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OCTOBER 2018, VOL.24, NO.6

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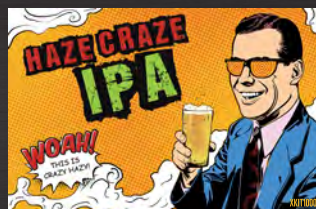
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features

38 FRUIT CIDER

Fall is here and that means it's the perfect time to make hard cider! Professional cidemaker Michael Fairbrother offers advice and three clone recipes for hard fruited ciders.

by Michael Fairbrother

44 ORGANIZE A HOMEBREW COMPETITION

A tremendous amount of planning and work goes into organizing a homebrew competition. Here is what to consider if your club is looking to start hosting a competition or make an existing one run more smoothly.

by Gordon Strong

52 PASTRY BEERS

Often brewed with adjunct culinary ingredients and featuring flavor profiles of baked goods and desserts, pastry beers push the boundary of what beer is. Get tips to brew your own pastry beer, plus 4 clone recipes.

by Josh Weikert

60 MORE GREAT HOMEBREW DEBATES

Six of *BYO*'s favorite homebrewing experts debate some of the hobby's most controversial topics, including boil vigor, the importance of precise mash temperatures, secondary fermentation, and Belgian candi sugar.

70 PIWO GRODZISKIE

Piwo Grodziskie is a historical beer style recently brought back from extinction. Two Vermonters set out to brew this low-alcohol, highly-carbonated, oak-smoked wheat ale.

by Aaron Ritchie & Andrew Becker

78 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.

by Jason Simmons



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departments

8

MAIL

We offer an overview of the MashMaster MillMaster Grain Mill, and correct the hopping schedule of a clone recipe from the July-August 2018 issue.

12

HOMEBREW NATION

Every brewer wants a clean brewing space, but let's be honest — how many of us truly achieve that goal? Well check out this month's edition of Drool. Also learn about the lautering process (hint: It's optional).

16

REPLICATOR

Odell Brewing Co. is riding high on the success of their new Rupture: Fresh Grind Ale. The Replicator gets the low down on this fresh approach to hopping an APA.

18

TIPS FROM THE PROS

Brewers can take many roads to create a chocolate-flavored beer. We sit down with three brewers well versed in creating chocolate-y deliciousness.

21

MR. WIZARD

The Wizard fields a question about a new style of IPA that has emerged from the Bay Area of California, the Brut IPA. He also delves into caloric counting and the mysteries of crystal malts.

28

STYLE PROFILE

Belgian blond ales are an often misunderstood beer style. Learn the details about what defines a Belgian blond ale, the history behind the style, and how to craft a version of your own.

101

TECHNIQUES

For folks that serve their beer via a draft system, creating the perfect pour requires a balanced system. Josh Weikert explains the techniques to properly balance a draft system.

105

ADVANCED BREWING

Table beers (beers under 3% ABV) present challenges that are not often a problem in stronger beers. Delve into the world of table beers and what it takes to brew a low-ABV beer worth having a spot at your dinner table.

109

PROJECTS

A lot of homebrewers will build their own immersion wort chiller ... but few engineer one. Check out this rib-cage immersion chiller and learn how to build one yourself.

120

LAST CALL

The Pink Boots Collaboration Brew Day unites female brewers on International Women's Day to don their pink boots and brew a version of a beer style. But what if the brewer is five years old? Meet Juniper Rose.



where to find it

112

Reader Service

113

Brewer's Marketplace

114

Homebrew Supplier Directory

RECIPE INDEX

Odell Brewing Co.'s Rupture clone . . .17

Belgian Blond 29

Moonlight Meadery's
Boys N Berries clone 41

Moonlight Meadery's
Crimes of Passion clone 41

Moonlight Meadery's
Razz What She Said clone. 41

Conshohocken Brewing Co.'s
Glazing Saddles clone 56

Forgotten Boardwalk Brewing Co.'s
Funnel Cake clone 57

Imprint Beer Co.'s
Black Forest Cake Stout clone . . . 58

Neshaminy Creek Brewing Co.'s
Maximum Mocha Porter clone . . 59

Grodziskie 75

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.

28

CLEAN BEER



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Q

**Do you have
a yeast strain
that you
consider your
house strain or
do you like to
mix and match?**

I mix and match yeast strains depending on the style I'm brewing (and even within the same styles).

There are too many great yeasts available to limit my batches with a single strain. Even when brewing the same recipe, I'd often rather experiment to see how different strains will influence the final taste, and afford myself a better variety among my homebrews.

I have several go-to strains for what we might call the major "fermentation character" families — so, a Belgian strain, an ale strain, a lager strain, and an English strain. In terms of a "house strain," anyone who has ever listened to me speak or read my writing knows that I have a strong affinity for clean German ale strains (such as Wyeast 1007). It's a real workhorse, adds a limited (but noticeable) ester profile that to my palate is generally a mild berry flavor, and ferments cleanly and completely at almost any temperature.

I still like good old WLP001 the most. It was my first yeast strain of course (hence the number) and what I homebrewed most with. In fact, I'm going to use it this weekend when I brew a Scotch ale with my dad. He wants to give homebrewing another try. I also like WLP590 for Belgian-style beers.

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Introduction to Kegging

Kegging may not be for everyone, but if you're tired of the bottling process and want to

enjoy some of the advantages of what kegging your beer offers, then you should start here. Learn the pros and cons of kegging, setup options, anatomy of a draft system and carbonation 101. <https://byo.com/article/introduction-to-kegging/>

MEMBERS ONLY



Milking It: The New Age of Lactose

Lactose is a common addition to dessert beers for the simple reason that this sugar

is inedible to brewer's yeast. This can boost the overall body and easily provide a sweetness without the need to go through the whole backsweetening process. Explore what lactose can do for your beer. <https://byo.com/article/milking-new-age-lactose>



Looking For a Table Beer Recipe?

London-based Kernel Brewery brews a table beer that is their most popular offering. Clock-

ing in at 3.3% ABV, their table beer provides a well-balanced, smooth body with a great hop presence. The high finishing gravity is what allows the beer to drink bigger than it really is. <https://byo.com/recipe/the-kernel-brewerys-table-beer-clone/>

MEMBERS ONLY



Tips for a Successful Homebrew Club

Thinking about organizing a club? Or maybe your club

needs a bit of a jolt with some fresh ideas? We've got just what you need — a bunch of the most interesting ideas from clubs far and wide compiled into one article. Covering everything from website development, setting up by-laws, creating events, club meeting ideas, and attracting new members. <https://byo.com/article/tips-for-homebrew-clubs/>

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MASHMASTER'S MILLMASTER GRAIN MILL

Hello, I just received the September issue of *Brew Your Own*. Fantastic as usual. I just wanted to comment about your article on grain mills on the market ("Malt Mills"). I realize these are the more common brands on the market but you left one out. I stumbled across a mill called "MillMaster Grain Mill" from a company in Australia called MashMaster. This is by far the best mill I've ever owned or used. Granted it has gotten much more expensive than when I purchased mine but I would still buy it again today if need be. Check these guys out and see what you think.

Ben Desmonie • via email

Thank you for pointing out this oversight on our end, Ben! You are right, the MillMaster is made in Australia, but it is available in North America. Since it wasn't included in September's rundown of mills on the market, let's take a closer look at the mill here:



According to the MashMaster website (www.mashmaster.com), the MillMaster Grain Mill retails for \$222.74 and features two 420 hardened steel, gear-driven rollers that are 5 inches (130 mm) long and 1.5 inches (39 mm) in diameter. The rollers adjust easily with a range of 0 to 0.075 inch (0 to 1.9 mm) with the use of quick adjustment side locking pins. This mill is advertised as the only gear-driven roller on the market that is fully adjustable at both ends. It



Josh Weikert took up homebrewing in 2007 during graduate school. He is a founding member and past president of the Stoney Creek Homebrewers, has medaled in every BJCP beer style, is a BJCP Grand Master Judge and Certified Cicerone, and is a two-time Eastern Pennsylvania Homebrewer of the Year. During the day, Josh is a professor and lecturer in political science. In addition to being a regular feature story contributor in *BYO*, Josh is our former "Replicator" columnist and, beginning this issue, he is now our new "Techniques" columnist. You can also read his beer writing on his blog at beer-simple.com. Josh is also a past *BYO* Boot Camp Speaker, and will be leading the "Advanced Hopping Techniques" Boot Camps in Asheville, North Carolina on March 22 & 23.

Josh authors the cover story of this issue, "Pastry Beers" (page 52), discusses balancing a draft system in his inaugural "Techniques" column (101), and debates whether a vigorous boil is necessary (62).



It all started back in 1995, when **Michael Fairbrother** tried a cyser (apple and honey mead) for the first time. Since that first sip he has developed a passion and a masterful skill at making international

award-winning meads and ciders. Michael opened Moonlight Meadery in Londonderry, New Hampshire in 2010 and is President of the American Mead Makers Association. He also helped develop and has taught the mead-making course at The Honey and Pollination Center at the Robert Mondavi Institute at UC-Davis.

In this issue, Michael shares tips (and three Moonlight Meadery clone recipes) for hard fruited cider, beginning on page 38.

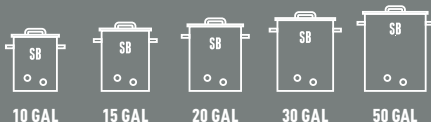


Gordon Strong is the President and highest ranking judge of the Beer Judge Certification Program (BJCP), the organization that certifies beer judges for homebrew competitions and also registers qualifying homebrew competitions. In addition to his Grand Master Level V judge status, Gordon is a three-time winner of the National Homebrew Competition Ninkasi Award and the author of homebrewing books *Brewing Better Beer* and *Modern Homebrew Recipes*. He has been *BYO*'s "Style Profile" columnist since 2015 and is a frequent feature story author. He is also a past *BYO* Boot Camp Speaker, and will be leading the "Advanced All-Grain Techniques" Boot Camps in Asheville, North Carolina on March 22 & 23.

In this issue, Gordon shares best practices for organizing a homebrew competition (page 44), explores Belgian blond ale (28), and debates precise mash temperatures (65) and secondary fermentations (66).

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has a 1/2-inch (12.7 mm) drive shaft keyed for easy motorization, drill drive, or hand crank, as well as a 3/8-inch (9.5 mm) shaft if preferred. The frame of the mill is made from aluminum. This mill does not come with a base nor hopper. A hopper made from 1.5 mm aluminum sheet metal, which holds 11 lbs. (5 kg) of grain, is sold separately for \$52.20. Another available upgrade is 420 stainless steel fluted rollers, vs the knurled rollers that come standard. These rollers provide a cutting on cutting crush, as used in high-end commercial mill rollers, to reduce excess flour production and husk damage. The flutes are angled to provide additional strength, durability, and wear resistance. This roller upgrade costs \$123.95.

CORRECTION TO THE BIERSTADT LAGERHAUS SLOW POUR PILS RECIPE

The hopping schedule for Bierstadt Lagerhaus' Slow Pour Pils in the July-August "Replicator" column was incorrect. Head Brewer and Co-Owner Ashleigh Carter reached out to us about the hopping schedule and it appears some information was lost in translation. While the recipe originally published included a late hopping addition, Ashleigh says the hops used for this recipe are actually evenly split between a first wort hop (FWH) addition and an addition with 70 minutes remaining in the 90-minute boil.


So, the hopping schedule should be:

- 4 AAU Hallertau Mittelfrüh hops
(first wort hopping)
(1 oz./30 g at 4% alpha acids)
- 4 AAU Hallertau Mittelfrüh hops (70 min.)
(1 oz./30 g at 4% alpha acids)

We have made this recipe free to view whether you are a digital member at byo.com or not, so if you would like to check out the revised recipe for Bierstadt Lagerhaus' Slow Pour Pils in its entirety, visit <https://byo.com/recipe/bierstadt-lagerhaus-slow-pour-pils-clone/>. It's always a great time for a Slow Pour!



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Have a question about something you've seen in BYO? Want to show off your latest DIY homebrewing gear or recipe? Write to us at: edit@byo.com, find us on Facebook: www.facebook.com/BrewYourOwn, Instagram: @brewyourownmag, or reach out to us on Twitter: @BrewYourOwn. 



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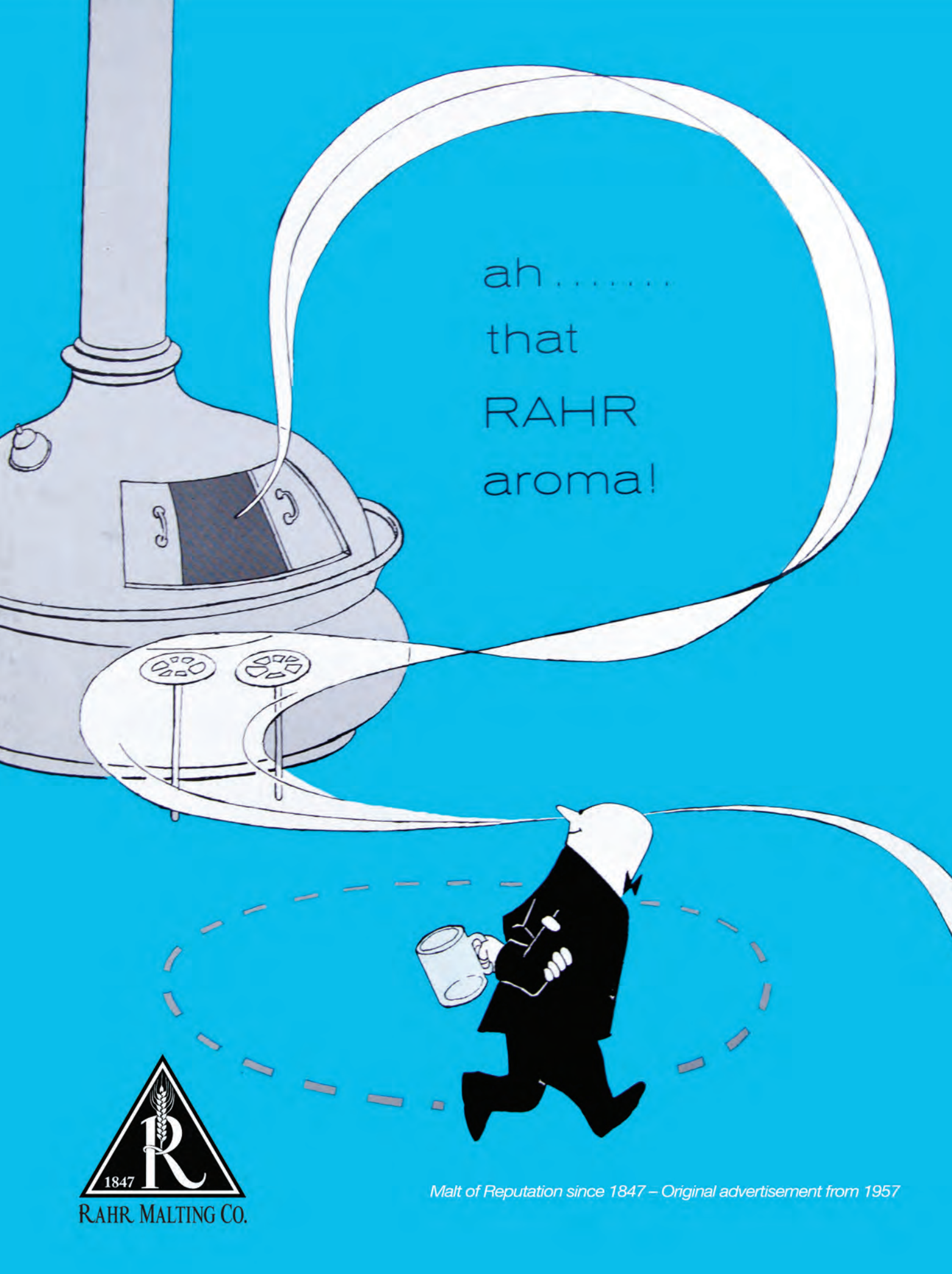
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BEGINNER'S BLOCK

BY DAVE GREEN

LAUTERING 101

At its core, lautering is a three-step process at the end of a brewer's mash, which separates out the sugary wort from the spent (used) grains. The word originates in the German language and represents a clearing or purification process. During the laut process, brewers are performing a mashout, a vorlauf, and a sparge of the grain bed . . . all of which are optional. So while traditional brewing practices include all steps of the laut process, many homebrewers, especially those who perform a brew-in-a-bag (BIAB) mash, may be forgoing all three steps. Partial mash brewers may find they perform one or two of the three steps. But many purist homebrewers still perform all three citing that there is a reason that the laut process was formulated in the first place.

