring out your new brewery's branding strategies are the right ones and will offer a roadmap for future branding success.

RYAN WHEATON - FOUNDER, CRAFT BREW CREATIVE

LATEST EMAIL STRATEGIES TO BUILD YOUR NANO SALES & MARKETING

Strategic email use can be a cost-effective way to boost beer sales, brand awareness, customer loyalty, special event attendance, and overall business in the taproom. But the key word is strategic – how much do you send, when do you send, and how do you even best build an email list? In this session you'll learn the latest email strategies other breweries are using to effectively build their sales and business from Alex Standiford, who consults and manages email programs for several small craft breweries.

ALEX STANDIFORD - DIRECTOR, FILLYOURTAPROOM.COM

DAY 1 • FRIDAY, NOVEMBER 1, 2019 | 9:30 – 10:30AM





10:30 – 11:00AM

COFFEE BREAK & EXHIBITS

NANO EXHIBITS

Grab a coffee and check out the latest in Nano-sized equipment, gear, ingredients, and supplies from dozens of craft brewing's top vendors.



11:00AM – 12:00PM

PLANNING YOUR BREWERY EXPANSION BUSINESS OPERATIONS

Congrats! Your Nano Brewery is doing well. You've got customers buying your beer, your taproom is humming along, and you are maxing out the amount of beer your system and fermenters can handle. So you are starting to think about expanding your brewery, but where do you start? How big are you going to go and what are the different key brewery and business aspects to consider? Learn how to plan your brewery expansion in a thoughtful and strategic way to avoid future headaches and surprises with Deborah Wood of Brewers Supply Group who has helped numerous craft breweries in Canada grow and expand their beer volumes and revenues.

DEBORAH WOOD - BSG CANADA

SOCIAL MEDIA BEST PRACTICES FOR BREWERIES SALES & MARKETING

Anyone can use social media, but how to use it strategically as a brewery business is another story. From Facebook to Instagram to Twitter, there are plenty of opportunities to build your Nano business and create a more loyal community of potential customers. Learn how to make the most of your social media efforts whether it is to build your brand's personality, drive traffic to brewery events, fill up the seats in your taproom, or reinforce your customer's connection to your brewery. Speaker Melissa Fears works at the intersection of craft beer and social media overseeing the social media program for Hopworks Urban Brewery with locations both in Portland, Oregon and Vancouver, Washington. She will walk you through the keys to use your social media effectively as a brewery business.

MELISSA FEARS - BRAND MANAGER, HOPWORKS URBAN BREWERY

BREWERY INSURANCE 101: PROTECTION FROM CONCEPTION TO OPERATION START-UPS

Starting up a brewery can feel like a big risk, but that doesn't mean you can't take steps to manage and protect your new business from unnecessary exposure. And the brewing industry comes with a whole set of specific insurance demands you need to know about before you ever even mash in your first batch of beer. Robin Campbell of CedarBrew Insurance will walk you through the commercial brewery insurance landscape so you better understand what coverage you need to consider both in planning and in year one of operation.

ROBIN CAMPBELL - RISK MANAGER, CEDARBREW INSURANCE

10 MISTAKES PRO BREWERS MAKE IMPACTING QUALITY BREWERY OPERATIONS

Steve Parkes trains new commercial brewers for a living and over his decades of experience as one of the leaders in brewing education in North America he's seen it all. Now find out what are his top ten mistakes he sees fellow pro brewers regularly make that impacts beer quality. You'll walk away with an actionable list of ideas you can put to use in your brewery to make better beer. Get ready to learn how to avoid mistakes you may have never realized you were making – all in the name of better beer!

STEVE PARKES
BREWMASTER & OWNER, DROP-IN BREWING COMPANY
OWNER & LEAD INSTRUCTOR, AMERICAN BREWERS GUILD



LUNCH & NANO TRENDS ROUNDTABLE

GROUP SESSION

NANO EXHIBITS

Listen and learn after you enjoy lunch as a range of craft beer industry veterans discuss trends specific to the Nano segment from both the business as well as beer side. Nano exhibitors will also be available over lunch to visit.

12:00 – 1:45PM



EVENT IDEAS TO PACK YOUR TAPROOM ROUNDTABLE

SALES & MARKETING

Find out from your fellow Nano Breweries what's working in terms of hosting special events at your tasting room and what hasn't. From themed parties to special releases to different competitions, Nano Breweries have gotten very creative coming up with new ways to bring old and new customers in their doors. We'll have a panel as well as open up discussions for the entire room so everyone can learn new ideas from each other.

2:00 – 3:00PM



KEYS TO A STRONG NANO BREWERY BUSINESS PLAN

START-UPS

There are plenty of templates out there for creating a business plan. But the brewing business has its own specific needs and specialized considerations to keep in mind when you want to convert your dreams into a potential brewery launch. Luckily we have Audra Gaiziunas who helps craft breweries-in-planning write better business plans that will help your new brewery move off the drawing board and more successfully into business.

AUDRA GAIZIUNAS - OWNER, BREWED FOR HER LEDGER, LLC

YOUR BIGGEST LEGAL RISKS AS A BREWERY

BUSINESS OPERATIONS

Are you opening up your brewery business to legal risks without even realizing it? Join craft brewery lawyer Matthew McLaughlin to go over the biggest potential areas of exposure you face running a brewery. The brewing business is unique and one filled with specialized legal concerns as a result of alcohol production and intellectual property. Be prepared to be surprised about possible legal problems that could harm your business and get in the way of your mission of making great beer at your Nano Brewery.

MATTHEW MCLAUGHLIN - FOUNDER, MCLAUGHLIN, PC

BREWING WITH UNMALTED ADJUNCTS: FROM FLAKED OATS TO COFFEE & BEYOND

BREWERY OPERATIONS

Barley malt. Hops. Water. Yeast . . . and gummy bears, coffee, flaked oats, and so much more. Brewing commercial beers with ingredients outside the traditional big four is more popular than ever before and a big driver to customer interest and sales in your taproom. But how do you best tackle these unmalted adjuncts in your brewery since most equipment set-ups are designed for more traditional brewing ingredients? Pro brewer Ashton Lewis is here to help you get creative with your brewing recipes while getting the most out of them and making the best beers you can. He'll walk you through techniques and best practices to use unmalted adjuncts in your Nano Brewery.

ASHTON LEWIS

BREWMASTER & CO-OWNER, SPRINGFIELD BREWING COMPANY
SALES REPRESENTATIVE, BSG CRAFT BREWING
TECHNICAL EDITOR, BREW YOUR OWN





3:00 – 3:45PM

PACIFIC NORTHWEST NANO BEER BREAK & EXHIBITS

NANO EXHIBITS

Sample some local Nano craft beer from the Portland-Vancouver area as you check out the latest in Nano-sized equipment, gear, ingredients, and supplies from dozens of craft brewing's top vendors.



4:00 – 5:00PM

ROADMAP TO BETTER BREWERY FINANCIAL PROJECTIONS

BUSINESS OPERATIONS

Let's face it, if your business projections and forecasted budgets are not as accurate as they should be they won't do you or your brewery much good. Building your financial projections on a firm foundation will help you better anticipate the future money needs of your company and help you run it more strategically. The brewery business is highly specialized with unique accounting needs for this industry. CPA Maria Pearman focuses on the craft brewing segment and she will help you understand how to create more accurate projections for your Nano Brewery and give you a clear roadmap of what you should know and include in your forecasts.

MARIA PEARMAN - PRESIDENT, RADIX ACCOUNTING

NANO CASE STUDY: ONE BREWERY'S JOURNEY FROM IDEA TO REALITY

START-UPS

During the early start-up and planning phase of your journey to opening up a Nano Brewery, it is valuable to hear from somebody else who just walked that same path ahead of you. Mike Wenzel took his idea of opening a small-scale commercial brewery in upstate New York and turned it into a reality. Find out about the lessons he learned along the way, from what he got right and wrong in the planning stages to the current realities of the business side of making and selling his beer commercially. You'll be better prepared for your own journey to launching a brewery after you hear and learn from this Nano brewer who wants to share his very relevant experiences with you.

MIKE WENZEL - CO-OWNER & BREWER, HELDERBERG MOUNTAIN BREWING CO.



MOBILE PACKAGING DO'S & DON'TS

BREWERY OPERATIONS

With space and cash flow at a premium for many in the Nano niche of craft beer, the option of mobile canning and bottling lines opens up new sales channel possibilities without the required investment and upkeep with on-site equipment. Learn more about how to make the most of using a mobile packaging company so you can better take advantage of the flexibility these can provide you as a brewer and as a business.