STEP 1 — THE MASHOUT

The term mashing out refers raising the temperature of a mash above the "safe zone" for enzymes that are working on breaking down the carbohydrates (sugars) of the wort. What this means is that the carbohydrates of the wort are "locked in" or static due to the extra heat de-activating the enzymes. This step is most important when brewers are looking to maintain a bigger body with more complex carbohydrates versus a drier beer. This step also reduces the wort's viscosity, allowing the subsequent lautering steps to occur more easily.

Often brewers will hold their mash in the 148–160 °F (64–71 °C) range to maximize the enzyme's activity for starch conversion. At the point they feel like the mash is complete to their satisfaction, often after 45–60 minutes, the laut process begins. The mash is heated up above the highest threshold of the mash enzymes — roughly 165 °F (74 °C). The most common temperature seen for the mashout

process is 168–170 °C (76–77 °C) with a five-minute rest before moving onto step two, the vorlauf.

A recirculation system such as a HERMS (heat-exchange recirculation mash system) or RIMS (recirculating infusion mash system) can avoid scorching the grains. If you don't have a recirculating mash system, there are a few other options available. Adding a calculated amount of boiling water to your mash can raise the temperature to mashout. Or a brewer can simply heat their sparge water (see step 3) hotter than normal, often to 180–190 °F (82–88 °C), which if done properly can emulate the effects of a mashout step. Finally, brewers can pull out part of the mash and boil that portion for a couple minutes before returning it to the mash to raise the whole mash temperature. This process is known as decocting the mash and often ½ of the mash will be pulled out for boiling.

STEP 2 — VORLAUF

To vorlauf in German means to run ahead. But in brewing terms, it's referring to the first runnings that come out of the mash/lauter tun when a bottom drain is opened. Brewers define vorlauf as a recirculation process as these cloudy first runnings are ahead of what they want, so they will recirculate this wort back on top of the mash to be re-run through the grains and cleared of the cloudiness in the process. This step is often simply referred to as the recirculation step. The wort is recirculated back on top of the mash until the turbidity is no longer apparent.

Homebrewers can vorlauf either with a pump to very slowly pump the wort back on top of the mash, or use a container to collect the wort that is then gently poured back on top of the mash. Always start slow in order to allow the grain bed to settle in place and not over-compress the grains.

STEP 3 — SPARGING

The sparge step is the final step in the laut process and is the "sprinkling" phase according to the German root of the word. Once the wort has run clear during the vorlauf step, the wort begins to be directed towards the brewing kettle. Sparging is a washing process in which the sugars are rinsed from the grains with fresh, hot water.

At this point, brewers have two options; they can perform a batch sparge or a fly sparge. Batch sparge implies that they drain all the wort out of the mash/lauter tun before filling it back up with sparge water. This can be repeated for a double batch sparge. Fly spargers will try to maintain a constant rate where wort out = sparge water in. Often you will hear that fly-sparge brewers should try to maintain a 1-inch (2.5-cm) layer of sparge water on top of the grain bed. This is difficult on a homebrew scale, so don't fret if you find you're over or under for a little bit. In general I don't exceed the initial strike water volume of the mash to sparge water volume beyond 1:1.25. This precludes unwanted tannins leaching into my beer from excessive sparging. Often I do 1:1 volumes though.

PUTTING IT ALL TOGETHER

This three-step process does not need to be performed for every beer. If you're looking for a drier beer, skip the mashout . . . it's unnecessary to purposefully stop the enzymes as you laut. Don't care about a little bit of turbidity and grain particles in your brew kettle? You can skip the vorlauf; after all BIAB brewers don't care. Don't want to sparge? Increase the volume of your mash water so that you can run-off the full volume direct to the brew kettle. I advise you to read up on the potential pitfalls of full-volume mashes if you do go this route though.

HOMEBREW DROOL SYSTEMS

GUSTAV LINDH – NYKVARN, SWEDEN



I have taken half of our garage and built myself a homebrewery. It's all electric with a focus on German equipment. The central piece is the Speidel Braumeister 50 Plus and with that I also have the Speidel 3200 watt heat stick when I'm in a hurry, heating the wort from mash out to a boil. Besides that I have a 3000 watt induction plate for heating sparge water, making starters, doing partigyle, or a quick BIAB beer. I'm a low-oxygen brewer (LODO) so I preboil all mash water in the Braumeister using the timer function before cooling it with the cooling mantle or with my 29-m (95-ft.) stainless steel immersion chiller. The ventilation of moisture from the brewing is non-electrical with the original extraction hood from Speidel and all condensation is brought out through a window. The Braumeister and the induction plate

stands on a custom-built brewstand that I designed to be the optimal height for moving the wort by gravity to the fermenter but still have a nice working height for mashing in.

The wet side of the brewery has an industrial kitchen sink that is very heavy, high-quality steel and I can fit a cornelius keg or the Braumeister malt pipe under the tap. Very convenient! The fermentation is primarily done in stainless fermenters from Speidel, their 45- and 95-L (12- and 25-gallon) versions, and I have a permanent lager fermentation fridge set at 9 °C (48 °F) with room for two brews and a lagering fridge set at 0 °C (32 °F) with room for up to 6 Cornelius kegs.

For serving beer I have a homebuilt kegerator with room for four kegs and a stainless serving tower with three Perlick 630SS faucets. I document all

my brewing, share my recipes and testing on my blog <http://www.lindhcraftbeer.com>, which has become the most visited blog in Sweden. Grab yourself a beer and stop by for a visit sometime. I also wrote a book about homebrewing that was released this past April (Swedish-only for now) and is available in the super market chain "ICA Maxi" in Sweden, hopefully making homebrewing more accessible to the general public here in Sweden. Skål!





CALENDAR

OCTOBER 6 BEER FOR BOOBS VII

Columbus, Ohio



The 7th annual Beer For Boobs competition organized by the Scioto Olentangy Darby Zymurgists (SODZ) is open to any amateur homebrewer age 21 or older. All net proceeds go to benefit Beer for Boobs breast cancer research, a non-profit organization started by White Labs founder and Vice President Lisa White. To date, SODZ has raised over \$4,700 for the charity. All entries must be received by October 6 and judging takes place October 20. This competition is AHA-sanctioned and entry fee is \$8 per entry. Each entry consists of (2) 12 or 22 oz. bottles. Places will be awarded in each category and first place will advance to the Best of Show round where a Best of Show beer will be selected. For more information or to register, visit <http://beerforboobs.sodz.org/>

OCTOBER 8 LIGHTS OUT! DARK BEER ONLY COMPETITION

Gig Harbor, Washington



Organized by the Browns Point Homebrew Club and 7 Seas Brewery, don't think about entering your hazy IPA to this homebrew competition. The minimum SRM allowed is 12 and the sky is the limit. This competition requires (3) bottles per entry and entries need to be received by October 8. The entry fee is \$7 and judging takes place on October 13. This competition is a WHOTY Qualifier event, meaning entrants can gain credits towards the Washington Homebrewer Of The Year award. The Lights Out! awards ceremony will be held on October 20 at the 7 Seas - Tacoma location beginning at 12pm. Be sure to bring along your Halloween costume. For more information or to register, visit <http://www.wahomebrewers.org/lightsout/>

OCTOBER 10 2018 MUG COMPETITION

Tucson, Arizona



The Tucson Homebrew Club (THC) is proud to host the MUG Competition, open to all homebrewers. Each entry requires (2) 12-ounce bottles. Each entrant is allowed up to 4 entries, with a maximum of 1 entry per subcategory of beer. The entry fee is \$7 and registration can be online. Entries need to be received by October 10. There is a drop-off location at Everything Homebrew located in Tucson or entries can be shipped. Judging will take place on October 13 at the Mr. Beer headquarters and an awards ceremony will be held at the 2018 MUG Conference. For more information, visit <https://tucsonhomebrewclub.brewcompetition.com/>



WHAT'S NEW?

HANNA INSTRUMENTS BREWING THERMOMETER



Hanna Instruments has released a new brewing thermometer designed specifically for all brewers, big or small. Crafted to provide accurate readings from strike water through fermentation while encased in a durable body (IP65-rated) designed to withstand the knocks, drops, and spills that happen during brewing. An extra-long, 1-meter (3.2 ft.) stainless steel probe enables the thermometer to reach deep into a brew kettle or fermenter in order to ensure reliable temperature readings. Hanna's exclusive CAL Check™ calibration technology ensures that the thermometer is providing accurate readings. Temperature readings are from -4 to 248 °F (-20 to 120 °C) and accuracy to ±0.2 °F (±0.1 °C). Thermistor probes are interchangeable if a different probe is desired. For more information visit hannainst.com/brewing-thermometer.html

BLICHMANN ENGINEERING CIP SPRAY BALL

Clean-in-place (CIP) is a task often associated with larger commercial brew systems and unitanks so that brewers don't need to climb into vessels to clean them. But the CIP concept has worked its way into the homebrewing and nanobrewing worlds. Blichmann Engineering has crafted a system so that large-scale homebrewers and nanobrewers can utilize CIP in their brew house or in their cellar. The Blichmann CIP Spray Ball has been designed and tuned specifically to be used with standard-sized March™ 815 or Rip-Tide™ pumps. This unit is modular and can be custom fit for use in any fermenter, kettle, or keg cleaner among other things. Full stainless steel construction ensures this to last a lifetime. Starting at \$49.99, there is a lid hatch accessory available. For more information or to find places to purchase, visit www.blichmannengineering.com/products/cip-spray-ball



FERMENTIS APP



Fermentis, manufacturer of the popular dry yeast strains for brewers, has released an app for both homebrewers and craft brewers. Designed for use on both Apple and Android devices, this app was created for brewers to gain a valuable tool on their handheld devices. There are several tools available such as a yeast selection tool that allows brewers to select their criteria based on desired attenuation, POF (polyphenolic off flavor) objective, and maltotriose range. Users can easily convert measurements between metric and imperial scales for things such as temperature, density, weight, and pressure. An attenuation and alcohol calculator provides yeast data based on a beer's specs. The app allows brewers to interact with Fermentis and find out the latest news and product releases. Easily found in your device's app store or you can learn more at fermentis.com/fermentis-app-launching/

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DEAR REPLICATOR, At my brew club (Aurora City Brew Club or AC/BC) a member came running in with a can of Odell's Rupture imploring that we had to try it. Everyone seemed to like it because it was so different. I have tasted it several times now including at the Great American Beer Festival and it is now a favorite of mine. If you could, please write an article about this beer, what they're doing, and hopefully get a recipe for Rupture.

Russell Willden
Aurora, Colorado



Thanks for the request, Russell! After contacting Odell Brewing, I received a response from Kristen Wood, Odell's Community Manager. Suffice it to say, they were excited to work with me and highlight just how unique Rupture: Fresh Grind Ale really is.

Odell Brewing was founded in 1989 by husband and wife duo, Doug and Wynne Odell along with Doug's sister, Corkie. After a number of years on the West Coast working his homebrewing magic, Doug and Wynne took their honeymoon in the United Kingdom. It was there where he discovered high quality, real ale. They decided that creating a sustainable brewery, which focused on said ale, was fiscally reasonable. Their preliminary location was in an old 1915 grain elevator, not too dissimilar to how many of today's breweries mark their beginnings in warehouses or similar structures. Great ideas have the tendency to last.

From then on, it's been the philosophy of restrained yet steady progress for expansion. That attitude has proven quite valuable as Odell boasts being the 28th largest brewery in the United States while only distributing to 16 states. In addition, the Odell family founders sold the company back in 2015 to its co-workers during a management buyout and ESOP (employee stock ownership plan). This ultimately allows the extended Odell brewing family to really cater to the region producing high-quality, fresh beers — some of which have a playful twist.

One of these playful beer ideas is where Rupture Fresh Grind originates. One of the brewers thought there had to be a better way to harness more from

whole hops in particular. It had to be whole hops since pellets lose a bit of their true character to oxidation, albeit minor, during pellet processing. During this experimental process, it was envisioned that the lupulin glands would be torn apart, enhancing surface area and thus increasing the rate of extraction while minimizing any oxidative side reactions. *Voila*, Rupture was born.

I know what you're thinking; this method of utilizing hops is a gimmick, something to be written off and thrown in the trash heap alongside mash hopping. But Odell let the customers decide for themselves if the experiment was successful after having to build the mill and related components from scratch. Recent data indicates that Rupture is the #2 best-selling beer in Colorado. Consider the other amazing breweries and associated beers in Colorado and you realize that's no joke. In sensory panels, tasters can easily pick out the difference between Rupture and other hop-forward ales due to its distinctive, fresh, resinous nose and flavor backed by additional citrus, dank notes. This same type of perception difference is akin to using freshly ground coffee beans versus coffee grounds that may be older than some of the beers in your cellar.

So how does one recreate Rupture in the comfort of your own home-brewery? On scale, Odell uses a hammer mill to reduce the whole hops down to a coarse, dried spice-like material that passes through the pores of a particular-sized grate before being extruded from the machine. They fresh grind just before brewing but due to utilization and batch size this requires

8 hours of manpower. The homebrewer can simulate this experience, without the expenditure of time, using a Ninja® or Magic Bullet type of mixer that preferably has multiple stainless steel cutters to rapidly shred the whole hops without generating a lot of heat. Although depending on where you live and if marijuana is legal there, there are better options available in terms of mills. Let curiosity be your guide.

Now that you've created this wonderful hop amalgam of ruptured lupulin, when should you add it to the boil: Beginning, middle, or flameout? You've just spent some time and money milling your hops so you shouldn't let the boil volatilize all of those delicate aromas. Aim to treat this mixture as any other whirlpool hop addition but with one exception — since you'll be using whole hops be prepared to lose quite a bit of wort due to liquid absorption by the vegetative material. On the plus side, it can be used partially as a filter.

Think of Rupture as not only an extremely fresh, highly flavorful, hop-forward ale, but also as a path towards additional experimentation on hop utilization. In the decade-plus that I've been brewing, the concepts of first wort hopping and whirlpool hops have gone from theories to highly practiced techniques. But with human ingenuity, the sky is the limit as this beer has demonstrated. What other techniques to preserve hop flavor and aroma remain hidden for us to discover? Do certain hop varieties perform better than others due to their proportions of essential oils compared to alpha acids? Let's keep the conversation and thoughts going to see what ideas emerge. Prost!

ODELL BREWING CO.'S RUPTURE CLONE

(5 gallons/19 L, all-grain)
OG = 1.063 FG = 1.013
IBU = 37 SRM = 8 ABV = 6.6%



INGREDIENTS

11 lbs (5 kg) 2-row pale ale malt
2 lbs (0.91 kg) Munich malt
7 AAU Cascade hops (60 min.)
(1 oz./28 g at 7% alpha acids)
20 AAU whole leaf Centennial
hops, ground (0 min.)
(2 oz./56 g at 10% alpha acids)
26 AAU whole leaf Citra® hops,
ground (0 min.) (2 oz./56 g at
13% alpha acids)
26 AAU whole leaf Simcoe® hops,
ground (0 min.) (2 oz./56 g at
13% alpha acids)
Wyeast 1056 (American Ale) or
White Labs WLP001 (California
Ale) or Safale US-05 or
Lallemand BRY-97 (West Coast
Ale) yeast
¾ cup (150 g) corn sugar
(if priming)

STEP BY STEP

Start off by grinding up the flame-out hops. Mill the grains, then mix with 4.1 gallons (15.4 L) of 164 °F (73 °C) strike water to reach a mash temperature of 152 °F (67 °C). Make any adjustments needed for a mash pH of 5.2–5.4. Hold this temperature for 60 minutes. This is a good time to begin milling your hops that will be used at the end of the boil.

Vorlauf until your runnings are clear, and begin your sparge. Sparge the grains with 5 gallons (19 L) and top up as necessary to obtain 6.5 gallons (25 L) of wort. Boil for 60 minutes, adding hops at the times indicated. Add Irish moss or Whirlfloc if needed.

After the boil and whirlpool, rapidly chill the wort to slightly below fermentation temperature, which is 65 °F (18 °C) for this beer. Pitch yeast.

Maintain fermentation temperature of 65 °F (18 °C) for ten

days or until the completion of primary fermentation, whichever is later. Then, reduce temperature close to 32 °F (0 °C), and bottle or keg the beer and carbonate to approximately 2.5 volumes.

ODELL BREWING CO.'S RUPTURE CLONE

(5 gallons/19 L,
extract with grains)
OG = 1.063 FG = 1.014
IBU = 37 SRM = 8 ABV = 6.5%



INGREDIENTS

6 lbs. (2.61 kg) extra light dried malt extract
1 lb. (0.45 kg) Munich dried malt extract
7 AAU Cascade hops (60 min.)
(1 oz./28 g at 7% alpha acids)
20 AAU whole leaf Centennial hops, ground (0 min.)
(2 oz./56 g at 10% alpha acids)
26 AAU whole leaf Citra® hops, ground (0 min.) (2 oz./56 g at 13% alpha acids)
26 AAU whole leaf Simcoe® hops, ground (0 min.) (2 oz./56 g at 13% alpha acids)
Wyeast 1056 (American Ale) or White Labs WLP001 (California Ale) or Safale US-05 or Lallemand BRY-97 (West Coast Ale) yeast
¾ cup (150 g) corn sugar
(if priming)

STEP BY STEP

Start off by grinding up the flame-out hops. Next bring 5 gallons (19 L) of water to a near-boil before adding both dried extracts while stirring. Stir until completely dissolved. Boil for 60 minutes, adding hops at the indicated times left in the boil. Add Irish moss or Whirlfloc as directed, if desired.

Follow the remainder of the all-grain recipe for fermentation and packaging instructions.

TIPS FOR SUCCESS:

From a 30,000 foot view, take your favorite APA recipe and fresh grind all of your flameout & whirlpool hop additions. High quality, fresh, aromatic whole hops are an absolute must in this beer. Grind them at a minimum the same day that you decide to brew (preferably with a grinder that has multiple blades such as Ninja® or Magic Bullet type of mixer/blender); you could even grind while heating your brewing water or mashing in order to save time. Secondly, even in a hop-forward beer like Rupture, you shouldn't forget to provide a solid malt backbone to allow the hops to springboard off. Finally, Odell doesn't need to treat their water to brew Rupture but you should aim for a balanced water profile in general especially in regards to sulfate:chloride ratios. (BYO)



BY DAVE GREEN

BREWING WITH CHOCOLATE

Dial in your cocoa additions

When it comes to chocolate-flavored beers, adding cocoa products may not be necessary but certainly can greatly enhance the final beer. But the intricacies of what, when, and how you should add the cocoa is often a debated topic in the brewing world. We decided to delve into the nitty-gritty with three professionals highly versed in what it takes to get the best when combining cocoa and beer.

Even roasted cocoa can have a bacterial count and risk of infection in the primary is a concern.



John Nanci, aka Alchemist John, aka The Alchemist, founded Chocolate Alchemy in 2004 supplying people with all the knowledge, equipment, and cocoa beans needed to make chocolate and igniting the current Bean to Bar Chocolate movement. He is 13 parts scientist, 8 parts teacher, 5 parts innovator, 3 parts brewer, baker, & chocolate maker, 2 parts puzzle solver, 1 part maths spotter, who loves a Fibonacci sequence and, last but not least, his daughter.

For those that do want to try roasting their own cocoa beans, you can try this in your home oven. It is taken right from my site <https://chocolatealchemy.com/how-to-make-chocolate-the-complete-text-guide/#cocoa-bean-roasting>

In general, if you try oven roasting, you will start hot (350–400 °F/177–205 °C) for a short amount of time and slowly lower it to your target temperature (275–300 °F/135–150 °C). This is for about 2 lbs. (1 kg) of beans. The more you are roasting, the higher your initial temperature should be and the time will probably be a little longer.

Remember, you want to roast the cocoa beans, not bake them. This is how that looks:

Whole cocoa beans:

- 375–400 °F (190–205 °C) for 5 minutes
- 350 °F (177 °C) for 5 minutes
- 325 °F (163 °C) for 5 minutes
- 300 °F (150 °C) for 10–15 minutes or until done.

For an even better indicator of a complete roast, use an infrared thermometer and roast until the beans show 250–260 °F (121–127 °C). Make sure you stir the beans before taking your reading so you don't have a high bias. If you have nibs, you need to roast them more gently. If you are roasting for brewing, that 250–260 °F (121–127 °C) window can be radically expanded. 300 °F (150 °C) will add some deeper nutty notes, 330 °F (166 °C) will begin to add some darker roasted notes, and 360 °F (178 °C) will really accentuate a deep roast character. On the chance

you are a coffee roaster and can roast in a drum, I highly recommend it. The Behmor 1600 Plus is a great roaster.

Once the beans have been roasted, making nibs is pretty straightforward. The beans need to be cracked and winnowed. You can get the gap large enough on some grain mills, but many are too small. For a small amount (and I cringe writing this) a rolling pin with the beans in a bag will do the trick. Winnowing is no more than blowing the husk (the outer covering) away and that is easily accomplished in a bowl, outside, and with the judicious use of a blow dryer. If you happen to have a Champion Juicer, with the lower screen removed, it will crack the beans easily.

Alternatively, if you take whole roasted cocoa beans and grind them up with a blender or blade grinder, what you end up with is what I term “brewing cocoa.” It is specifically meant for water extractions so is perfectly suited for beer brewing. The husk has additional color and flavor that may (or may not) be suitable for your style. Doing it this way saves you the hassle of making nibs.

Brewing cocoa and nibs go well in both the mash and the boil. I am not a fan of either in the primary fermentation. Even roasted cocoa can have a bacterial count and risk of infection in the primary is a concern. Once alcohol is present, nibs work fine in the secondary. I don't like the flavor the husk contributes in the secondary so steer clear of adding brewing cocoa there.

This is just a partial transcript; to read more tips from John Nanci on this topic, find his complete transcript at byo.com/article/brewing-with-chocolate



Chris Mayne is the Co-owner and Brewer at Northshire Brewery in Bennington, Vermont. He started as a homebrewer, which led to opening Northshire Brewery in 2009. He likes to make traditional-style beers along with exploring free style brews. Cask-served ales are his favorite way to serve beer.

Brewing with chocolate can be a rewarding adventure or a terrible disappointment. At Northshire Brewery we brew a year-round Chocolate Stout. This is a firm 6% ABV stout brewed with English chocolate malt and a small addition of dark chocolate added in the boil. This beer has a very slight chocolate finish. We also brew our Chocolate Apocalypse for those fans that want a chocolate beer through and through. This beer is big and bold with cocoa and chocolate start to finish.

To get the chocolate intensity you want, start with dark crystal malts then add healthy amounts of chocolate malt and/or dark chocolate malt. Use up to 10% chocolate malt of total grain bill. Higher mashing temps help with sweetness but can also strip some undesirables from dark malts. Adding roasted barley and black malts later in the mash can help reduce these astringent gremlins. Adding cocoa nibs in the mash will give subtle cocoa flavors.

The boil is when you want to add solid chocolates. I like using high percentage cocoa chocolates, 92–94%. Grating the chocolate will help it dissolve into the solution. After active fermentation we add cocoa nibs. I run the nibs through the autoclave before adding to the fermenter, but a pressure cooker will also work. Keeping lots of notes, especially sensory panels, will help you fine-tune your recipe.

Cocoa and chocolate are very rich flavors, too much of either could overpower your beer. Adding lots of chocolate or cocoa also adds lots of oils and bitterness. These are side effects of big chocolate flavors. Imperial stouts can handle bigger chocolate additions better than a session beer. Colder serving temps will also help solve the “side of the tongue assault” that can come from big chocolate bombs. Finally, when brewing with chocolate, sample all of the different chocolate products before brewing. Imagine how those flavors will go with your base beer.



Wayne Wambles began homebrewing in 1993. He has been brewing commercially since 1996 and has worked at many brew pubs and breweries in the Southeast US. He has been the Brewmaster for Cigar City Brewing in Tampa, Florida since its inception in 2008.


My personal preference is always single origin cacao nibs that have been winnowed and lightly roasted. I have been enamoured with the uniqueness of some of these single origin chocolate varieties and have designed recipes around them. I have blended multiple single origin varieties in order to create more complexity too. In other cases, I have an idea for a beer that incorporates chocolate and have picked the right nibs based on the existing recipe.

I prefer to add cacao nibs to secondary, using recirculating infusion to hit my target aroma/flavor. We use a separate vessel that keeps the nibs out of the fermenter or bright tank. This process creates a homogeneous mixture of beer and chocolate, allowing us to understand where we are in the infusion process. It also expedites the infusion process versus static infusion. Static infusion can stratify, so try to gently mix if possible. If you can design a recirculating infusion device, you will not only save time infusing the chocolate but you will usually be able to use less with better aroma/flavor results. Be careful with infusion contact time and usage rate. If you go too far,

you will end up with some undesirable astringency. When it comes to quantity, it all depends on the desired impact. Targeting a range of 0.5–1.25 lbs./bbl (230–570 g/bbl, ¼–½ oz./gal., 2–5 g/L) of cacao nibs is a good range. If it's a darker, higher gravity beer, it's best to lean towards more cocoa.

Make sure that there are ample crystal malt additions and/or residual sweetness (higher terminal gravity) when you are using higher volumes of chocolate to combat astringency. This can be partially controlled by implementing higher mash temperatures too.

Be careful with cocoa powder usage versus cacao nibs. High levels of cocoa powder usage can create a chalky character in beer that leaves an unpleasant mouthfeel in the finish. Cacao nibs can increase mouthfeel of beer. If you are light in body prior to the addition, this can help. If you are targeting a lighter body, you might have to slightly adjust mash temperatures in order to account for the slight increase in body from the cacao nib usage rate.

I primarily focus on porters and stouts for chocolate infusion, but brown ales and dark mild ales could benefit from some chocolate as well. 

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LALLEMAND

BY ASHTON LEWIS

OH, YOU BRUT!

Also: Counting calories and a look inside crystal malts

Q I HAVE BEEN READING ABOUT “BRUT IPAS” AND AM CURIOUS WHAT THESE BEERS ARE, AND HOW THEY ARE BEING BREWED. ANY INFORMATION WOULD BE GREAT!

BEN BAUER
GILROY, CALIFORNIA

A Brut IPAs are the current IPA rage blazing across the nation. Kim Sturvandt at Social Kitchen & Brewery in San Francisco is credited with being the first brewer to create this type of IPA at the end of 2017. Since that time, this beer style has spread to other Bay Area brewers and beyond to other brewing regions of the US. The idea of brut IPA began as a way of drying out bigger IPAs to improve balance and to allow late hops the ability to shine. The key to this style is amyloglucosidase, an exogenous brewing enzyme used for a variety of applications. Amyloglucosidase is a mouthful, so most brewers simply call it AMG or Amylo (or the older term Convertase), taken from the trade name Amylo 300 used by many brewers to brew these brut brutes.

As long-time readers of my column know, I don’t write much about styles and prefer delving into the technical side of brewing, but I cannot ignore opining a bit about this style. When I first heard of this type of beer I concocted a mental pint that was dry, bitter, very bubbly, and hoppy. To my mental palate one word comes to mind . . . unbalanced. There is something about dry, highly aromatic, and bitter IPAs that seems out of kilter to my palate, and the exceptionally high carbonation in my mental pint accentuated the unbalance. Call me odd, I like an IPA with some malt balance. This is all preference stuff and the reason I avoid these topics when at

all possible is because we all have our personal preferences.