OWEN LINGLEY - OWNER, CRAFT CANNING & BOTTLING

BREWERY BRANDING THROUGH TAPROOM EVENTS

SALES & MARKETING

Events in your taproom are a great way to bring old and new customers into your business to buy more of your beer. But events can also do much more than a one-time sales boost on a given day. Events can be a valuable tool in building and reaffirming your brewery's branding with customers (and even potential customers who don't attend the event but hear about it elsewhere.) Learn about the ways you can use your taproom events to not only drive sales, but also drive branding for your brewery as your story gets more defined in the public's eye. Ryan Wheaton, a brewery branding consultant, will walk you through how to incorporate branding into your taproom events that will help you long-term.

RYAN WHEATON - FOUNDER, CRAFT BREW CREATIVE



PACIFIC NORTHWEST CRAFT BEER OPENING RECEPTION

NANO EXHIBITS

We've invited some of our favorite Portland-Vancouver area craft breweries to join us to pour samples of their beer for you as a fun way to wrap up your first full day of NanoCon. You'll have the chance to talk with attendees, brewers, and visit with our exhibitors before you head out on the town to check out the incredible local brewery and taproom scene in the Vancouver-Portland area for the evening.

10 LEGAL STEPS TO TAKE BEFORE OPENING YOUR BREWERY

START-UPS

One of the biggest blind spots and areas of concern for new breweries starting up is getting a grasp on all the legal paperwork required for both a small business and especially a small business producing and selling alcohol. Federal, state, and local permits and licenses need to be completed as well as a host of other legal considerations as you get ready to open your doors. We're lucky to have Matthew McLaughlin, an attorney with years of experience helping start-up craft breweries, lead this seminar so you can better understand some of the most important checklist items on the legal side of your business well before you ever pour your first pint.

MATTHEW MCLAUGHLIN - FOUNDER, MCLAUGHLIN, PC

DRY YEAST TECHNIQUES FOR NANOS

BREWERY OPERATIONS

One option many Nano Breweries are looking at increasingly in their ingredient selection is dry yeast. Dry yeast has come a long way since the days of old, not-so-viable dusty packets found under the lid of a malt extract can during your earliest homebrewing days. More strains are being released and the quality has improved dramatically. Nano Brewers have taken notice while also attracted to the ease of storage and shelflife in their small breweries. But since dry yeast has been out of the mindset of many commercial brewers for the last few decades, what are the best practices to using yeast in a dry format? How do you make sure dry yeast results in the kind of fermentations you want with the end qualities in the beer you serve? José Pizarro from Fermentis will help bring you up to speed on the new world of dry yeast and how best to use it in your brewery.

JOSÉ PIZARRO - NORTH AMERICAN REPRESENTATIVE, FERMENTIS

LEVERAGING LOCAL TOURISM TO BRING IN MORE CUSTOMERS

SALES & MARKETING

You are doing your best to get the word out in a variety of ways about your craft brewery. But why not piggyback your efforts along with your town or region's own tourism marketing efforts? Craft beer remains a hot draw for visitors wanting to check out local spots of interest. And local visitors' bureaus know this fact and most likely would love to feature your business in their promotions. Learn how teaming up with everyone from city beer tourism operators to your local tourism office can bring more customers in your door to buy your beer and how you can take advantage of this team dynamic to raise awareness for your brewery.

MICHELLE MCKENZIE - VISIT VANCOUVER USA

UNDERSTANDING TAPROOM-SPECIFIC ACCOUNTING

BUSINESS OPERATIONS

The accounting behind making your beer and selling your beer in your taproom needs to have different rules applied if you want to run your business more strategically. Learn what the key accounting and financial guidelines should be for your taproom so you can understand your numbers more accurately to be in a better position to forecast your future and make key decisions. Learn what you need to know about the numbers-side of your important taproom-side of your business from CPA Maria Pearman, who specializes in working with craft breweries.

MARIA PEARMAN - PRESIDENT, RADIX ACCOUNTING

5:00 -
6:30PM

DAY 2 • SATURDAY, NOVEMBER 2, 2019 | 9:30 - 10:30AM





10:30 – 11:00AM

NANO EXHIBITS & COFFEE BREAK

NANO EXHIBITS

Refuel with a cup of coffee and check out the latest in Nano-sized equipment, gear, ingredients, and supplies from dozens of craft brewing's top vendors.



11:00AM – 12:00PM

NANO TABLE TALKS GROUP SESSION

Peer to peer learning from your fellow Nano industry people at its best. We'll have dozens of tables each assigned a different topic of interest to Nano Breweries spanning brewing, sales, business, and start-ups. For 30 minutes you will trade advice and tips with the other people at your table on that specific topic. Then you'll switch tables to another subject of interest to you. So you'll have the chance to gain knowledge on two different specific subjects you want to explore (and maybe make some new friends and contacts along the way!)

12:15 – 1:45PM

LUNCH & NANO IDEA-O-RAMA ROUNDTABLE

GROUP SESSION

NANO EXHIBITS

Get ready to listen in as specialized craft beer experts each share their top favorite five ideas in a rapid-fire discussion after you wrap up lunch. Nano exhibits will also be open for you to explore during the lunch session.



2:00 – 3:00PM

NEW (& CLASSIC) PRO HOPPING TECHNIQUES

BREWERY OPERATIONS

The last few years have seen a change in how professional brewers look at hopping schedules and techniques with a shift towards late hopping. But there are still hopping techniques that have stood the test of time that also need to be considered as you pull together your next recipe. Pro brewer Ashton Lewis will cover both the new wave of hopping techniques as well as hit the classic hopping techniques you need to know as well. He'll cover both the hows and whys of the techniques so you can better understand when you make your hopping decisions.

ASHTON LEWIS
BREWMASTER & CO-OWNER, SPRINGFIELD BREWING COMPANY
SALES REPRESENTATIVE, BSG CRAFT BREWING
TECHNICAL EDITOR, BREW YOUR OWN



YOU'RE NEVER TOO SMALL FOR HUMAN RESOURCES

BUSINESS OPERATIONS

Yes, you are a small business. Maybe you are even the only employee or have one or two others to help you out with the brewing and selling your beer. But that doesn't mean you shouldn't follow some basic guidelines when it comes to human resources. Having procedures in place will help you navigate any potential trouble spots that can pop up and cause you much more than just headaches. Nano Brewery owner and Human Resources consultant Sean Lopolito will help you understand what you should minimally have in place for your brewery business from a human resources standpoint to protect yourself and your business. It might not be as fun as brewing beer, but in many ways it is just as important.

SEAN LOPOLITO
OWNER, LOPS BREWING
PRESIDENT, PINEHURST CONSULTING GROUP

CREATING A CUSTOMER-CENTRIC NANO BUSINESS

SALES & MARKETING

The old saying is “The customer is always first.” But what exactly does that mean and how do you implement a customer-centric business? And what are the actual benefits of being customer-centric as you hand a pint of beer to a patron across the bar in your taproom? Get the answers to these questions and how being customer-centric can positively impact your bottom line with Audra Gaiziunas who works with craft breweries on the financial side of their businesses. She is all about hard numbers so you’ll leave knowing more about the financial upsides of being customer focused.

AUDRA GAIZIUNAS - OWNER, BREWED FOR HER LEDGER, LLC

I-BARREL, 5-BARREL, OR MORE? DETERMINING SYSTEM SIZE

START-UPS

How big or small a brewing system do you want to have in place at your planned brewery? That’s a pretty big question to answer and there are lots of factors to consider. How much beer do you want to produce? How much beer do you think you can sell? How often do you want to be brewing each week? Are there space limitations for your brewhouse? Walk through these questions and many more with John Blichmann who helps craft breweries figure all this out as a producer of small-scale brewing systems. During his years of selling small-scale systems John has heard all the questions and is the perfect person to help you on the path of deciding how big or small a system you should have in place on day one.

JOHN BLICHMANN - PRESIDENT, BLICHMANN ENGINEERING

PACIFIC NORTHWEST NANO BEER BREAK & EXHIBITS

NANO EXHIBITS

We’ve invited a new group of local Nano Breweries from around Portland and Vancouver to pour samples and visit with as you check out the latest in Nano-sized equipment, gear, ingredients, and supplies from dozens of craft brewing’s top vendors.