The bottom line was my mental pint stayed full for some time; after all, I live in Missouri and had no reference when first reading about this beer. But when I tasted an actual brut IPA I experienced something quite different, and I really liked what I tasted. Aromatic and hoppy, but not unbalanced by bitterness like many of the West Coast IPAs brewed during the race for the most extreme bitter face. And dry and bubbly, but not dry like many Champagnes, which is of course where Kim got his inspiration for the name. To my palate, the very low finish gravity boosts fruitiness by pairing back sweet, malt notes that can make for a cloying finish that competes with hop and yeast esters, and leaving a less cluttered canvas where the other beer components can shine. The dryness does not give way to the astringent notes aggravated by extremely high carbonation that were present in my mental pint. I think what is being revealed here is how biased folks, at least one, can become by the name of a beer or a beer style.

Interested in brewing a brut IPA? Keep on reading. The common feature of this style is the use of AMG. This enzyme hydrolyzes the alpha 1-6 bond found in branched dextrins left over from the action of alpha and beta amylase on amylopectin, the predominant type of starch found in all of the grains used in brewing. AMG also

The idea of brut IPA began as a way of drying out bigger IPAs to improve balance and to allow late hops the ability to shine.



Photo courtesy of Shutterstock.com

HELP ME, MR. WIZARD

hydrolyzes alpha 1-4 bonds from the end of starch chains to yield glucose. This all means that if AMG is allowed enough time to do its thing, the final gravity of beers treated with AMG will be quite low. Because the density of ethanol is less than water, very dry beers can have a specific gravity less than 1.000, or an apparent extract less than 0 °Plato, which gives way to the expression “finishing negative.”

The first AMG beer to make a huge splash was Miller Lite in 1973, but this beer was not the first of its type. Dr. Joe Owades pioneered this work at the Rheingold Brewing Company in the late 1960s and his new type of beer was originally launched as Gablinger's Diet Beer, which did not do so well. He passed along his idea to Peter Hand Brewing where Meister Bräu Lite was born. Miller acquired the brand in 1972 and relaunched it as simply “Lite” in 1973. And for about the last 40 years, the enzyme AMG has been synonymous with American-style light lagers with their bone dry character and low-level flavors.

There are really two ways to use AMG in brewing; it can be added to wort or mash in the brewhouse or it can be added to the fermenter during fermentation, and both methods have their merits. The most cautious approach is to add AMG to the mash where it becomes part of the enzyme party and works along with the activity of alpha and beta amylase. I consider this approach cautious because extended mash rests and/or increased enzyme doses are required to end up with a negative final gravity. In fact, many craft brewers have used AMG for years to slightly reduce finish gravities and have not made a big fuss about this technique because not all breweries are keen on revealing every detail about how things are done. The take home message here is that adding AMG to the mash is a good way to give this enzyme a trial without totally drying out your beer.

But if you really want to see how dry you can go, the key is adding AMG to the fermenter. Although the temperature during fermentation is well below AMG's peak temperature activity, the time of fermentation is rather long in comparison to the time of mashing. Another key difference is that the heavy lifting of starch degradation is completed during

mashing and AMG only acts upon the branched starch bits, the so-called limit dextrins, that alpha and beta amylase cannot hydrolyze in the mash, and this is a plus for the kinetics of the reaction. Most fermentations will go negative when AMG is added to the fermenter, and if they don't, they likely will ... in the bottle. Unless you are looking to produce bottle bombs, you need to allow enzymatic and fermentation activity to completely cease prior to bottling. And this brings up another dilemma; big beers may be pushing the alcohol tolerance of yeast, so the enzyme may produce fermentables that are not metabolized by yeast, which may add sweetness or become a food source for spoilage organisms. Brewers who like to harvest and re-pitch yeast from one fermentation to another need to be mindful that the yeast crop will contain active amyloglucosidase. Yet a few more reasons why using AMG in the mash is a more conservative approach. Not all brewers are conservative, so if you are plowing ahead with AMG in the fermenter, you need to consider all of these potential issues.

AMG produces glucose from limit dextrins. If you present yeast with a plate of fermentable sugars that includes glucose, maltose, and maltotriose, the glucose is preferentially gobbled up and the occasional result of this carbohydrate party are left over molecules of maltose and maltotriose; in other words we have a hanging fermentation that does not completely finish. But if the yeast are first presented with maltose and maltotriose and then presented with glucose afterwards, fermentations tend to be more consistent and are less likely to stall. So here is the take home message about AMG in the fermenter; add it after the peak fermentation is complete, but before yeast flocculation. This same approach is used by brewers who are looking to produce very high-alcohol beers using fed fermentation methods, which helps the yeast finish fermentation.

Some of these brews are carbonated to very high, Champagne-like levels and others have more normal carbonation levels. The commonality is that brut IPAs are all dried by the artful use of AMG and that is what makes this style different. So go get your brut on!

Several brewing suppliers carry AMG and they all have similar properties, but not all have the same enzyme concentration and it is important to verify suggested usage rates. In general, these products work well in the mash at temperatures ranging from 140–150 °F (60–65 °C) at a usage rate of 0.004–0.012 oz./lb. (0.25–1.25 mL per kilogram) of malt (dosage depends on supplier). AMG does work best in conjunction with alpha amylase, or after alpha amylase has had sufficient time to reduce the size of amylopectin molecules, and time of addition is one of the levers available to the brewer for process control. Alternatively, AMG can be added in fermentation at the rate of 0.0013 oz./gal.–0.005 oz./gal. (0.01–0.04 mL per liter) of beer. Check online for sources of AMG or ask your local homebrewing store to buy a liter and sell in smaller quantities. AMG solutions typically retain over 95% of their activity after a year of storage at temperatures below 65 °F (18 °C); refrigerated storage is advised.

Q I ENJOY DRINKING BEER, AS IN MORE THAN ONE AT A TIME, AND I ALSO HAVE BEEN LIKING MANY OF THESE SO-CALLED PASTRY STOUTS THAT HAVE BEEN POPPING UP AROUND THE COUNTRY. I DO TRY TO WATCH MY WAISTLINE AND AM CURIOUS ABOUT THE GENERAL METHOD USED TO ESTIMATE CALORIES IN BEER AT HOME.

DAN FARLEY
SKANEATELES, NEW YORK

A This is a fun question considering the source region; Empire Brewing in Syracuse and Canastota, NY has been brewing their Skinny Atlas Light since 1994 using water from Lake Skaneateles. Not sure that Chubby Atlas Choco Stout has the same ring to it! Calorie estimation of beer is easy if you know the alcohol and carbohydrate content of the beer in question. Alcohol contains 7 calories per gram and carbs contain 4 calories per gram. The challenge is calculating these values because there is not a direct relationship between the change in gravity during fermentation and the alcohol and carbohydrate in the finished beer. But there are some pretty solid calorie estimating formulae floating about on the web that are helpful for those brewers who want some solid estimates about calories and alcohol without having to invest in laboratory tests.

I feel comfortable with the equations presented by Dr. Gary Spedding in his presentation titled "Empirically Measuring and Calculating Alcohol and Extract Content in Beer with a Reasonable Degree of Accuracy and Confidence" because Gary explains how he derived his formulae. This is a pretty dense presentation to read, but his formulae can be used to write some handy spreadsheets. Gary presented this paper at the 2014 Michigan Brewers Guild technical conference in Kalamazoo, Michigan and posted his presentation at http://www.michiganbrewersguild.org/docs/2014-wc_gary-spedding_abv-testing.pdf. There are other such methods in the homebrewing literature and select those that make sense to you.

The equations that are handy for calorie calculations are the following:

$$RE (\% w/w) = (0.1948 \times OE) + (0.8052 \times AE)$$

$$ABW (\% w/w) = (0.8052 \times (OE - AE)) / (2.0665 - (1.0665 \times OE/100))$$

Where RE is estimated real extract, OE is the original extract (°Plato of the wort prior to fermentation), AE is the apparent extract (°Plato of beer at the end of fermentation), and ABW is the

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estimated alcohol by weight in the fermented beer.

The thing about all of these estimates based on mathematical models is that they have all been developed using lab data from a selection of “normal beers.” Spedding has a note in his presentation stating “[this estimate of real extract based on apparent extract and original extract] is only an empirical observation and applies only to traditionally fermented beers near 65% RDF (real degree of fermentation).” Pastry stouts have a much lower RDF than 65% because they typically require lots of lactose, and estimates about the caloric content of these beers must follow a different path. And for any commercial brewers reading this column, you all should do what is needed to provide accurate values for labeling. The old expression “close enough for government work” should not be provided as a footnote for guesstimates that are supplied on TTB documents. These beer estimating tools for alcohol and calories also give odd results when used for wine and cider because the models

were developed using beer.

Now that all of the legal disclaimers have been noted, it’s time to get on with some generalities to address the basic question about calories and pastry stouts. I’m not looking to establish any new calculators that will stand the test of time here, rather I want to illustrate how boosting the final gravity with lactose affects calories in a 12-ounce (355-mL) beer. The table below shows estimated calories in a range of beers that have apparent extract equal to 25% of the OG, and also shows the calories in these beers when lactose is added to boost the final gravity. I have chosen 2 °Plato, 4 °Plato, and 6 °Plato (1.008, 1.016, and 1.024 SG respectively); these figures represent the bump in original and final gravity associated with the lactose addition (the same because lactose is not fermented by yeast). These lactose supplemented brews are certainly bigger than an average brew, but when consumed like a dessert, pastry stouts are not as calorie-rich as an adult-sized serving of frozen custard.

Example	Original Extract (OE)	Apparent Extract (AE)	Estimated ABW	Estimated Calories (per 355 mL / 12 oz.)	Estimated Calories w/ Lactose + 2 °P (per 355 mL / 12 oz.)	Estimated Calories w/ Lactose + 4 °P (per 355 mL / 12 oz.)	Estimated Calories w/ Lactose + 6 °P (per 355 mL / 12 oz.)
1	10 °P (1.040)	2.5 °P (1.010)	3.1%	134	163	192	221
2	12 °P (1.048)	3.0 °P (1.012)	3.7%	162	191	220	249
3	14 °P (1.057)	3.5 °P (1.014)	4.4%	191	220	249	278
4	16 °P (1.065)	4.0 °P (1.016)	5.1%	220	249	278	307
5	18 °P (1.074)	4.5 °P (1.018)	5.8%	250	279	308	337
6	20 °P (1.083)	5.0 °P (1.020)	6.5%	280	309	338	367

Q IN AN ARTICLE I RECENTLY READ ONLINE (FROM THE SEPTEMBER 2000 ISSUE), YOU DISCUSSED CARAMEL/CRYSTAL MALTS AND THE FACT THAT THESE MALTS OFFER NON-FERMENTABLE SUGAR CHAINS. DOES THE ADDITION OF CARAMEL/CRYSTAL MALTS OFFER ANY FERMENTABLE SUGAR AT ALL, OR DOES THE STEWING AND KILNING PROCESS RENDER ALL OF THE SUGARS NON-FERMENTABLE?

MORREY THOMAS
SOUTH CAROLINA

A Morrey, thanks for letting me know that my material from 2000 is still being read today! Crystal, also known as caramel malts, do contain a mixture of fermentable sugars, non-fermentable Maillard reaction products, and starches that can be hydrolyzed during the mash by alpha and beta amylase. Not all crystal malts are produced in the same fashion and some are less thoroughly crystalline in nature than others. I have never seen any data from crystal malt producers that directly addresses your question, but there are some indicators that can be used to better understand the differences among crystal malts being produced by various maltsters.

Before jumping into this discussion, let’s take a few steps back and review how crystal malts are made. The most common method is drying “green malt” (green malt refers to germinated malt containing about 45% moisture) in a roasting drum using a special process that includes a “stewing step” that proceeds drying. Green malt is loaded into the drum roaster, heated to about 149 °F (65 °C), and held for sufficient time for malt amylases to convert malt starches into a combination of fermentable and non-fermentable sugars; essentially the malt starches are mashing inside of the malt kernel during the stewing process. The sugar-rich malt is then kilned or dried using specific time and tem-

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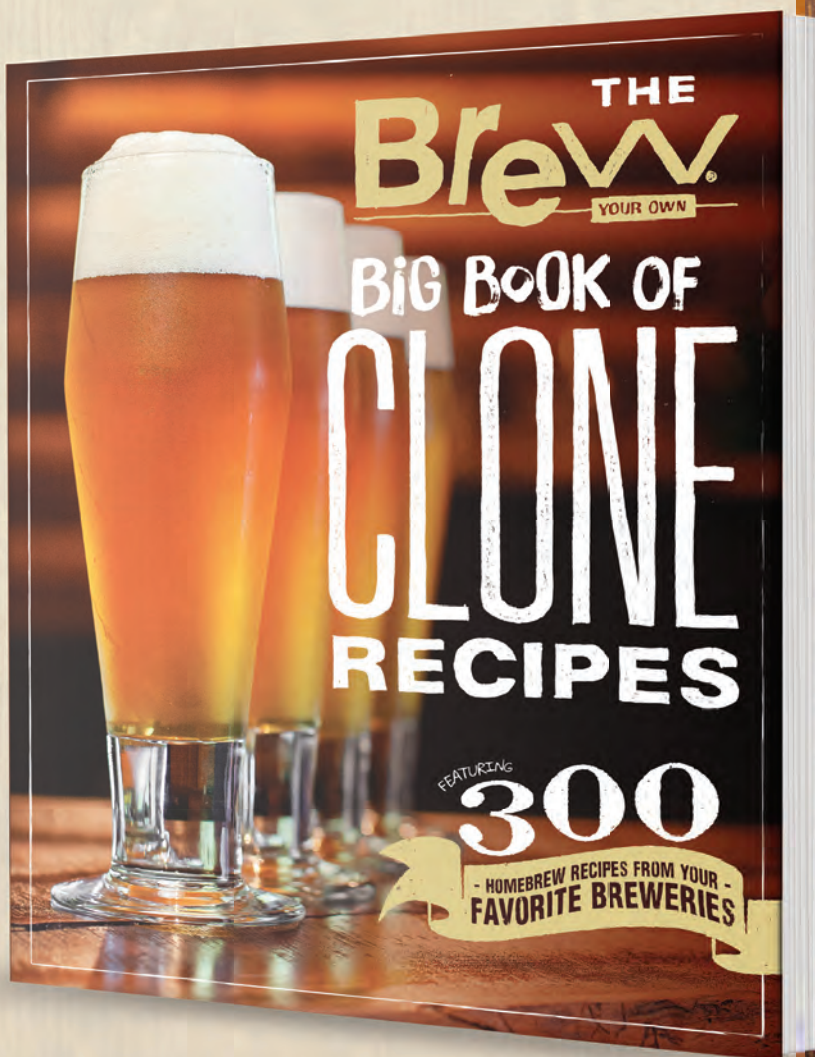
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HELP ME, MR. WIZARD

perature profiles that allow the maltster to control color and flavor development. During the kilning cycle, malt sugars and dextrins react with amino acids in the various chemical reactions that are collectively known as the Maillard reaction. Maillard reaction products, often abbreviated MRPs, range in aroma and color intensity as the reaction is allowed to continue and as kilning temperatures increase.

Crystal malts can also be produced on a malt kiln by controlling air flow, moisture within the grain bed, and malt temperature to achieve similar results as drum roasting. Process control is much better in a roasting drum, however, and the uniformity of crystallization tends to be better in drum-roasted crystals in comparison to those produced on kilns. This difference can be visually assessed by cutting malt kernels in half using a special tool called a farinator or by carefully bisecting kernels with a razor blade; the appearance of the endosperm is transformed from “mealy” to “glassy” during crystal malt production. The objective is to have 100% of crystal malt kernels appear glassy when visually evaluated after bisection, and this metric is reported by maltsters who produce crystal malts.

So what does the production process and glassiness have to do with wort fermentability? MRPs are not fermentable, and malt starches and dextrins that can be converted into fermentable sugars during mashing in the mash tun decrease as glassiness increases. This means if you

are using crystal malts with a relatively high proportion of mealy kernels that you should expect these malts to yield fermentable sugars when mashed. Crystal malts are primarily used for flavor and color at usage rates that are usually less than 10% and normally in the 5% range, so the contribution of extract is relatively low. This is a good malt to tweak in recipes by noting its influence on beer flavor. [®]



Photo courtesy of Bress Malt and Ingredients Co.

A farinator is a tool that maltsters can utilize to analyze the extent of crystallization that occurs during roasting. This kiln-roasted caramel malt has some percentage mealy (seen with white cross-section) and some percentage glassy (see with a dark cross-section).

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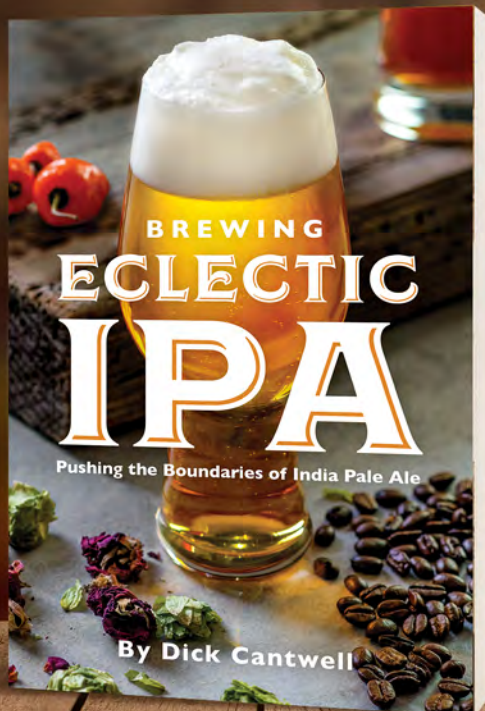
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Belgian blond ale (BJCP Style 25A) is a name given to a range of beers by the BJCP to describe the Abbey-type beers produced in Belgium, and most commonly associated with Leffe Blond.

BELGIAN BLOND BY THE NUMBERS

OG: 1.062–1.075
 FG: 1.008–1.018
 SRM: 4–7
 IBU: 15–30
 ABV: 6.0–7.5%



Photo by Charlie A. Parker/Images Plus

BELGIAN BLOND ALE

The best known Belgian Abbey beer

Some people have asked me how I choose the styles to write about in this column. At the start, it was easy — I just started writing about new styles in the 2015 BJCP Style Guidelines. But after I wrote about all of those, I now have a free hand to pick a style. Sometimes I have encountered a new style and want to describe it, sometimes I have read about a historical style and want to explore it, and other times I have enjoyed a good commercial example that inspired me. This time, I decided to let chance play a role. I said I'd write about whatever style won the next competition I judged. In Paraguay at the time, a wonderful Belgian blond won Best-of-Show, so that's what we get.

It comes at a good time since I was doing some research on Belgian beer styles and the use of designations such as Trappist, Abbey, and the like, and how they relate to styles. In 1999, the Union of Belgian Brewers created a "Certified Belgian Abbey Beer" logo for breweries that were licensed to use the name of a current or former Abbey. This followed the 1997 introduction of the "Authentic Trappist Product" logo by the International Trappist Association. However, these logos are appellations that indicate the origin and authenticity of a product, and really have nothing to do with the actual beer styles.

While the BJCP has used these terms to describe styles, they can be somewhat confusing in the marketplace. It's not that confusing for homebrewers, but the BJCP guidelines are often used for purposes other than their original intent. The Trappists are actually concerned that people will brew beers commercially and call them Trappist because it's the name of the style. Far fetched? I don't know, but

why pick a fight with monks? I don't really want a quarterstaff upside the head.

I know, Belgian blond is an Abbey style, not a Trappist style, but looking at the names of all the styles needs to be done at the same time so they don't conflict. This means that it's likely that the BJCP will make some naming changes in the future to try to clarify this usage. In the meantime, remember that Abbey and Trappist are controlled names implying origin. Blond is a color, and is used in Belgium to describe many different beers (amber and brown are the other common color names there). Belgian blond ale (BJCP Style 25A) is a name given to a range of beers by the BJCP to describe the Abbey-type beers produced in Belgium, and most commonly associated with Leffe Blond.

HISTORY

Belgium has a monastic brewing history going back hundreds of years, at least to 1200; however, this legacy is not continuous. Napoleon Bonaparte forcibly secularized France (and its conquered territories) during his reign as a way of weakening the influence of the Catholic Church. In Belgium, this meant Abbeys were abolished and the brewing equipment removed. In the 20th century, two world wars also impacted breweries as invading armies often seized equipment. So much of Belgium brewing is defined by the post-WWII era.

Much like the United States lost most of its continuous heritage due to Prohibition, Belgium had phases of brewing and rediscovery, changes to market demands, and financial influences. It makes for a nice story to have a belief in beer styles going unchanged for hundreds of years, but that really isn't true.



Since much of this style is based on what Leffe has done, let's look at their history with this beer. The Abbey Notre-Dame de Leffe was believed to have a brewery from the 1200s until the Napoleonic era, according to Michael Jackson. However, there was no record of a brewery in the early 20th century. But the monastery is believed to be the first to enter into a formal licensing agreement with a commercial brewery in 1952. Through several acquisitions, the brand became owned by InBev, and heavily marketed worldwide. You can't take two steps in Belgium without seeing the Leffe stained glass logo hanging outside a bar.

The association with a current or former Abbey is what defines Abbey beer today; at one time, it was any beer with a vaguely religious reference. While many Abbey beers are derivative of the type of beers that Trappist brewers make (dubbel, tripel, and the like), a beer like Leffe Blond is not. It was developed after Leffe Brune (Brown) was revived in the 1950s, and is basically a pale version of a dubbel. It should not be confused with the pale, hoppy, bitter, lower-strength beer brewed by several of the Trappist breweries in Belgium, nor should it be confused with the generic Belgian beer menu term that simply identifies the color.

While Leffe is the most popular example of this style (with the marketing muscle of InBev assisting, no doubt), the style is made by several other Abbey breweries such as Affligem, Grimbergen, and Val-Dieu. But these beers are in the style of Leffe, and also designed to appeal to Pils drinkers looking for something more substantial, but without the higher strength of a tripel.

While there is nothing about Abbey and Trappist designations to denote beer styles as we know them, there are some generic observations that can be made (Michael Jackson has also made these distinctions, so I don't think I'm going too far out on a limb). Trappist-made beers tend to have more character than equivalent Abbey versions, and are often more

BELGIAN BLOND

(5 gallons/19 L, all-grain)
OG = 1.063 FG = 1.013
IBU = 25 SRM = 7
ABV = 6.6%



INGREDIENTS

10.5 lbs. (4.8 kg) Belgian Pilsner malt
12 oz. (340 g) aromatic malt
1 lb. (454 g) flaked maize
12 oz. (340 g) Caravienne or caramel malt (20 °L)
5 AAU Saaz hops (60 min.) (1 oz./28 g at 5% alpha acids)
3.3 AAU Hallertauer hops (10 min.) (1 oz./28 g at 3.3% alpha acids)
4.9 AAU Styrian Goldings hops (5 min.) (1 oz./28 g at 4.9% alpha acids)
Wyeast 3787 (Trappist High Gravity) or White Labs WLP530 (Abbey Ale) or Safbrew BE-256 yeast
¾ 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 1 tsp. of calcium chloride to the mash.

Step mash: Mash in base malts (Pilsner and aromatic) and maize at 131 °F (55 °C) and rest for 15 minutes. Increase to 146 °F (63 °C) using direct heat or infusion and hold for 40 minutes. Increase to 158 °F (70 °C) using direct heat or infusion and hold for 15 minutes. Add crystal malt and raise to 168 °F (76 °C) for 15 minutes, recirculating the wort. Fly sparge with 170 °F (77 °C) water, collecting 6.5 gallons (25 L) of wort.

Boil the wort for 90 minutes, adding hops at the times indicated in the recipe. At the end of the boil, chill the wort to 67 °F (19 °C), pitch the yeast, and ferment until complete. Rack the beer. Rack and package the beer, or rack and clarify the beer if desired with finings before packaging (prime with corn

sugar and bottle condition, or keg and force carbonate).

BELGIAN BLOND

(5 gallons/19 L, extract with grains)
OG = 1.063 FG = 1.013
IBU = 25 SRM = 7
ABV = 6.6%



INGREDIENTS

7.8 lbs. (3.5 kg) pale liquid malt extract
1 lb. (454 g) Caravienne or caramel malt (20 °L)
5 AAU Saaz hops (60 min.) (1 oz./28 g at 5% alpha acids)
3.3 AAU Hallertauer hops (10 min.) (1 oz./28 g at 3.3% alpha acids)
4.9 AAU Styrian Goldings hops (5 min.) (1 oz./28 g at 4.9% alpha acids)
Wyeast 3787 (Trappist High Gravity) or White Labs WLP530 (Abbey Ale) or Safbrew BE-256 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Use 6 gallons (23 L) of water in the brew kettle; heat to 158 °F (70 °C). Steep the crystal malt for 30 minutes, then remove, allowing the bag to drip into the kettle.

Turn off the heat. Add the malt extract and stir thoroughly to dissolve completely. You do not want to feel liquid extract at the bottom of the kettle when stirring with your spoon. Turn the heat back on, add the first hop addition, and bring to a boil.

Boil the wort for 60 minutes, adding remaining hops at the times indicated. At the end of the boil, chill the wort to 67 °F (19 °C), pitch the yeast, and ferment until complete. Rack the beer. Rack and package the beer, or rack and clarify the beer if desired with finings before packaging (prime with corn sugar and bottle condition, or keg and force carbonate).



STYLE PROFILE

aggressive (drier, hoppier, maltier, etc.) while Abbey beers are often a bit sweeter or more appealing to a broader audience. Again, don't look for this in any definition, but it is a common observation.

One final footnote about the spelling of the name. "Blond" is correct in Flemish, and "Blonde" is correct in French; Belgium uses both languages, so either spelling is technically correct. Most Belgians have no problem switching between Flemish and French (and often English as well), so this really isn't a point to argue about.

SENSORY PROFILE

A Belgian blond ale is, well, blond in color – generally golden. The beer is clear with a characteristically dense and creamy white head that laces well. Leffe is described as having kind of glowing, sunshine-like color. So something in the gold range would be fine.

The aroma is malty, with Pilsner-type aromatics but with a slightly sweeter or honey-like character. Fruity esters and spicy phenols blend in, but the esters tend to be a little more prominent. I often find orange and lemon citrus notes. The phenols are more peppery than clove-like, and are a background note. A light floral or spicy hop note can be present, if it complements the other aspects. As a moderately-strong beer, a little perfumy alcohol might be noted as well.

The flavor has similar components as the aroma, with the malty flavor coming on first but with the beer finishing dry, smooth, and soft. The bitterness is moderate and balanced, but with the malt flavor winning out ever so slightly. The beer shouldn't be sharp or crisp, and the hop character should be restrained. The yeast profile is similar to the aroma, with fruity esters similar to citrus (orange, lemon) and a slight spicy peppery-phenol character. The malt can have a slight honey or faint caramelized sugar flavor, but no flavors associated with darker malts. Any hops noted should complement the yeast character, not overshadow it.

The beer is typically in the 6.5–7.0% alcohol range, so some alcohol can be noted and a light warmth. It should never burn or have a hot impression. The beer should have a moderate body but with a higher carbonation that helps liven up the beer and help the head stand. The overall character should be smooth and possibly a touch creamy, but not in a heavy way. Remember, this should be a generally dry beer.

Taken as a whole, the beer is a smooth, approachable Belgian ale with a gold color, moderately-strong alcohol, and a subtle fruity-spicy Belgian yeast character. The beer should be dry, well-carbonated, and smooth, but not crisp and biting. The balance is very slightly towards the malt, but hop bitterness is present to avoid an overly sweet impression in the finish. The malt can have a slightly sweet impression on the palate, however.

The beer might have characteristics similar to a Belgian strong golden ale or Belgian tripel, but not as intense. A Belgian blond will be a touch sweeter and not as bitter in the balance as either of those styles. It has a strength and balance similar to a Belgian dubbel, but without the darker

flavors associated with the deeper color. The beer can have a certain subtlety to it, while still showing the complexity associated with Belgian beers. So don't expect a high intensity of aromas or flavors, but it should still register as Belgian on your senses.

BREWING INGREDIENTS AND METHODS

Stan Hieronymus' classic *Brew Like a Monk* book offers a solid insight into Belgian brewing practices. His observations match my observations through several visits to Belgium. I encourage anyone interested in these types of beers to purchase this book and read it carefully.

Most Belgian beers have a base of Pilsner malt, even the dark ones. Dingemans is the most common maltster seen in Belgian breweries, although there are other Belgian and French maltsters that make fine products (Castle and MFB, for instance). If these products are not available, try German malts (such as from Weyermann) but the German malts tend to be a little cleaner. I find a subtle fruitiness in Belgian Pilsner malts that enhances their beers, so that is my first choice here.

Belgian beers traditionally get color from candi sugar syrups, not sugar rocks. In the 1990s, these syrups weren't available so many homebrewers would use a variety of specialty malts to get color and flavor. Today there are several brands of syrup available, and those are best used for Belgian beers. However, since a Belgian blond is pale, no dark syrups are needed. Pale syrup could be used, but it's basically the equivalent of using sugar. Belgians make sugar from sugar beets, so I often seek white beet sugar for this use. It's common in my area, but white cane sugar is fine too.