TRAINING YOUR TAPROOM STAFF

SALES & MARKETING

Your taproom staff is the frontline of interacting with your end customers. They can easily help or hurt beer sales based on how well they interact with visitors. And ultimately they are a reflection of your brewery and will influence the enjoyment of your beer being served. Learn the best practices for training your taproom staff and how to make them more knowledgeable about your brewery’s beers they are being asked to sell to customers. A server or bartender more knowledgeable about your beer will translate to a better customer experience, which then translates to more sales. Learn how to make sure your staff maximizes the opportunity to turn a first-time visitor into a longtime customer with the right training about your beer.

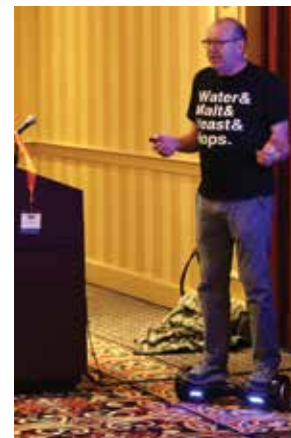
TAPROOM DRAFT SYSTEM OPERATIONS & MAINTENANCE

BREWERY OPERATIONS

You work hard to produce great beer in the brewery. Shouldn’t you work just as hard to make sure that beer makes it from keg to glass in great shape? Cleaning draft lines and making sure your draft system is operating properly should be a priority when running a taproom. Learn the right cleaning techniques, how often to clean, and what other regular maintenance you should be doing so your draft system does the beer you brewed justice. Nick Klein, who works in the Portland, Oregon area working with draft systems, will teach you what you need to know so you can better take care of your draft beer back home at your brewery.

NICK KLEIN - ACCOUNT MANAGER, NORTHWEST DRAFT TECHNICIANS

2:00 – 3:00PM



3:00 – 3:45PM



4:00 – 5:00PM





4:00 – 5:00PM

KEYS TO A SUCCESSFUL BREWERY WEBSITE

START-UPS

Your website will be your billboard to the outside world for your new brewery. But what website elements need to be included as you design this new brewery website? Website budgets can quickly spiral upward if you aren't strategic about pages you need versus those that won't matter as much. You'll learn these website planning strategies from Alex Standiford who builds websites for breweries and has first-hand knowledge of what works and what doesn't for craft breweries. And ultimately what will drive more business to you and dollars to the bottom line.

ALEX STANDIFORD - DIRECTOR, FILLYOURTAPROOM.COM



10 BREWERY INSURANCE MISTAKES TO AVOID

BUSINESS OPERATIONS

Are you underinsured or even not insured and exposed to risk without realizing it? Craft brewing is a specialized industrial business with plenty of potential problems in addition to all that wonderful beer. Having the right insurance coverage in place, including policies specific for brewing beer, will reduce your exposure to unwanted risk. Robin Campbell will walk you through her top ten list of insurance mistakes you can avoid as a brewing business. You'll learn from other brewery's mistakes and leave with a better understanding of where you stand right now and what insurance moves you might want to consider.

ROBIN CAMPBELL - RISK MANAGER, CEDARBREW INSURANCE



5:00 – 6:30PM

PACIFIC NORTHWEST CRAFT BEER CLOSING RECEPTION

NANO EXHIBITS

We've invited some more of our favorite craft breweries from Vancouver and Portland to join us to pour samples of their beer for you as a fun way to wrap up NanoCon. You'll have this final chance to talk with attendees, speakers, local brewers, and visit with our exhibitors before you head out to check out the Portland-Vancouver area's breweries and craft beer taprooms for Saturday night.





As an attendee, you'll have the opportunity to check out the latest Nano-sized brewing equipment, products, supplies & services from leading craft brewery vendors Friday & Saturday in the Heritage Ballroom.

Thanks to our **BYO NANO CAN** Sponsors!



GREAT CONFERENCE HOTEL IN THE BEERVANA OF PORTLAND-VANCOUVER!

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The 2019 NanoCon is being held at the Vancouver Hilton just across the river from Portland, Oregon. The Portland-Vancouver area is an international leader in the craft beer world with 80+ local breweries to discover. You not only have the chance to learn strategies to be more successful at your own brewery all day at the conference, but we've set up the schedule so you can also explore on your own this incredible local craft beer scene at night.

Vancouver Hilton
301 W. 6th Street
Vancouver, Washington 98660

Telephone Reservations: 360-993-4500

Mention group name "BCI" to receive a special discounted rate.

Web Reservations:

byo.com/nanocon

Group Discounted Room Rate:

\$169 per night for a room with either one king bed or two queen beds.



Hotel Information: We have reserved a limited number of rooms at a special discounted rate for attendees. Contact the hotel directly for your room reservations. When making your reservations make sure to say you are attending the "NanoCon" to receive the special discounted group rate for your room. Rooms are available on a first-come, first-served basis. The special discounted rate will be available until the conference group block of rooms is sold out (which it did last year), so reserve your room right after registering for the conference.

**Please make sure you have already successfully registered for the conference before making your hotel room reservations or any other travel plans.*

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REGISTER BY AUGUST 5 TO SAVE \$200

COME EARLY OR STAY LATE: PRE- AND POST-NANOCON ACTIVITIES



**WEDNESDAY, OCTOBER 30 &
THURSDAY, OCTOBER 31**

STARTING UP YOUR OWN COMMERCIAL BREWERY BOOT CAMP

**10 a.m. – 5 p.m. both days
With Steve Parkes (\$450 for NanoCon attendees, \$525 for non-attendees)**

Over Wednesday & Thursday you'll walk through the steps, planning decisions, and keys you need to know on both the brewing and management side to successfully open a commercial craft brewery with the Lead Instructor and Owner of the American Brewers Guild Steve Parkes, who had trained hundreds of professional brewers. Learn from Steve's decades of expertise and wide range of experience to help you better achieve your goals. Over two full days you'll be guided through all the various elements you'll have to know for the next big step toward starting a craft brewery. This two-day workshop is the perfect lead-in to the main NanoCon event if you already have a brewery in planning or are just starting to consider the possibility of opening one up yourself.

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**WEDNESDAY, OCTOBER 30
HANDS-ON NANO BREWERY SCIENCE**

**10 a.m. – 5 p.m.
With Ashton Lewis (\$225 for NanoCon attendees, \$275 for non-attendees)**

Get hands-on with pH meters, slants and loops, stir plates, centrifuges, and other brewing science gear with professional brewer and *BYO* Technical Editor Ashton Lewis. Ashton will walk you through what your Nano Brewery should have in terms of scientific testing equipment and how to best use this gear to improve quality control over your beer. You'll have the chance to understand how to not only use and care for the equipment properly, but also how to use the results to boost the consistency and quality of your brewery's beer. This workshop will focus only on those pieces of equipment suitable – and affordable – for a small-scale Nano craft brewery.

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**THURSDAY, OCTOBER 31
BREWERY FINANCIALS**

**10 a.m. – 5 p.m.
With Audra Gaiziunas (\$225 for NanoCon attendees, \$275 for non-attendees)**

You'll start the day by gaining an understanding of the importance of finance and accounting in craft beer and learn the top financial mistakes craft breweries make (and how to avoid them). You'll then be introduced to the basics of the brewery

balance sheet, income statement, and cash flow statements to understand how they all tie together for your brewery business. You'll also learn basic ratio analysis to better communicate with bankers and investors. Brewery cost accounting will be covered including beer recipe costing and overhead allocation. Plus during this full-

day workshop budgeting, inventory management, and standard operating procedures you should have in place will be discussed. You'll leave this workshop armed with the tools and confidence to better understand and manage your Nano Brewery's financial needs.

**THURSDAY, OCTOBER 31
BEST YEAST HANDLING PRACTICES FOR THE NANO BREWERY**

**10 a.m. – 5 p.m.
With Dr. Chris White (\$225 for NanoCon attendees, \$275 for non-attendees)**

Join Dr. Chris White of White Labs as he discusses how to master different yeast-related techniques for your Nano Brewery. This full-day workshop will cover culture selection and explore preparing yeast for pitching, what to expect when re-pitching, working with multiple cultures, and how to troubleshoot fermentation issues related to poor yeast-handling practices. Plus you'll learn from Dr. White on the collection and storage of yeast, utilizing yeast for multiple generations, determining proper pitch rates, yeast nutrition, creating ideal fermentation conditions, and fermentation troubleshooting when problems do occur.



**THURSDAY, OCTOBER 31 AND
SUNDAY, NOVEMBER 3
WASHINGTON CRAFT BREWERY TOURS (\$150)**

**Thursday, October 31
5 p.m. – 9 p.m.
Sunday, November 3
11 a.m. – 3 p.m.**

This four-hour tour includes round-trip transportation from our NanoCon hotel, the Vancouver Hilton, while tasting and visiting four different breweries in the greater Vancouver area. Beer and a meal is included as you explore a variety of different craft breweries on the Washington side of the river.



**PORTLAND, OREGON CRAFT
BREWERY TOURS (\$150)**

**Thursday, October 31
11 a.m. – 3 p.m.
5 p.m. – 9 p.m.
Sunday, November 3
11 a.m. – 3 p.m.**

This four-hour tour includes round-trip transportation from our NanoCon hotel, the Vancouver Hilton, while tasting and visiting four different breweries in Portland. Beer and a meal is included as you explore a variety of different craft breweries here in the city referred to as Beervana.



SCHEDULE AT-A-GLANCE



Pre-Conference NanoCon Boot Camps • Wednesday, October 30, 2019

10:00 AM – 5:00 PM	Starting Up a Commercial Craft Brewery Boot Camp (Day 1)
10:00 AM – 5:00 PM	Hands-On Nano Brewing Science Boot Camp

Pre-Conference NanoCon Boot Camps & Brewery Tours • Thursday, October 31, 2019

10:00 AM – 5:00 PM	Starting Up a Commercial Craft Brewery Boot Camp (Continued, Day 2)
10:00 AM – 5:00 PM	Brewery Financials Boot Camp
10:00 AM – 5:00 PM	Yeast Handling for Nano Brewers Boot Camp
11:00 AM – 3:00 PM	Portland Craft Brewery Tour (early session)
5:00 – 9:00 PM	Washington Craft Brewery Tour
5:00 – 9:00 PM	Portland Craft Brewery Tour (late session)

NanoCon Day #1 • Friday, November 1, 2019

8:00 – 9 AM	REGISTRATION			
9:00 – 9:15 AM	WELCOME & INTRODUCTION			
9:30 – 10:30 AM	Branding Strategies for Start-Up Nanos	Reliable Yeast Propagation Techniques	Brewery-Specific Cash Flow Strategies	Latest Email Strategies to Boost Business
10:30 – 11:00 AM	COFFEE BREAK & NANO EXHIBITS			
11:00 – 12:00 PM	10 Mistakes Pro Brewers Make Impacting Quality	Planning Your Brewery Expansion	Social Media Best Practices for Breweries	Brewery Insurance 101: Protection from Conception to Operation
12:15 – 1:45 PM	LUNCH & NANO TRENDS ROUNDTABLE			
2:00 – 3:00 PM	Events Ideas to Pack Your Taproom Roundtable	Your Biggest Legal Risks as a Brewery	Keys to a Strong Nano Brewery Business Plan	Brewing with Unmalted Adjuncts: From Flaked Oats to Coffee and Beyond
3:00 – 3:45 PM	PACIFIC NORTHWEST NANO BEER BREAK & NANO EXHIBITS			
4:00 – 5:00 PM	Roadmap to Better Brewery Financial Projections	Nano Case Study: One Brewery's Journey from Idea to Reality	Mobile Packaging Do's & Don'ts	Brewery Branding through Taproom Events
5:00 – 6:30 PM	PACIFIC NORTHWEST CRAFT BEER OPENING RECEPTION			

NanoCon Day #2 • Saturday, November 2, 2019

9:30 – 10:30 AM	10 Legal Steps to Take Before Opening your Brewery	Dry Yeast Techniques for Nanos	Leveraging Local Tourism to Bring In More Customers	Understanding Taproom-Specific Accounting
10:30 – 11:00 AM	COFFEE BREAK & NANO EXHIBITS			
11:00 AM – 12:00 PM	NANO TABLE TALKS			
12:15 – 1:45 PM	LUNCH & NANO IDEA-O-RAMA ROUNDTABLE			
2:00 – 3:00 PM	New (and Classic) Pro Hopping Techniques	You're Never Too Small for Human Resources	Creating a Customer-Centric Nano Business	1 Barrel, 5 Barrel, or More? Determining System Size
3:00 – 3:45 PM	PACIFIC NORTHWEST NANO BEER BREAK & NANO EXHIBITS			
4:00 – 5:00 PM	Training Your Taproom Staff	Taproom Draft System Operations & Maintenance	Keys to a Successful Brewery Website	10 Brewery Insurance Mistakes to Avoid
5:00 – 6:30 PM	PACIFIC NORTHWEST CRAFT BEER CLOSING RECEPTION			

Post-Conference NanoCon Brewery Tours • Sunday, November 3, 2019

11:00 AM – 3:00 PM	Portland Craft Brewery Tour
11:00 AM – 3:00 PM	Washington Craft Brewery Tour

Name _____
 Address _____
 City _____ State/Province _____
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PRE-NANOCON BREWERY BOOT CAMPS

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- 1-Day Hands-On Nano Brewery Science for NanoCon Attendees (Oct. 30) \$225
- 1-Day Hands-On Nano Brewery Science Boot Camp Only (Oct. 30) \$275
- 1-Day Brewery Financials for NanoCon Attendees (Oct. 31) \$225
- 1-Day Brewery Financials Boot Camp Only (Oct. 31) \$275
- 1-Day Yeast Management for Nano Brewers for NanoCon Attendees (Oct. 31) \$225
- 1-Day Yeast Management for Nano Brewers Boot Camp Only (Oct. 31) \$275

PRE- & POST-NANOCON CRAFT BREWERY TOURS

* Open to attendees and their guests

- Thursday, October 31, 11:00 AM – 3:00 PM Portland-area Breweries \$150
- Thursday, October 31, 5:00 – 9:00 PM Portland-area Breweries \$150
- Thursday, October 31, 5:00 – 9:00 PM Washington Breweries \$150
- Sunday, November 3, 11:00 AM – 3:00 PM Portland-area Breweries \$150
- Sunday, November 3, 11:00 AM – 3:00 PM Washington Breweries \$150

Discounted hotel rooms need to be reserved directly with Vancouver Hilton
 For details: byo.com/nanocon

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 802-362-3981 EXT. 106

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 802-362-2377

» PLEASE NOTE A SEPARATE REGISTRATION FORM IS REQUIRED FOR EACH NANOCON ATTENDEE »

YOUR NANOCON REGISTRATION INCLUDES:

- » Admission to the conference's full two-day schedule of seminars
- » Two Lunches with Roundtable Programs
- » Nano Exhibits Admission
- » NanoCon Welcome Bag
- » One Year (8 issues) Print Subscription/Renewal to *Brew Your Own Magazine*
 (Your discounted hotel room needs to be reserved directly with the Vancouver Hilton,
 go to byo.com/nanocon for more details.)



PAYMENT METHOD

- Check Enclosed (payable to BYO magazine)
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By registering for the conference, I give permission for the free use of my name and photo in any media account of this event. I also certify that I am 21 years of age or older. Cancellation policy: For a refund, less a \$100 administrative charge per person, send written notice by October 1, 2019. Refund requests after October 1, 2019 will not be refunded. All refund requests will be processed post-conference. Early Bird Discount registration must be received and paid for in full by August 5, 2019.

“Fal covers the depth and breadth of brewing Gose, with tips, clever tricks, and tasty anecdotes.”

-Kristen England, Head Brewer, Bent Brewstillery

- Discover Gose’s history and evolution
- Includes detailed brewing techniques

25
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YEAST MECHANICS

Opening the hood to get a better look

It seems there's no way to write about beer and yeast without saying: "Brewers make wort, yeast makes beer." So, there, we've done that bit so now we can take a closer look at how yeast turns our wort into beer and how to get the most out of your yeast. By the way, don't take that to mean we're not serious about yeast's impact on our beer. Don't forget, Drew brews arguably the most yeast-influenced style in existence — saison.

First a disclaimer ... while we're both science-y guys, neither one of us is a microbiologist. So we're going to discuss yeast the way we think of and understand it. We'll be talking about concepts, not hard-core biology. That's the way we like it and that's the way we think most of you like it, too. After all, it's what our ancestors did! (But feel free to tell us how we're wrong!)

BRIEF HISTORY OF YEAST — MAGIC STICKS TO PASTEUR

Yeast is a member of the fungi (fungy) kingdom, which means that strictly speaking it's neither plant nor animal. Technically it's a eukaryotic microorganism, which is a fancy way of saying it's a more structured cell with clearly delineated parts — unlike say bacteria, which tend to have less structured gooey internals. So guess what? You, me, the tree, and yeast — we're all classified the same ... as eukaryotic-based organisms!