Looking at the range of products in a Dingemans catalog can give insight into what Belgian brewers have most available to them. When looking for additional character in a Belgian blond, the extra maltiness of Munich or aromatic malt is desirable in a light amount, as can be lower-color crystal-type malts. Since Belgian beers typically are dry, a restrained use of any crystal malts should be employed.

Hieronymus has some recipe information (but not an actual recipe) for Leffe Blond in his book. One key point that I noted is that the recipe uses flaked maize instead of sugar. I have brewed the recipe with both, and I agree that corn gives a more accurate character for a Leffe-inspired beer.

He also mentions that most Belgian Trappist and Abbey brewers use a step mash in order to get a properly attenuated beer that still has body. Similar to modern German brewing practices, I think this method helps deliver the malty but dry experience without a heavy mouthfeel. Conversion temperatures vary, but it's common to have a rest in the mid-140s °F (62–64 °C) where the bulk of the conversion takes place.

Malty Belgian beers are more common than hoppy ones (at least until recent years, with few exceptions), so hops don't have a huge emphasis. Noble-type European varieties (Saaz, Hallertauer) are common, as are Styrian Goldings and sometimes English hops such as Goldings. Bittering, flavor, and aroma additions are common, but dry hopping is not. In general, hops shouldn't interfere with the yeast character in

most Belgian styles.

Yeast drive much of Belgian brewing, and Belgian blond is no exception. While the yeast character in this style is not as aggressive as in tripels, saisons, and other similar styles, it does provide the estery and spicy notes that are commonly found in commercial examples. Hieronymus identifies Leffe as using a "house strain" but Jackson says they are using yeast from Vieux Temps. I think there are several Belgian yeast strains that would work in this style, provided the overall intensity of the yeast profile is moderate.

HOMEBREW EXAMPLE

I've played around with this recipe several times, and like the balance it has now but I always have ideas of things I'd like to try. It's a fairly simple grain bill, and I like to use Belgian malts (Dingemans, specifically) for the grains.

Pilsner malt is the base, with at least 80% of the grist. I bump up the maltiness and sweetness with a combination of aromatic malt (for maltiness) and Cara 20 (for a light sweetness). Flaked maize rounds out the grain bill, and also rounds out the flavor. I have tried this recipe with corn sugar instead of maize, and I prefer the flavor and mouthfeel of the maize.

I step mash this beer so that it doesn't wind up too full in body or sweet. If you can't step mash, try a single infusion at about 147 °F (64 °C). Belgian beers are typically well-attenuated, so don't mash too high. The beer has a soft finish, so use calcium chloride as your calcium source and steer clear of the sharper calcium sulfate salt.

Hops are European, with a mix of Saaz, Hallertauer, and Styrian Goldings. These choices were based on the *Brew Like a Monk* book. If fresh US substitutions are available (Sterling for Saaz, Vanguard or Liberty for Hallertauer), feel free to use them. I haven't really tasted anything that substitutes well for Styrians, so try to find those.

I've made this with Westmalle yeast (Wyeast 3787, White Labs WLP530) since it is a favorite of mine, but it's not likely to be the Leffe strain. Michael



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STYLE PROFILE

Jackson's *Great Beers of Belgium* book says Leffe uses the Vieux Temps strain, but I don't know that it is commercially available. Since Vieux Temps is a Belgian pale ale, I think it might be interesting to try the White Labs WLP515 (Antwerp Ale) strain (used in De Koninck, the most classic Belgian pale ale). That yeast will be a little more neutral in character, which may be better in this case.

If you do use the Wyeast 3787 yeast like I did, I have some tips for you. Don't start this too warm; it creates some strong over-ripe banana flavors when you do. Also, don't try to restrain the temperature – this yeast hates to be cooled down; it will just floc out if you do. I like to pitch around 66-67 °F (19 °C) and let it rise. It might need rousing towards the end to fully attenuate. It will produce a very high and sticky kräusen. I think beers made with this yeast need some warm conditioning time to mature. My tasting notes say the beer peaks at about three or four months. It can be a little rough, with some tart apple notes if too young. So maybe trying that Antwerp Ale yeast would be better if you need it sooner.

Another yeast that might be worth trying in this style is the White Labs WLP570 or Wyeast 1388 strains (Duvell yeast). It will be a little more estery but less phenolic than the 3787/WLP530 yeast. I haven't used it in this style, but it would be my next choice.

Remember that this beer shouldn't be as aggressively

"Belgian" as some other well-known styles (tripel or saison, for instance). You're looking for a well-balanced and drinkable beer with above-average strength, and showing a mix of Pils malt flavor, balanced bitterness, light hops, with an estery character and light spice. The finish should be soft and clean, with more of the impression of malty and corny sweetness than sugary sweetness. (BYO)



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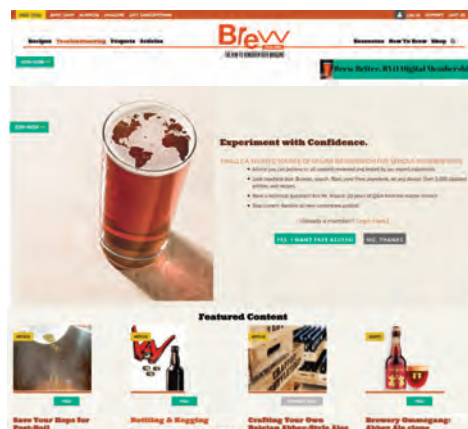
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All future *BYO* content will be added online as part of a *Brew Your Own* Digital Membership. In addition, all content from *BYO* issues dating back to 2012 has been uploaded so every article, project, and recipe in *BYO* over the past six+ years is now waiting for you in our secured digital membership website. Furthermore, as a digital member, you'll also have the benefit of:

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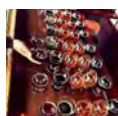
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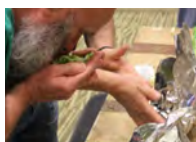
THURSDAY, MARCH 21, 2019



INSIDER TOURS OF ASHEVILLE CRAFT BREWERIES – You'll tour – and taste – at four different craft breweries around Asheville during this pre-Boot Camp offering. You'll have the opportunity to meet brewers and ask questions in addition to sampling beers. Includes a meal. A great way to kickoff your Boot Camp experience and check out some of Asheville's booming craft beer scene.

FRIDAY, MARCH 22, 2019 ASHEVILLE BOOT CAMPS

Each Boot Camp will run from 10 a.m. to 5 p.m. and is limited to just 35 people. Your boot camp includes lunch, a lunch keynote with Brian Grossman of Sierra Nevada Brewing, plus a post-Boot Camp Asheville Craft Beer Reception with local craft breweries pouring samples.



ADVANCED HOPPING TECHNIQUES – **Josh Weikert** – Join *BYO* Contributing Writer Josh Weikert as he explores when and how to add hops to create awesome hop-forward beers. You'll cover timing and techniques of hop usage including mash hopping, boil hopping, whirlpool/knockout hop stand additions, and dry hopping. You'll cover hop varietal choices, hop pairing/blending, evaluating hops including hop rubbing and sensory training, water adjustments and much more to get the most out of your hops and into your glass. *Please note this workshop will also be offered on Saturday as well.*



TROUBLESHOOTING HOMEBREW FAULTS & FIXES – **Ashton Lewis** – Join *Brew Your Own's* Mr. Wizard and Technical Editor Ashton Lewis as he walks you through the potential minefield of beer flaws and faults homebrewers can face. You'll learn how to troubleshoot – and fix! – your own homebrews with Ashton who has helped thousands of homebrewers over the last 20 years as *BYO's* Mr. Wizard. You'll have the chance to experience many faults first-hand to better recognize them later.



ALL-GRAIN BREWING ESSENTIALS – **John Palmer & John Blichmann** – Designed for intermediate to beginner homebrewers getting into all-grain brewing, this full-day workshop will cover all you need to know to successfully make great homebrews using all-grain brewing both with traditional and newer techniques. *How To Brew* best-selling author John Palmer and equipment guru John Blichmann will take you hands-on through the full all-grain process from milling, mashing, and sparging before going into the boil. You'll get to know the equipment, techniques, and ingredients first-hand and learn all-grain brewing by doing in a small-class environment. They'll also cover newer homebrew all-grain techniques such as Brew-in-a-Bag and No Sparge in addition to traditional mashing and some advanced tips as well.



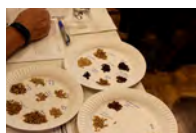
ADVANCED ALL-GRAIN TECHNIQUES – **Gordon Strong** – Pull out the mash tun and get ready to learn advanced all-grain techniques hands-on with *Brew Your Own* Columnist, book author, and President of the Beer Judge Certification Program, Gordon Strong. Gordon will walk you through a world beyond straight infusion mashing with keys to mastering step mashing, sour mashing, and decoction mashing. Plus you'll learn about playing with mash thickness and other ways to control your all-grain wort production. *Please note this workshop will also be offered on Saturday as well.*



BARRELS & WOOD-AGING – **Michael Tonsmeire** – Learn how to choose, use, and maintain oak barrels – and oak alternatives – for your brewing. Barrels are a significant investment in money, time, and beer so understanding how to properly select and use them is essential. Learn hands-on from *Brew Your Own* Columnist and *American Sour Beers* book author Michael Tonsmeire. Michael will also cover options for barrel alternatives and how to best use the broad variety of available products such as chips, staves, and spirals including both oak and non-oak alternatives. This full-day workshop will also cover special brewing and recipe considerations to making beers to complement the flavors of woods, spirits, and wines to take your wood-aged beers to a new level.



HOMEBREW EXPERIMENTS – **Denny Conn and Marshall Schott** – Developing your own recipes, refining your own brewing techniques, and tweaking your equipment set-up all require the know-how to conduct your own homebrew experiments. Without reliable results you rely on guesswork instead of facts to improve your brewing. Join two of the true leaders in experimenting with homebrews – podcaster/book author Denny Conn from *Experimental Brewing* and blogger/podcaster Marshall Schott from *Brülosophy* – as they first walk you through how to properly conduct your own experiments at home including structured blind evaluation techniques, and then walk you through some real life homebrew case studies to show how these experiments can play out. Get ready to roll up your sleeves and get your science on! *Please note this workshop will also be offered on Saturday as well.*



ADVANCED RECIPE FORMULATION – **Brad Smith** – Create your own signature recipes and learn the keys to developing the specific grain bill, hop schedule, and ingredient proportions to meet your homebrewing goals. Brad Smith, *BYO* Contributor and BeerSmith software owner, has helped thousands of homebrewers design their own beer recipes and now you'll learn first-hand from this recipe building expert how to use both artistic and scientific approaches to beer design to end up with the beer you envisioned in your glass. You'll also explore ingredients, techniques, and understanding your own brewing system. *Please note this workshop will also be offered on Saturday as well.*



ADVANCED YEAST TECHNIQUES – **Dr. Chris White** – Join Dr. Chris White of White Labs as he discusses how to master different yeast-related techniques including harvesting yeast, figuring cell counts and viability, the do's and don'ts of repitching including steps such as yeast washing, building up a proper yeast starter, storing your yeast samples, and much more! Here's your unique chance to learn in a full-day seminar format about getting the most from your yeast from one of the true leaders in the beer yeast field.

TWO-DAY BOOTCAMP: COMMERCIAL BREWERY START-UP – **Steve Parkes** – When you register for this Boot Camp you will attend it for both Friday and Saturday unlike our other offerings to better cover more material in greater depth. Opening a commercial craft brewery is a far cry from just ramping up the amount of beer you brew. Over Friday and Saturday 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 has 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.

SATURDAY, MARCH 23, 2019 ASHEVILLE BOOT CAMPS

Each Boot Camp will run from 10 a.m. to 5 p.m. and is limited to 35 people. Your Boot Camp includes lunch, a *BYO* Columnist Q&A lunch keynote, plus a post-Boot Camp Asheville Craft Beer Reception with local craft breweries pouring samples to wrap up your full day.



SOUR BEER TECHNIQUES – *Michael Tonsmeire* – Learn hands-on traditional European as well as newer American methods to produce sour and funky beers from Michael Tonsmeire, the *Brew Your Own* Columnist who literally wrote the book on the subject with *American Sour Beers*. Michael will demonstrate the unique skills needed to create your own delicious sour beers including wort production (extract and all-grain), growing alternative microbes, blending, aging on fruit, and sanitation. The focus will be on practical topics difficult to convey by words alone, so no biology or chemistry degree required. You'll leave with a clear understanding of the processes to reliably produce sour beers suited to your palate and desired time frame.



HANDS-ON HOMEBREW SCIENCE – *Ashton Lewis* – Get hands-on with pH meters, refractometers, slants and loops, stir plates, centrifuges, and other brewing science gear with *BYO* Technical Editor and Mr. Wizard Columnist Ashton Lewis. Learn how to accurately count yeast using a microscope, culturing yeast, using slants, harvesting yeast, washing and reusing yeast, propagation and determining growth rates, and more. Here's your chance to learn up close and personal what you may have read in books or magazines, or listened to in seminars, and Kara is the perfect teacher to lead you personally through the world of yeast using lab equipment you can source for your own home use.



ADVANCED YEAST LAB – *Kara Taylor* – Join White Labs' Laboratory Operations Manager Kara Taylor at White Labs' Asheville facility for some hands-on yeast lab work to develop skills you can bring back home to help you make better beer. Learn how to accurately count yeast using a microscope, culturing yeast, using slants, harvesting yeast, washing and reusing yeast, propagation and determining growth rates, and more. Here's your chance to learn up close and personal what you may have read in books or magazines, or listened to in seminars, and Kara is the perfect teacher to lead you personally through the world of yeast using lab equipment you can source for your own home use.



BREWING WATER ADJUSTMENTS – *John Palmer* – Water is the least understood ingredient when making great beer. John Palmer, who literally wrote the definitive book on the subject, *Water: A Comprehensive Guide for Brewers*, will help take the mystery out of water's role in brewing and how to make better beer as a result. You'll learn how to read water reports, understand flavor contributions, and how to adjust your brewing water to brew different styles of beer. You'll leave with not only an understanding of the chemistry concepts of brewing water, but also the practical how-to aspects of getting the most from this critical ingredient.

Due to many requests we are repeating four of our most popular Boot Camp topics from Friday again on Saturday to give more people the opportunity to register for the following workshops that have all sold out at prior locations.



ADVANCED HOPPING TECHNIQUES – *Josh Weikert* – Join *BYO* Contributor Writer Josh Weikert as he explores when and how to add hops to create awesome hop-forward beers. You'll cover timing and techniques of hop usage including mash hopping, boil hopping, whirlpool/knockout hop stand additions, and dry hopping. You'll cover hop varietal choices, hop pairing/blending, evaluating hops including hop rubbing and sensory training, water adjustments and much more to get the most out of your hops and into your glass. *Please note this workshop will also be offered on Friday as well.*



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SUNDAY, MARCH 24, 2019



INSIDER TOURS OF ASHEVILLE CRAFT BREWERIES

You'll tour – and taste – at four different craft breweries around the Asheville during this post-Boot Camp offering. You'll have the opportunity to meet brewers ask questions in addition to sampling beers. Includes a meal. A great way to wrap-up your *BYO* Boot Camp experience and check out some of Asheville's booming craft beer scene.