While both bread yeast and beer yeast are *Saccharomyces cerevisiae*, there are differences based on historical selection criteria. Bread yeast is suited to producing CO₂ rapidly, while the main purpose of beer yeast is alcohol production (and these days — flavor production). [Side experiment — go and

make a loaf of bread with bread yeast. Put the dough, covered, in the fridge and allow it to proof, aka ferment, overnight. Pull it out, let it finish rising and treat as normal. You'll be rewarded with an amazingly flavorful loaf of bread.]

Keep in mind this doesn't always mean much. Across history, brewers and bakers were usually tied at the hip — some cases culturally (see Egyptian salaries in buckets of beer and loaves of bread), phraselogically speaking in others ("beer is liquid bread"). Bakers often used leftover barm from their brewer cousins before we got into a time and period of differentiation. And in the bad old days of homebrewing — before we had the plethora of yeast choices before us — homebrew recipes usually instructed would-be zymologists to pitch their wort with a fresh package of bread yeast. Yes, you can make beer this way, but it's going to be a better idea to go for a carefully selected beer yeast.

But this is all fairly modern information. The story goes that in the "old days," before even Denny was born, there was a "magic stick" that was passed down through the family brewers/brewsters. No one knew exactly what it did, but they knew that if they wanted to make beer they had to stir the wort with that stick. Supposedly that was because the stick had become loaded with yeast from the previous batches that went into the new batch? True? Apocryphal? The answer has been lost in the mists of time, but it at least makes a darn good story, am I right?

Drew: Ok, actually — not really all that unknown today. We know that

Bread yeast is suited to producing CO₂ rapidly, while the main purpose of beer yeast is alcohol production



Photo by Denny Conn

medieval and later brewers understood that the *kräusen* of a fermenting beer was capable of starting the fermentation process and yielded cleaner beer more quickly. We also can still see remnants of the “magic stick” tradition in the wooden hoops used to store Kveik strains in the Norwegian farmhouse brewing traditions that Lars Garshol has been documenting (garshol.priv.no). Fundamental thing to remember — our predecessors may not have had all the fine details, but they weren’t dumb. They built the foundations of where we’ve gotten to! (But let’s face it — history is “boring” while stories are “fun.”)

Fast-forward to 1680, Antonie van Leeuwenhoek used a microscope to observe globules of beer yeast, but he didn’t

GETTING YOUR YEAST READY TO WORK

If you’re using dried yeast, there’s really not much to do to get it ready. Dried yeast doesn’t need a starter to be ready to work. In fact, a starter with dried yeast actually might be detrimental by depleting the dried yeast nutrient reserves. You want the yeast to consume those in your wort, not in a starter. Some manufacturers recommend rehydrating dried yeast before using it, others don’t. We’ve found that rehydration is seldom necessary. While some studies have shown that you may be slightly reducing viability by not rehydrating, there are so many cells in a pack of dried yeast that a slight reduction in viability probably doesn’t really matter. If you’re making a lager, or a larger and/or high-gravity batch, pitch 2 or even 3 packs of dried yeast.

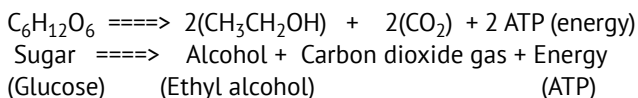
“ If you’re a pitching rate fanatic, this whole idea may seem a bit foreign . . . OK, downright weird to you. ”

understand what they were — cell theory wouldn’t come for another 150-ish years, so he thought these curious little blobs were a byproduct of grain flour.

Jump again to 1857, Louis Pasteur used subsequent discovery to figure out how fermentation worked, how microorganisms move, and what role yeast played in fermentation. He also proved that yeast could function aerobically (with O₂) or anaerobically (without O₂). He basically figured out how to keep your beer, wine, milk, etc. from spoiling — pretty important stuff.

HOW YEAST MAKES BEER

Ever heard somebody say “Yeast eats sugar, farts CO₂, and pees alcohol?” Not exactly the most mouth watering way to think of our beer, but there’s at least a grain of truth there. The semi-technical explanation is that fermentation converts the glucose (and other simple sugars such as fructose and sucrose) found in wort into ethyl alcohol and CO₂, producing energy as well. From the point of view of the yeast, the alcohol, ester, phenols, and CO₂ are byproducts.



Source: <https://www.yobrew.co.uk/fermentation.php>

The basic mechanism is there, it works . . . it really works. Fermentation, in all of its forms, is a critical component to how life keeps rolling on. So with, or without our input, fermentation happens. The key to what we do is shepherding the fermentation along a happy path with flavors we enjoy and low final gravities.

To best achieve this, we need the happiest yeast out there. Much like us, yeast do best if they’re raised right. So let’s dig into what we can do to assist.

Liquid yeast is a whole other matter and generally requires more care. Different brands and packages of yeast contain differing amounts of cells. Some arrive in your hands with enough yeast that you probably won’t need a starter, but the brewer should always read and follow the manufacturer’s recommendations.

For liquid yeast with lower package cell counts, a starter is a good idea. We make starters for any batch of 5.5 gallons (21 L) that has a starting gravity in excess of 1.040. Most yeast companies say that’s overkill — *you can use our yeast without starters!* But remember, they’re working hard to make the brewing process seem easier. We’re working hard to make it simple . . . and successful. Our experience is that it works better for us if we take the extra step.

It took years to get homebrewers to understand the importance of yeast starters. Then we took it too far — a few years ago, it became popular to use a yeast calculator to see how many cells you needed, then use a stir plate to get that cell count. We both did that for quite a while. But then we ran across a revival of an old method that is easier and works at least as well as the calculator/stir plate rigamarole.

It’s called the “Shaken, Not Stirred” method, also referred to as SNS or even the 007 Method. It was espoused by a guy who went by *S. cerevisiae* on the AHA discussion forum and is based on the idea that yeast are like nuclear weapons when it comes to growth. The old saying “close only counts in horseshoes and handgrenades” is a similar concept. Cause when it comes to yeast pitching rates, he argues that growth is so explosive, close is good enough. (You can find the full blog post here: <https://www.experimentalbrew.com/blogs/saccharomyces/yeast-cultures-are-nuclear-weapons>). In short, the theory is that cell count doesn’t matter as much as yeast health.

You begin by boiling up a 1-qt. (1-L) starter wort in the 1.035–1.040 gravity range. Once it’s cooled down, put it into a 1-gallon (4-L) container (Denny uses repurposed apple

juice jugs) and shake it until the container is full of foam. Don't use foam control in your starter wort or you'll never be able to do this! Let it ferment overnight and pitch the whole thing (no decanting) into your wort the next day. That's all there is to it.

Denny has used this method exclusively for the last couple years, for both ales and lagers, with excellent results. The beer starts quickly, ferments happily, and tastes great. His tests have been on 5.5-gal. (21-L) batches of ales of up to 1.075 OG and lagers up to 1.065 OG. For larger batches or higher gravities, he brews a lower gravity or smaller size batch first and harvests the slurry from that for pitching into the larger or higher gravity batches.

Remember, you want your starter container to be 4 times the size of your starter wort so you can fill it with foam by shaking. The yeast will utilize the oxygen absorbed in that foam to synthesize sterols. The yeast cells utilize those sterols to keep cell walls flexible and encourage yeast cell budding. Remember, we're not as concerned here about the number of cells as the health and vitality of those cells. It's gonna go nuclear! Again – it's not the numbers, it's the health. Think a soccer game played with a large number of pizza eating slobbs vs a small squad of fit athletes.

If you're a pitching rate fanatic, this whole idea may seem a bit foreign ... OK, downright weird to you. It's taken Drew a good long while to adjust. We've had it drilled into us that cell count really matters and that a low cell count will make

for a more estery beer. But will it really? Nearly 20 years ago, Denny asked Dr. Clayton Cone of Lallemand about how pitch rate affects beer flavor. The conventional wisdom has always been that lower pitch rates will stress yeast and increase ester production. Dr. Cone's answer blew that away. Here's a summary of what he said ...

"Ester production is related to yeast growth, but not in the way you might think. The key to yeast growth and ester production is acetyl Co-A. It is necessary for both yeast growth and ester production. When it is busy with yeast growth, during the early part of fermentation, it is not available for ester production. Ester production is directly related to biomass production. Everything that increases biomass production (intensive aeration, sufficient amount of unsaturated fatty acids, stirring) decreases ester production. The more biomass is produced the more Co-enzyme A is used and therefore not available for ester production. Anything that inhibits or slows down yeast growth usually causes an increase in ester production: Low nutrient, low O₂, etc."

There was a lot more detail to Dr. Cone's answer (you can read the rest at https://web.archive.org/web/20040203053903/http://consumer.lallemand.com/dan_star-lalvin/fortnightyeast.html#flavors). Go ahead and have a laugh, Denny is misidentified as Todd from Idaho!, but the takeaway is this: If you pitch less yeast and encourage it to grow with appropriate oxygenation and nutrients, you will make a less estery beer, not a more estery beer. In other



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TECHNIQUES

words, science once more thumbs its nose at conventional brewing wisdom.

Don't forget, underpitching is relative. You want to pitch enough yeast, but not too much. Since homebrewers are often told that it's impossible for them to overpitch, this is an important point. So let's look at that next.

SAVING AND REUSING YEAST

In his excellent article cited earlier, Dr. Cone also addresses saving and re-pitching yeast slurry. Many homebrewers, again going on the oft repeated advice that you can't overpitch, use the entire slurry from a batch for their next batch. Dr. Cone recommends using no more than 25% of the slurry, and that fits with our experience. Overpitching a slurry can be detrimental for several reasons. But don't fret on hitting these guidelines precisely. If you accidentally pitch 30% of the cake, your beer won't fail.


Homebrewers have also been fed the idea that you need to wash the yeast. First, unless you acid wash it, what you're actually doing is rinsing it. Second, there's only minimal advantages to doing that (those minor exceptions include removal of colors, certain hop compounds, and trub.) It won't necessarily improve your beer, while on the other hand it's just one more thing you can potentially screw up and contaminate your slurry.

To store slurry for re-pitching, leave a little beer behind when you rack your beer for packaging. Use that bit of beer to swirl up the slurry, then pour it into 3–4 sanitized

containers and keep them in the fridge. Many people use capped beer bottles or Mason jars to do this. If you use glass, keep in mind that the yeast will continue to ferment slowly even in a cold fridge. Denny ended up with glass shards in the wall if his fridge as proof of this! These days, he prefers to use ½-gallon (2-L) plastic tubs that his local homebrew shop uses for liquid malt extract. Not only will they not shatter, the snap on plastic lids will simply bulge if pressure builds up in them. (Seriously, don't tightly seal up a fermenting mass. It's a recipe for grenades!)

WHAT YEAST ATTENUATION RATING IS FOR

A lot of brewers look at the attenuation ratings for a particular yeast and assume that's the attenuation they'll get with it. That's not necessarily the case. The attenuation rating is meant to just be a comparison of the possible attenuation of one strain to another using the same wort. In reality, wort composition has far more effect on attenuation than the rating on the yeast. Depending on the wort makeup and fermentation conditions, you could get anywhere from 60–90% attenuation from the same yeast. If you want to control attenuation, recipe design is probably the easiest and most controllable way to do it.

So, there you have it . . . both sides of the yeast story. We hope you'll try some of our unconventional ideas and see how they work for you. For us, they've resulted in great beer with less effort and more fun. And isn't that why we all homebrew? 



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HOT-SIDE MATH

Geeking out on brewhouse efficiency

Understanding and measuring brewhouse efficiency is a very important skill to the all-grain homebrewer. It is the beginning of understanding consistency. If you can't brew with a consistent process you cannot properly evaluate your recipe changes. Brewhouse efficiency, as we are going to examine it, is the measure of how much of the potential sugars you extract from the malt measured once the boil kettle is full. An important goal is to be able to consistently hit the same efficiency with your brewhouse.

Calculating brewhouse efficiency is relatively simple but there are some inaccuracies that have to be considered if we are going to get a precise number. The numbers we must carefully measure are the weight of all of the grains and adjuncts used, the final volume of the wort collected, and the gravity of the wort collected. Often I see brewers trying to hit a target gravity with little concern to the final volume.

First we need to calculate the potential sugars available in the malts. Many brewers use recipe calculators to perform this task but there is something to be learned by doing this at least once by hand. The ideal specification to have is the coarse grind "as is" extract percentage from the maltster.

Let's take a look at this malt spec and see what it means. Coarse grind is the closest mill setting to a brewer's mill (often 0.7 mm on a slotted roller). The other spec would be fine grind (often 0.2 mm on a slotted roller) and it will always be higher than the coarse grind specification.

It is also important to understand the "as is" vs "dry basis" part of the spec. "As is" includes the moisture in the malt and the "dry basis" assumes all the water is removed. Since malt is usually about 5% moisture there is a difference in these numbers. Since we are going to

weigh our malt without further drying it we prefer the "as is" specification. The other number we might find is the Fine to Coarse (F/C) ratio, an index of malt modification. It allows us to convert the fine extract to the coarse extract.

If we have the "coarse grind as is" extract we will use it without adjustment. If we don't, we can do some conversions to get a more realistic expectation of the extractable sugars:

Coarse Grind (dry) Extract x (1 - Moisture) = Coarse Grind (as is) Extract.

The worst case would be if we only have a fine grind dry and moisture content %. Because the F/C ratio is a variable, we don't have enough information and we have to do a little guessing. Looking up a random Pilsner malt online I found these specs as an example:

Moisture content = 4.3%.
Extract, fine (dry) = 83.5%.

First, using the equation above, I can convert the dry to "as is":

$0.835 \times 0.957 = 78\%$ Extract, fine (as is)

Highly modified malts have an F/C ratio of 0.5–1%. We will take the 1% value if it is not on our spec sheet:

$0.78 \times 0.99 = 77\%$.

Now that we know the extract available we can get a more commonly used homebrewing number, extract potential, measured in points per gallon, or ppg. Extract potential is what we expect if we have 100% efficiency and extract all the sugars from 1 lb. (0.45 kg) of malt in 1 gallon (3.8 L) of water:

$\text{ppg} = (\text{Coarse Grind (as is)} / 100) \times 0.04621 + 1.$

Calculating brewhouse efficiency is relatively simple but there are some inaccuracies that have to be considered if we are going to get a precise number.



Photo courtesy of Shutterstock.com

So, in our example:

$$\text{ppg} = (77\%/100) \times 0.0462 + 1 = 1.0356.$$

It is good for us to uncover where the constant 0.0462 found in this equation comes from. That is derived when one pound (0.45 kg) of sucrose is dissolved in one gallon (3.8 L) of water; the yielding solution will measure 1.046 SG. We can get this number alternatively from the density of sucrose (1.58 g/cm³, which I'll leave it for the very advanced brewer) or we can measure it directly with a hydrometer.

Now we can start to see what our main extract is going to look like. If we can get 1.0356 in a perfect world and, for example, we only get 1.0285 we clearly lost some gravity points due to some form of an inefficiency. This equation is:

$$(\text{Measured Gravity} - 1) / (\text{ppg} - 1)$$

So for our case, we have: 0.0258 / 0.0356 = 72.5%.

This is a low, but an often-seen, efficiency range among all-grain homebrewers.

In an actual recipe we have different grains found at varying ratios, but the theory is the same as the example above. Let's try one:

13 lbs. (5.9 kg) base malt at 1.036 ppg
 1 lb. (0.45 kg) Carapils® at 1.026 ppg
 1 lb. (0.45 kg) dextrose sugar at 1.046 ppg
 in 5 gallons (19 L) of water

The one found in the 1.XXX of standard gravity measurements is always a problem with these calculations so we will remove it from our equation in the beginning and add it back at the end giving us:

$$(13 \times 0.036) + (1 \times 0.026) + (1 \times 0.046) = 0.549$$

Next we divide by our volume: 0.549 / 5 gallons = 0.098 and add back the 1 to make specific gravity happy and we get a theoretical value of 1.098 for our recipe. Now once we mash and measure 1.082 and collect 4.75 gallons (18 L), what was our efficiency? Let's figure that out:

$$\text{Efficiency} = [(\text{OG} - 1) / (\text{predicted gravity} - 1)] \times (\text{actual volume} / \text{desired volume})$$

$$\text{Efficiency} = (0.082 / 0.098) \times (4.75 / 5) = 78\% \text{ efficiency}$$

It is the last correction that is often missed or incorrect in homebrewing. The actual volume measured is very important.

I use a stainless ruler to measure my volume. Simply add 5 gallons (19 L) (measured as carefully as you can) to your kettle and measure the height from the bottom to the top of the liquid. Then add 1 more gallon (4 L) and measure again (assuming you have straight walls.)

If you want to be very pedantic about this you can heat the water to your measuring temperature and then cool it to your serving temperature and calculate the apparent expansion

of water in your kettle. In small batches the actual kettle's expansion can be ignored. The change likely exceeds the measurement error from the yardstick.