TWO-DAY BOOTCAMP: COMMERCIAL BREWERY START-UP

– *Steve Parkes* – When you register for this Boot Camp you will attend it for both Friday and Saturday unlike our other offerings to better cover more material in greater depth. Opening a commercial craft brewery is a far cry from just ramping up the amount of beer you brew. Over Friday and Saturday 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 has 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.



REGISTRATION

ASHEVILLE, NORTH CAROLINA

MARCH 22 & 23, 2019

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- ☐ **ONE-DAY REGULAR REGISTRATION - \$275**
EITHER FRIDAY OR SATURDAY BOOT CAMP (choose only one below)

Friday, March 22, 2019

 - ☐ Advanced Recipe Formulation
 - ☐ Barrels & Wood-Aging
 - ☐ Advanced Hopping Techniques
 - ☐ Troubleshooting Homebrew Faults & Fixes
 - ☐ Advanced All-Grain Techniques
 - ☐ Homebrew Experiments
 - ☐ All-Grain Brewing Essentials
 - ☐ Advanced Yeast Techniques

Saturday, March 23, 2019

 - ☐ Hands-On Homebrew Science
 - ☐ Sour Beer Techniques
 - ☐ Brewing Water Adjustments
 - ☐ Advanced Yeast Lab

Please note due to repeated requests we are repeating four of the most popular Boot Camp topics from Friday again on Saturday to give more opportunity to register for the following workshops.

- ☐ Advanced All-Grain Techniques
- ☐ Advanced Hopping Techniques
- ☐ Advanced Recipe Formulation
- ☐ Homebrew Experiments

- ☐ Turning Pro & Commercial Brewery Start-Up - TWO DAY BOOT CAMP

****PLEASE NOTE A SEPARATE REGISTRATION FORM & FEE IS REQUIRED FOR EACH BOOT CAMP ATTENDEE****

REGISTRATION FOR BOOT CAMP INCLUDES:

- ◆ 10 a.m. to 5:00 p.m. Boot Camp limited to 35 people per class
- ◆ Lunch with your Boot Camp group plus lunch speakers each day
- ◆ Course materials
- ◆ Boot Camp Welcome Bag from Sponsors
- ◆ One year (8 print issues) Subscription/Renewal to *Brew Your Own* magazine
- ◆ Asheville Craft Beer Reception with local craft breweries pouring samples
(Discounted hotel room needs to be reserved directly with the Crowne Plaza Asheville, go to BYOBootCamp.com for details)

PAYMENT METHOD

- ☐ Check Enclosed (payable to *Brew Your Own* magazine)
- ☐ Credit Card ☐ Visa ☐ MasterCard

Card # _____ 3-Digit CCV# _____ Exp. Date _____

Name on card: _____

Signature: _____

By registering for the Boot Camp 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 February 22, 2019. Refund requests received after February 22, 2019 will not be refunded. All refund requests will be processed post-Boot Camp. Early Bird Discount registration must be received and paid for by January 22, 2019.

HOTEL INFORMATION

The BYO Boot Camp will take place March 22 & 23, 2019 in Asheville, North Carolina at the Crowne Plaza Asheville. We've reserved a limited number of rooms at a special discounted rate for Boot Camp attendees. Check out BYOBootCamp.com for full details on reserving your discounted room.

4 WAYS to REGISTER

WEB PAGE:
BYOBOOTCAMP.COM

MAIL THIS FORM WITH PAYMENT TO:
BYO BOOT CAMP
5515 MAIN STREET
MANCHESTER CENTER, VT 05255

PHONE:
802-362-3981 EXT. 106

FAX THIS FORM TO:
802-362-2377

ASHEVILLE CRAFT BREWERIES INSIDER TOUR


Thursday, March 21, 2019 (\$135)

- ☐ 11 a.m. to 3:45 p.m.
- ☐ 4:00 to 8:00 p.m.

Sunday, March 24, 2019 (\$135)

- ☐ 12:00 to 4:00 p.m.





FRUIT CIDER

by Michael Fairbrother

Hard apple cider with a
fruity twist



Photo by Charles A. Parker/Images Plus

Cidermaking is a journey. Don't be fooled by anyone who tells you it's easy, as developing a delicious hard cider requires a lot more artistry than simply adding yeast to apple juice. Cidermaking requires you to develop, refine, and master many different skills. When you add the additional layer of fruit to your cider, it requires even more understanding of how these new flavors will fit with those from the apples. My hope is to provide some basic guidelines and inspire you to set off on a journey of becoming a cider artist. I view what I do these days as being a fermentation artist, the magic to making world-class beer, mead, or cider all require a mastery of fermentation.

I started making cider in the fall of 1995 as the Brew Free or Die and Boston Wort Processors homebrew clubs had an annual cider picnic. Paul Correnty, who went on to author *The Art of Cider Making*, was selecting the apples that were pressed into cider, and I was fortunate enough to start my cidermaking journey among such a dedicated group of enthusiasts.

Until recently, there used to be two typical forms of hard cider — sweet varieties and dry ciders. As has happened with homebrewers and craft brewers pushing the envelope of beer, exploring new styles and using unusual ingredients has also become the norm in cidermaking. It's common when visiting a cidery to find various ciders with unique ingredients including fruits, spices, or hops, ciders fermented with different yeast strains, and ciders aged in oak barrels.

Just as varied as the styles of ciders, or the number of apple varieties and fruits that can be used to make fruited cider, so too are the methods to cider production. Before you jump into fruited cider, it's important that you understand the basics of making hard cider, which I'll cover here in addition to the nuances that come with making hard fruited ciders.

HOW YOU LIKE THEM APPLES?

It all starts with great apples and the farmers who grow them. I recommend going to the source and talking with the farmers. Appreciate what goes into farming and the growing of apples. Understand the yield, flavors, sweetness, and acidity of the apples as they differ year to year. Farmers are critical in cider production. The orchard needs to be protected from disease, frost, and wildlife. With many orchards in danger of becoming future development properties, go out and support the local apple growers, and at the same time soak up their knowledge about their apples. Hey, it also makes for a great fall day out with the family.

Most of the sweet apples that are abundant in grocery stores and farmer's markets will work for making hard cider, but I like to get a pretty diverse blend of dessert apples and cidermaking apples (some of which are so tart you would never eat them on their own). At Moonlight Meadery (of which I am the owner as well as Meadmaker and Cidermaker), we use as many as 12 different varieties of apples, but that's because we are trying to maintain some consistency to our batches of hard cider. The apples we have access to in late spring have been kept cold under nitrogen all winter, are usually a little sweeter, and have dehydrated a little. Apples you've heard of, like Macintosh, Cortland, Gala, Liberty, or Northern Spy

often provide the principal flavors. Lesser-known heirloom apples contribute subtle layers of flavor, acidity, and tannins.

FRUIT OPTIONS

When it comes to fruit selection to add to a hard cider, there are no wrong answers. However, some definitely pair with apples better than others. I have had good success with fruits like black currants, cranberries, boysenberries, and raspberries. What each of these fruits have is a fair amount of acidity that builds onto what the apples bring. I normally shoot for 10–20% of the sugars coming from the non-apple fruits. This way you still get plenty of apple character with a light fruit note. Adjust the amounts as you like, but just be forewarned fruits like black currants are very assertive.

With fruited ciders you can add the fruit either before fermentation or afterwards. The flavor and aroma will change based on when you make the additions. Fruit additions made prior to fermentation will lose some of the fresh fruit flavor and aroma, but still help create a tasty fruit cider.

When making fruited cider on a small scale, I would buy organic fruit juice from the grocery store and add it prior to fermentation. Where 2 to 4 quarts (or liters) would make up that 10 to 20%, in a 5-gallon (19-L) batch, this is an easy way to make fruit cider by blending the fruit juice with your sweet (non-fermented) cider.

When making a fruited cider with the fruit added after fermentation to back sweeten a dry cider, I use much less juice and back sweeten to taste. Keep in mind, when going this route, stabilization will be needed to ensure refermentation doesn't occur. This can be done with the addition of sorbate and sulfite. The best way to determine how much juice to add when back sweetening is to perform bench trials and then scale up your batch when you find a taste you like.

The form of the fruit you use is another question that you'll have to answer, and there are a few good options including juice, puree, and fresh or frozen fruits. If going with juice, which is by far the easiest option and results in a great, clean flavor, just make sure it contains no preservatives, like sorbate, that might inhibit your yeast. Pasteurized or sterile juice is fine.

If you go with fresh fruit, I recommend pressing the juice from the fruit vs. the option of adding bagged, crushed fruit. Having access to a press will make it easy to press softer fruits to create juice that you can use when making your fruited cider. Hard fruits need to be ground up prior to pressing (similar to how you would prepare your apples). The fruits I listed in Chart 1 at the bottom of this page are all easily pressed without the need of grinding before pressing. Another option to make pressing easier is to freeze the fruit first (cutting it into chunks if using larger fruits), and

Chart 1: Fruits, sugar contents, & tasting notes from Michael Fairbrother's ciders.

Fruit	Gravity	Notes
Raspberry	1.036	Lightly tart, works well with sweet cider.
Blackberry	1.043	Slightly sweet, works well with drier ciders.
Black Currant	1.047	Tart, wine-like, works well from dry to sweet.
Boysenberry	1.052	Great depth, like it in a semi-sweet cider.
Tart Cherry	1.036	Well-balanced, semi-sweet to sweet.

Moonlight Meadery Fruited Cider Clone Recipes

Boys N Berries

4 gallons (15 L) sweet apple cider
1 gallon (4 L) boysenberry puree
4 Campden tablets
1 packet Lalvin Narbonne
71B-1122 yeast
1.5 tsp. Go-Ferm

Crimes of Passion

4.5 gallons (17 L) sweet apple cider
0.5 gallon (2 L) black currant juice
4 Campden tablets
1 packet Lalvin Narbonne
71B-1122 yeast
1.5 tsp. Go-Ferm

Razz What She Said

3.5 gallons (13 L) sweet apple cider
1.5 gallon (6 L) raspberry juice
4 Campden tablets.
1 packet Lalvin Narbonne
71B-1122 yeast
1.5 tsp. Go-Ferm

STEP BY STEP

Add juices and Campden tablets to a sanitized fermenter. Place sanitized airlock onto fermenter and wait 24 hours. After the 24 hours, prepare yeast by adding the 1.5 tsp. of Go-Ferm to ½ cup of hot water and mix. Let the mixture cool to 104 °F (40 °C) and then add the active dried yeast. After 15 minutes (yeast should begin to foam), stir well to mix the yeast into a slurry. Pour the yeast slurry into the fermenter. Seal fermenter with a sanitized airlock and put fermenter in an area that is 65 °F (18 °C).

When fermentation stops and the specific gravity as measured by a hydrometer is stable (has not changed over the course of several days), it is ready to transfer the cider into a secondary fermenter. Sanitize your secondary fermenter and siphoning equipment. Carefully siphon the fruited cider into the secondary fermenter. Leave as much sediment as possible in the primary fermenter. Let the cider clarify in the secondary fermenter. You may wish to add a fining agent such as isinglass to facilitate clearing, and/or potassium sorbate to prevent further fermentation.

At this point in the process you're going to want to taste your cider and see what final adjustments need to be made. This

is where your skills really will shine as you need to balance the acidity, and sweetness.

I recommend using sanitized siphoning equipment to pull a small amount of cider to sample, and if needed, then back sweeten to taste and stabilize. Options for back sweetening are limitless — you could use fruit juice, sugar, honey, etc. The challenge is not to ruin what you have worked so hard at. The fermentation process causes particular matter to drop, and when you rack off the sediment it results in your clear finished product. If you were to add juice to back sweeten, you should expect that this will leave some sediment in the fruited cider. However, you can get a rather amazing fruit note by adding juice to the finished fruited cider.

If you wish to bottle condition your stabilized cider, wait 24 hours and then add priming sugar. Use a bottle-conditioning calculator to get the right carbonation level. Bottle conditioning will produce a dry cider and cannot be used if sorbate has been added to stabilize a sweet cider.

You can bottle or keg your fruited cider the same way you would your homebrew. Hard fruit ciders can be consumed after two weeks of bottling and aged for six months or more to achieve superior flavor.

.....



then thawing them. This freezing and then thawing of the fruit will help release the juice and make pressing easier. When using stone fruits you should slice and remove the pits prior to pressing.

SANITATION

Freshly pressed cider and fruit juice is going to be full of wild yeast, some of which can provide unwanted results. Without the step of boiling in the cidermaking process, it's extra important to sanitize all surfaces (remember you can't sanitize something that isn't clean) in your brewing area. Follow a strict protocol on cleaning and sanitation — it will only help you make better fermented beverages in the long run.

SUGAR CONTENT AND ACIDITY

I highly recommend you record everything you do in the cidermak-

ing process in order to allow you to adjust/improve your skills as a cidemaker. A hydrometer is used to measure the sugar content (density) of the must. This provides a means of knowing the quantity of sugar, and the potential alcohol strength. The measurement of pH is necessary only for the dose of sulfite to the must. In addition, the total acidity (TA) will help you understand the perceived sweetness of the finished cider and can be found using an acidity test kit.

SULFITE AND PECTINASE

Sulfur dioxide, or SO₂, is a chemical compound used by winemakers to help keep their wine protected from the negative effects of oxygen exposure as well as spoilage micro-organisms. SO₂ management is beyond the scope of this column, suffice to say it is also important to be aware of it in cidermaking. For more on the subject, please

visit <https://winemakermag.com/article/634-solving-the-sulfite-puzzle>. This is a process that requires accurate pH level measurement.

For North American apples that are fairly sharp, you are looking for a dosage of 40 to 50 ppm of SO₂ — this equates to adding 1.8 grams (just less than a ½ teaspoon) of potassium metabisulfite that is dissolved into some juice and mixed into the must 24 hours prior to pitching the yeast. If using Campden tablets, four in a 5-gallon (19-L) batch will provide 50 ppm of SO₂. Please use caution and don't consume or smell the freshly sulfited juice.

The usage of pectic enzyme or pectinase breaks down some of the pectin chains in the juice, which will help the cider clear once fermentation is completed. This is an optional step, and I made cider for 20+ years without it, but have now used it for the past 3 years as a commercial ci-

dermaker. Think of this treatment as an insurance policy, it doesn't hurt and provides increased odds that the cider will be perfectly clear when finished. For my operations, any pectin in the fermented ciders could damage our filtration system.