Water has a non-linear expansion rate that strongly affects measuring temperature on the hot side.

°C	°F	% Contraction	
		39 °F (4 °C)	68 °F (20 °C)
100	212	4.16%	3.99%
90	194	3.47%	3.30%
80	176	2.82%	2.65%
70	158	2.22%	2.05%
60	140	1.68%	1.50%
50	122	1.19%	1.02%
40	104	0.78%	0.60%
30	86	0.43%	0.26%
20	68	0.18%	0.00%
10	50	0.03%	-0.15%
4	39.2	0.00%	-0.18%

The % volume change of water based on both water's maximum density at 39 °F (4 °C) on left, and room temperature 68 °F (20 °C) on right. These numbers came from <http://engineeringtoolbox.com>

So our actual volume is: Actual Volume = Measured Volume x (1 - Percent Contraction)

Updating our equation: Efficiency = [(OG - 1) / (predicted gravity - 1)] x [(actual volume x (1-volume change)) / desired volume]

This lowers our efficiency to 77%.

MAKING A DIFFERENCE

How can we affect this efficiency in our system? The most important parameter to get a hold of is mill gap. Different malts will need slightly different settings in order to get the best efficiency without sticking the mash. Mash screen design affects this parameter and this setting needs to be sorted out by trial and error for each mash tun design.

We also can control our mash pH, however I recommend the homebrewer sets this to 5.2-5.4 instead of the more efficient 5.8 because of flavor reasons. Grist-to-water ratio will change mash pH and also affect efficiency. Also, increasing sparge temperature will extract more sugars while sparge duration can also strongly affect efficiency. To put these in order of most important to least important, in my mind, for single infusion mashes with highly modified malts: Mill gap spacing, sparge duration, sparge temperature, grist/water ratio, mash pH, and finally mash screen design.

I include mash screen design last because once set it does not change. Keeping the other parameters constant will allow you to have consistent efficiencies in the mash and a more consistent brewhouse to experiment with recipe changes.

I strive to maintain about 80% efficiency in my system as I find that is a good balance between my time, an efficient

use of raw materials, and flavor. In order to achieve that high of an efficiency I have to sparge more slowly for high-gravity beers. An important parameter here is grain bed depth. A deeper grain bed requires more time to sparge efficiently.

In a more advanced system with rakes and the ability to step mash we can gain further efficiency by controlling the additional parameters.

BOIL MATH

The next place we need to take control of is our boil. We know how much wort we collected and now we are going to boil it. If we are going to have a consistent product we need to control the evaporation rate. We can't control what we can't measure, so after the boil is finished we use our ruler and measure the final volume.

Holding the evaporation rate constant is very important because it changes the flavors of the malt as well as the gravity readings. For small changes you can make a consistent product by boiling a little more and watering back to the desired volume or the desired gravity. However, this only works for small corrections. An experienced taster should be able to taste a 2% change in evaporation rate between batches of the same recipe.

There are some numbers I like to keep in mind. Going below 9% evaporation rate should only be done with careful consideration of dimethyl sulfide. I have seen commercial processes with evaporation rates below 6% but only with

extreme changes to a traditional brewhouse. Also, over 16% creates flavors from melanoidin production that are undesirable in many styles (although highly desired in others.) I have formulated all of my recipes around a 10% evaporation rate.


This leaves to the last a final bit of hot-side math. How do we calculate how to fix our missed gravity? If our gravity lands too high, we will use water to dilute the sugar levels back to the desired gravity:

$$\text{Water Needed} = [(\text{Actual Volume} \times (\text{Measured Gravity} - \text{Target Gravity})) / (\text{Target Gravity} - 1)]$$

If our gravity lands too low, we will use light dried malt extract (DME) as it will change the flavors the least:

$$\text{DME Needed (lbs.)} = [\text{Actual Volume} \times (\text{Target Gravity} - \text{Actual Gravity})] / 0.045$$

The constant 0.045 is from the ppg of DME of 1 lb. (0.45 kg) of DME in 1 gallon (3.8 L) of water = 1.045 SG.

Whew, if you stuck in this far you have learned how your recipe calculator works, at least the gravity-side of the calculator. You can now calculate your efficiency and correct back to your recipe after boil. This is the beginning of creating a consistent brewing process and will allow you to learn how recipe changes affect the flavors of your beers without brewhouse parameters muddying up the waters. 

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PORTABLE RO SYSTEM

Water on the go

Maybe like me you have come to realize the importance that water and water chemistry plays in the flavor of the beer you brew. And maybe like me you have also wanted to take control of the mineral composition of the water you use for brewing so you can dial in a particular profile for that perfect helles, NEIPA, or saison. If you want help with that . . . I'm not your guy. I'll be the first to admit that I bought, read, and understood little in *Water: A Comprehensive Guide for Brewers* by John Palmer and Colin Kaminski.

Realizing I'm not an expert and being okay with that I made it my goal to make the water modification process as easy and repeatable as possible. Those goals were part of the reason I started using reverse osmosis (RO) water instead of carbon-filtered water from my tap. Using RO water means I am essentially starting from a blank slate every time I sit down to design a water profile for a beer I'm brewing. That's because the mineral profile of RO water, unlike that of my tap water, doesn't change with the seasons, doesn't change based on the water source the treatment plant may be using that day/week/month, doesn't change based on the amount of rain or snow fall, etc. It's really consistent. And consistency is important in brewing if you want to brew the best beer possible.

But as with most things there are

some cons to go along with the pros. The biggest con for me was the initial investment. I knew I was going to drop a bit of my brewing allowance on a nice RO system. But I was already buying 5–10 gallons (19–38 L) of distilled water at \$1 per gallon (\$0.27 per L) for many of my brew days, so I knew it wouldn't take long for the system to pay for itself. Another con was that fact that the majority of RO water filter systems are meant to be mounted to a wall and semi-permanently plumbed into a water source. I was not in a position to be able to do this so I knew I'd have to figure out another solution.

Well . . . necessity is the mother of invention so I designed a cart that would hold my RO system, holding tank, and all the necessary items needed to move the RO water out of the holding tank and into my brewing kettles. It's not connected into my home's plumbing system. Instead it's mounted to the cart, can be moved to the sink where I let the RO system do its work, and then I move it back to my brewing space to be used to make delicious beer.

So for those who don't have the space, option, or desire to permanently install an RO system, a mobile cart might be a great option for you. The only feature I'm considering adding in the future is a water heater element and timer. With this I could have my brewing water both filtered and ready for mashing in when I wake up.

Well . . . necessity is the mother of invention so I designed a cart that would hold my RO system

Tools and Materials

- RO water filtration system with float valve (<http://wholesale.spectrapure.com/CSP-Manual-Flush-90-GPD-RO-System>)
- Hydraulic lift table (<https://www.harborfreight.com/61405.html>)
- ½-in. weldless bulkhead
- Edge pickup diptube
- ½-in. ball valve
- 12V DC pump
- HDPE water barrel or other storage tank
- Pegboard or plywood
- 1³/₁₆-in. spade bit
- 7¹/₁₆-in. spade bit
- Electric drill



Photos by Nick Parker

STEP BY STEP

1. SOURCE THE RO SYSTEM

The first step is purchasing a reverse osmosis (RO) system. There are a lot of manufacturers out there. I purchased the CSP-90-MF made by SpectraPure. This RO system supplies 90 gallons (340 L) of RO water per day and came with the features I was looking for in an RO system. Plus it came with a float valve that will automatically shut the flow of water off once it reaches a certain level. It also came with an inline TDS (total dissolved solids) meter that is helpful for monitoring the effectiveness of the RO membrane.



2. CART CONSIDERATIONS

For the cart I used a hydraulic lift table with a lift capacity of 500 lbs. (227 kg) meaning it can easily bear the load of many a barrel full of water. If you don't want or need the ability to lift the water, there are cheaper rolling carts that would work well. And the chief feature of a cart (wheels) means I can move it to my basement sink or hose spigot and then into the brewery where I ultimately need the water.



3. OBTAIN AN APPROPRIATE BARREL OR OTHER VESSEL TO HOLD THE WATER

For RO water storage I used an HDPE barrel that was previously used to hold food-grade glycol for a local craft brewery. These types of HDPE barrels can be found rather cheap on Craigslist and other places. Just be sure to buy one that hasn't been used to store something that will leech undesirable flavors into your water. And regardless of what it stored, be sure to clean in thoroughly prior to its first use.



4. INSTALL OUTLET

To drain the RO water out of the barrel I installed a diptube and weldless bulkhead I sourced from BrewHardware.com. I used the diptube designed for edge pickup attached to a ½-in. male NPT Weldless Bulkhead. To install the bulkhead I drilled a 1⅜-in. hole in the side of the barrel with a spade bit. After that I added a ½-in. ball valve and attached a 12-volt DC water pump to it. Because I mismatched my thread types, I ended up with a male-to-male connection. This was remedied by using a short section of silicone hose and a hose clamp. And since the pump didn't have a built-in switch, I added a plug-in power switch.




5. MOUNT THE RO SYSTEM

With the storage tank nearly complete, it's time to get the RO system attached to the cart. How you do this is up to you. I had some spare pegboard from another project and cut it to span the distance between the upright sections of the cart's handle and then secured it with zip ties. The pegboard holes didn't line up perfectly with the RO system hanging bracket so I drilled two holes, installed bolts, washers, and nuts and then hung the RO system on the board. I noticed a slight gap between the filter housings and the mounting board so I installed a scrap piece of wood to give the filter housings something to rest against and eliminate any stress on the mounting bracket.



6. FLOAT SWITCH

The last thing to do was install the float valve. I drilled a 7/16-in. hole near the top of the water barrel and installed the float valve and then connected it to the RO system. The cart was now ready to go. I wheeled it over to the basement sink and used a garden hose connector that came with my RO system to hook it up. I let the water run overnight and came down on brew day to find that the float valve had automatically stopped the flow of water once the barrel was full. I now had plenty of RO water ready for brew day. 



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PROVING RESILIENCE

A 10-year-old takes up homebrewing

He has also taken orders for a second batch of Resilience, and we'll do that one after the Belgian ale.

As we have reported in two previous issues of Brew Your Own magazine, the Camp Fire of 2018 devastated several towns in Butte County, California and charred almost 240 sq. miles (62,000 ha). In response, Sierra Nevada Brewing Company initiated the Butte County Resilience relief effort to raise money for those affected by the fire. In all, over 2,000 breweries, multiple brewing supply wholesalers, and countless homebrewers took part in the money-raising effort. In the midst of the greater story, we found Owen Shore, a ten-year-old kid who wanted to help out. He did so by brewing a batch of Resilience IPA with his mom and they auctioned the beer to friends and family. All of the money they raised went towards the relief effort, \$462 from the first batch alone. So we tracked down the Shores with the help of David Little of the North Valley Community Foundation, one of the leading organizations spearheading the relief effort, and interviewed Owen and his mom, Patti.

Have you folks had friends or family affected by these fires?

Patti: My cousin and her family lost their home to the Tubbs Fire in the North Bay in 2017. For the Camp Fire in 2018 in Paradise located in Butte County – I had cousins, uncles, aunts, and a 100-year-old grandma (Owen's great grandma) all of whom live in Oroville, California and many more family members who used to live in Oroville. Oroville didn't burn but many Paradise evacuees went there, and it was quite close to Paradise, so we were following the news closely too.

Was this your first time homebrewing?

Patti: No, this was Owen's third time. His first batch was Blind Pig IPA in August 2018. That was so popular with friends and family that he did a second batch in the fall.

Any troubles that you ran into along the beer production/packaging way?

Patti: With our first two batches, we learned it took a l-o-n-g time for the wort to cool. We were pretty excited when a friend gave us a wort chiller, which really sped up the process, and plus Owen got to learn about heat transfer (this whole beer brewing thing is just a hugely extended science experiment). With Resilience, the end product came out a little over-carbonated – it foamed a lot, so we had to tell people to open it in the sink and pour it carefully into a chilled glass. It still tasted delicious and hoppy. Also, we used whole hops for that batch, and discovered that it is REALLY hard to dry hop with whole hops into the narrow bottleneck of a carboy! Finally, Owen's dad, Dan, did not like the state of the kitchen after Owen and I were done with the boil. So, for Christmas, he got Owen an outdoor burner that we can connect to our natural gas line. We are meant to brew in the great outdoors!

What feedback have you received from people who have tasted your brew?

Patti: People seem to love it. We (the adults) taste it first just to make sure something terrible didn't happen before Owen (with his mother) distributes it.

Owen: Some people thought I was too young to brew.

Do you expect to ever brew again?

Patti: Owen used his Christmas Visa gift cards to buy everything he needs to do a batch of Belgian ale. He has also taken orders for a second batch of Resilience, and we'll do that one after the Belgian ale. Yes, the money from Batch #2 of Resilience will again be donated to North Valley Community Foundation.


For the full transcript, visit: www.byo.com/article/proving-resilience 



Photo courtesy of Patti Shore

Owen Shore proudly displays his homebrew that he crafted with his mom, Patti. Their Resilience IPA was used to raise money for the Camp Fire relief effort.

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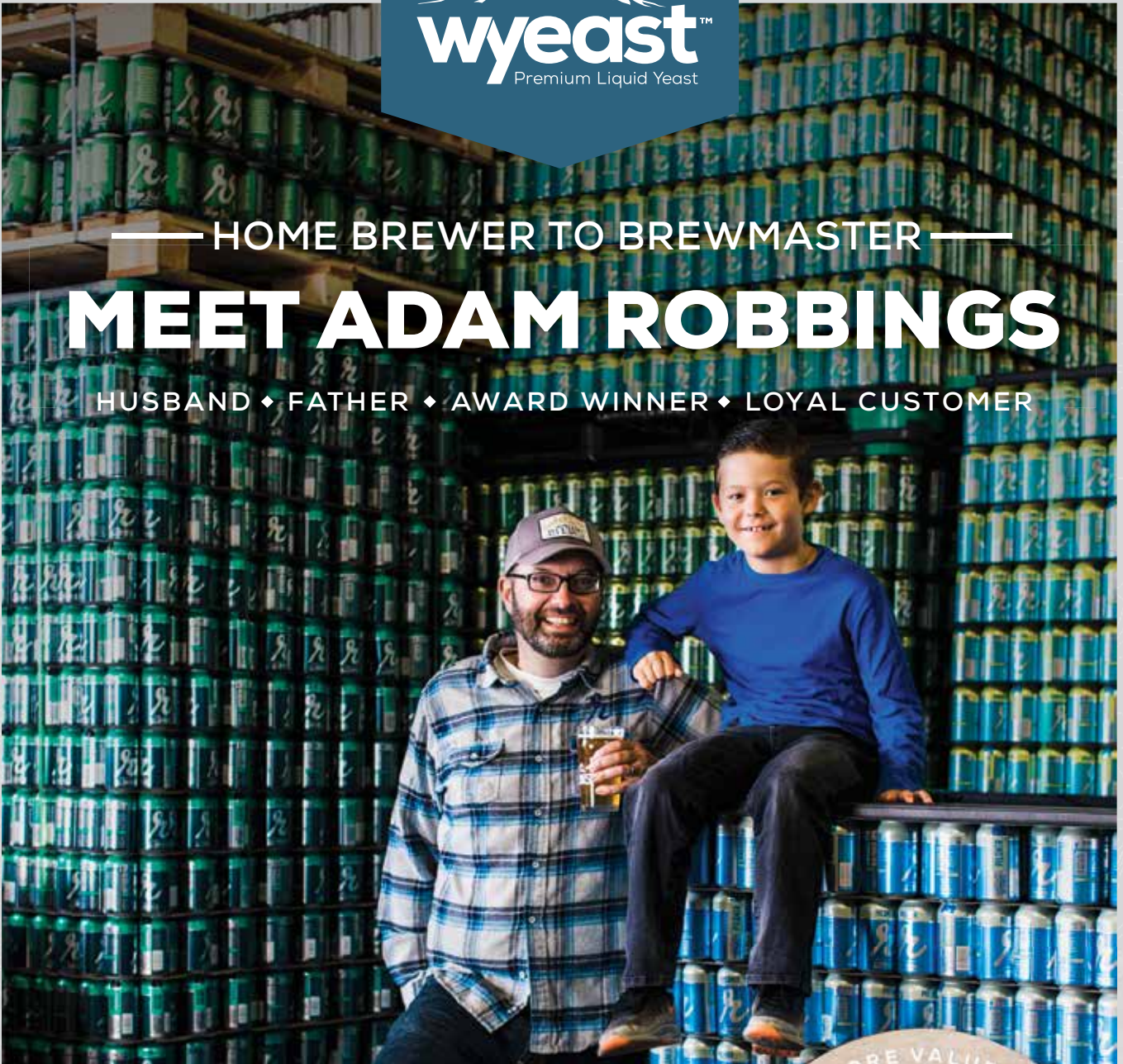
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