FERMENTATION MANAGEMENT

This is the most critical step, and applies to beer and meadmaking as well. The yeast being kept in an ideal environment will only make for a better fermented beverage. Each yeast is different, for how much nutrients it requires, what temperature it likes to ferment at, how aggressive it is towards other microbes, and the other characteristics it creates.


I exclusively use Lalvin Narbonne 71B-1122 for all the cider that we make and follow the optimal yeast rehydration protocol from Lallemend. Ideally, you are looking to maintain a

ratio of 1 part yeast to 1.25 parts yeast rehydration nutrient. For this strain, fermentation works best at 64–68 °F (18–20 °C).

Non-grape fruits are often low in nitrogen; the result is that the yeast creates hydrogen sulfide. Nutrients like Fermaid O can remedy this, and supply the yeast with the missing nitrogen. At about 1/3 of the way through fermentation, add 1 teaspoon of Fermaid O. Additionally, using the Tailored Organic Staggered Nutrient Addition (TOSNA) process like a lot of commercial meadmakers follow for their meads, would also work. The TOSNA process uses Fermaid O along with a Go-Ferm addition that is added when hydrating the yeast. Fermaid O is added in equal size increments at 24, 48, and 72 hours after pitching the yeast, and lastly at either one week or when the 2/3 sugar break is complete. The size of the Fermaid O addition is dependent on the nitrogen

requirements of the yeast, original gravity of the must, and batch size. The formula to determine the total Fermaid O addition is :

$$\text{Initial Sugar (g/L)} \times \text{Nutrient requirement} \times \text{batch size (gal.)} / 50 \text{ (ppm)} = \text{Total Fermaid O (grams)}$$

For more on the TONSA-2 method, visit www.meadmaderight.com. 

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ORGANIZE a HOMEBREW COMPETITION

Best practices to create a successful, fun homebrew competition

by Gordon Strong

The task of organizing a new homebrew competition can seem quite daunting — after all, it's a lot of work and many people have been doing this for years. How can you as an individual, homebrew club, or organization create an experience that both entrants and judges will enjoy without killing yourself in the process? Never fear, I've pulled together recommendations from experienced competition organizers that can get you started on the right foot. I've organized or been on the staff of dozens of competitions and have judged at hundreds more around the world. Many are run in a similar manner, but there continues to be innovation as some groups try new approaches. Not all are successful, but

experimentation and risk-taking can produce breakthroughs. By sharing these lessons learned, all competitions can take advantage of these improvements without taking the risk.

So let's take a look at competitions by asking some basic questions.

WHAT DOES A GOOD COMPETITION LOOK LIKE?

Not all competitions are created equally. Judges and entrants shouldn't expect the same experience every time, but some of the better competitions tend to share some common features:

1. The competition should match its goals. Some groups want a large competition, while others are

seeking to give local judges more experience and practice. Yet others are having a day of celebration for the local homebrewing community. If you don't know what you're trying to do, how can you plan for it?

2. A good competition has sufficient judges so the flight sizes are reasonable. Don't abuse the judges by making them judge an unreasonable number of entries; they won't likely return.
3. The competition should draw good quality entries. If your competition gains a reputation of being a death march of crappy entries, you may find yourself short of judges in the future.
4. The competition day runs smooth-



All entries should be sorted into appropriate flights prior to the start of the competition so judging moves along smoothly and any troubleshooting can be done beforehand.

ly without wasted time. There are distinct phases to a competition, and it should move between them without having an entire room doing nothing. Judges are a finite resource; you don't want to squander them.

5. Many competitions offer something special for judges, such as good food, a technical talk, a companion event, a raffle or prizes, or some other attraction. Some competitions give away volunteer appreciation packs with stickers, glassware, and other giveaways, and sponsors are usually willing to give, knowing all the volunteers will get something from them.

Do you see a theme here? You are trying to make your competition easy on your judges so that they are happy to volunteer. If you have good judges and keep them happy, they'll do a good job and your entrants will receive more thoughtful and valuable feedback on their score sheets. If entrants are happy, they'll keep entering your competition and tell their friends and clubs of their experience.

WHAT KIND OF COMPETITION DO YOU WANT TO HAVE?

The Beer Judge Certification Pro-

gram (BJCP) registers over 600 competitions a year all around the world. There are plenty of competitions, so on any given day you will have others who are doing the same thing you are — trying to draw entrants and judges to a homebrew competition. Brewers tend to enter competitions for two basic reasons: To compete and hopefully win a medal, or to get feedback on their beer to help them improve as brewers. You can accomplish both in the same competition, but sometimes you need to choose.

So you should decide on your overall goals. Are you trying to make money for your club, sponsor, or charity? If so, you need to take specific actions to raise money while controlling expenses. Seek sponsors, ask for donations, have a raffle, or do other things that generate revenue or reduce expenses. You will seek to have a larger competition and to judge as many entries as is practical, so organization and speed are of the essence.

If the purpose is fundraising, some added revenue ideas are “sponsor a category” where the sponsor's name is listed in the results for that category, is announced during the awards, and can even give special prizes for the winner of that category. Adver-

tising sponsors on social media also helps drive awareness of your competition. Additionally, having sponsors for items that are needed — glassware, bottle openers, food, etc. — helps cut cost. Best of Show and other major awards should have a nice prize associated with them. Knowing this ahead of time can help drive more entries to the competition.

Are you trying to increase judge experience? Then you may want to have training sessions, limit entries or flight sizes, encourage new people to judge, and pair these people with experienced judges who enjoy mentoring. A slower pace will encourage discussion and education.

Are you trying to give the best feedback possible? Training sessions and education can also be used here, but being selective about the judges used is also important. Judges with no experience should be encouraged to steward so they can learn without giving scored feedback. The stewards can even fill out a scoresheet or take notes on the beer to see how they compare to the judges and get practice. Many new judges started because of the experience of having stewarded. The pacing depends on what judges can handle, but smaller flights will keep judges fresh.

There are many other factors, but they tend to influence the competition size (number of entries accepted), the judge pool (number and experience of judges), the flight size (number of entries judged by one panel of judges), and the pacing.

WHAT RESOURCES DO YOU HAVE?

Competitions typically use volunteer labor, often from local clubs. How many people do you have that can be on the support team, and how experienced are they? Have they performed these roles before, or have they watched others do them? Inexperienced helpers will require more oversight.

How many judges do you expect to draw? You have to invite them or incentivize them to attend; they often have choices of which competitions to judge. Some ways that you can make

it appealing for them are to offer discounted hotel rates or the option of staying with local club members, offering speakers or a technical program in conjunction with the competition, and having prizes, food, and a good location with ample parking to make it convenient.

What does your judging venue look like? How many tables of judges can you seat? How much cold storage space do you have, and how long do you have it? This can affect the delivery window for entries. Does it have air conditioning or heat, depending on the season? Is it quiet and free from distractions? How many days and sessions can you schedule? Will you need other days to do pre-judging before the competition?

I have seen competitions be overwhelmed by more entries than they are able to judge. It's not a pretty sight, and the judges often pay the price. Setting entry limits based on what you are reasonably able to judge in the time allotted is often the most prudent choice.

Are you using competition management software (such as BCOE&M)? Have you tested it, and done any competition-specific customizations like adding special entry categories? Do you understand how the software affects the judging on competition day? Does it produce the paperwork necessary for tracking and judging the entries, recording the results, and quickly identifying winners? Software can even allow for scoresheets to be scanned and posted, giving entrants quick results, saving money on mailings and can be finished soon after judging. These scoresheets can also be used along with leftover entries for a BJCP study group to help bring along more judges for future competitions.

Now let's take a look at how to plan for the event itself.

THE COMPETITION TEAM

One of the most important jobs a competition organizer does is to choose the team. For larger competitions, the organizer is basically a project manager who ensures that people are assigned to all tasks, the work is being done, that schedules are being



Making sure all of the tables, chairs, and judging supplies are set up and tidy prior to, and throughout, a competition makes for a comfortable environment.

met, and that information is flowing between team members. The organizer is ultimately responsible for the entire competition, so that person must verify that tasks are done.

The logistics can be divided into three phases: Before the competition, during the competition, and after the competition. All the pre-competition work is planning and organizing. When entries arrive, they must be unpacked, sorted, labeled, and prepared for competition. A sorting team is needed, usually under the direction of the cellar master.

A web coordinator makes sure that competition entry software is set up properly, and that entries can be registered and paid. A different person may handle communications, or this could be part of the organizer or web coordinator job. One job they may also be required to do, depending on your local/state regulations, is submit an application for a permit to hold the event. If so, be sure to understand the timeframe and information needed in order to hold the competition.

The judge director recruits judges, organizes entries into flights, and assigns judges to flights. The judge director must have knowledge of entries so that styles can be grouped into flights, and that judges with

entries aren't assigned to their own beers. Combining categories with low entries is a good way to reduce the number of flights and provide a reasonable amount of competition in a given category.

There are other critical jobs involved with the venue, such as making sure all the tables, chairs, judging supplies, and related items are properly set up. Often the head steward will take on this role, as well as organizing, training, and instructing stewards during the competition. If you have access to the venue the night before setting everything up early makes competition day that much easier.

On the competition day, the cellar master controls the flow of entries from the cellar to the judging tables. Someone must handle data entry as flights are completed; this can be a dedicated data entry person, the cellar master, the competition organizer, or another staff member.

The judge director handles issues related to judges and judging on competition day. One of the big problems is no-show judges, which can wreck a carefully-planned schedule. Many competitions deal with this by planning a bullpen, or group of unassigned judges that can fill in for miss-

ing judges. If all judges arrive, the bullpen judges normally get assigned as a third judge on an existing flight, or might form additional teams to help finish slow moving flights.

The judge director should be ready to swap judges due to unexpected problems (“I can’t judge this flight; I was a co-brewer of an entry,” “I’m allergic to an ingredient,” “I think I recognize an entry,” and so on). Some judges will have questions about entries during the competition that stewards can’t resolve — those issues are typically escalated to the judge director or competition organizer.

The head steward makes sure the tables are being served properly by stewards, and that judging is moving along at a good tempo. Having adequate supplies and helpers is important, but so is anticipating the needs of judges and being ready for the next phase of the competition. Resetting tables between flights so sessions start promptly is often a sign of a well-run competition.

After the competition, the major tasks are cleaning up the room, organizing paperwork so score sheets can be returned to entrants, disposing of leftover entries, holding awards ceremonies, shipping prizes, medals, and score sheets, and thanking the sponsors and volunteers. When cor-

responding with judges and entrants, it is often a good idea to identify when the competition will happen next year so they can save the date.

For smaller competitions, some of these roles can be combined. However, if growth is anticipated in future years, it may be a better idea to start dividing the work from the start. This allows processes and communications to be tested without the stress of a huge competition.

Whenever people are assigned to roles, it is a good idea to have new helpers shadow them to learn the jobs. This is especially important for the key roles; while many people do these jobs year after year, always relying on the same people can become risky if they get burnt out or become unavailable one year. Competition organizers should also be open to new organizers from other competitions coming to observe and learn; this is a great way for new people to understand what is required.

MODERN PRACTICES

Competitions have changed quite a bit since I started judging over 20 years ago. It used to be common for panels of three judges to evaluate 12 or more beers in a flight. Judge speed varied, so it also was fairly common for

sessions to run late as slower judges struggled through their flights.

With many more judges today, it is reasonable to try to have flights of 6 or 7 beers with two judges per panel. The use of a “mini-Best of Show (BOS)” to reconcile multiple flights of the same category to select overall category winners greatly reduces the workload and maintains the palates of judges. When judges don’t get fatigued they can complete their assignments in a predictable amount of time.

The use of “queued judging” for large categories also speeds up the rounds. Multiple panels of judges work from a common list of beers for a category. If one group of judges is slower, then other panels will judge more, but all panels finish at nearly the same time. The best few beers from each panel are then re-evaluated in a mini-BOS to select the overall winners.

As competitions have grown, some competitions have added extra days of judging, including some pre-judging where a few categories are finished before the bulk of the judging happens. This is a good practice for dealing with odd sized flights or those that require special skills (meads and ciders, for example). Sometimes just a few extra pre-judged categories is the difference between relaxed happy



The head steward is responsible for making sure flights are being poured properly by stewards and that judging is moving along at a good tempo.

judges and stressed, fatigued judges.

The use of a bullpen to have judges in reserve is a good idea for a large competition. When used with queued judging, extra teams can be added when all judges are seated, or the judges can join an existing flight.

It is quite common for competitions to set an entry limit to prevent overload of their system. Various quota systems can also be employed, such as limiting the number of entries per brewer, to be more open to all competitors.

Competitions often try new processes and methods, but many experienced BJCP judges are set in their ways. You are free to experiment, but judges often have expectations about the normal flow of activities. So if you try something new, be sure to explain what you are doing to the judges so they aren't surprised. You may also want to plan some additional time in the schedule for them to understand, practice, and become familiar with your unique approach.

TWO CASE STUDIES

I've recently attended several well-run competitions. I talked to key members of two of these events to capture their thoughts on what contributed the most to their success.

Jack Smith and Mike Beattie TRASH Homebrew Club (Pittsburgh, Pennsylvania)

They want to have a one-day competition and expect to have about 50 judges per session, so they set a limit of 375 entries. They don't expect to get many out-of-town judges (maybe 5–10%), so they put an emphasis on building the local judge community. Jack called this, "playing the long game." They had judge training classes, organized BJCP exams, and emphasized educational activities, expecting it to take about two years to build a new judge.

Jack performed the judge coordinator role, and cited communication as a key success factor. "Communicate early and often," he said. Let judges know when the competition is occurring, where judges need to be and when, what styles they will be

judging, and keeping them updated on any changes.

Receiving entries and sorting them can be a challenging task, so he also recommends that competitions strictly limit who can hand-carry entries to the competitions. Judges who are traveling from more than 100 miles away is his rule. Merging these entries into the carefully organized cellar system can be challenging, but offering this to out-of-town judges does tend to increase participation.

Spreading the workload among a large team is recommended, even for some seemingly minor tasks such as getting prizes. They dedicate three to four people with one leader, and break up the list on who to contact. The key roles of organizer and judge coordinator are known well in advance, the rest are volunteers recruited during the competition planning phase.

The day when bottles are sorted into categories is a key milestone, and requires many helpers. They use 10–12 people on bottle sort day, where bottles are handled three times. Boxes are unpacked, stickers with entry numbers are placed on the bottles, and the bottles are sorted into boxes for each table (flight).

A dedicated person is placed in charge of the venue; TRASH usually uses a brewery since pro brewers will often offer up the space for free. Just make sure the brewery isn't brewing on competition day or it will be difficult for judges to smell the beers.

As judge coordinator, Jack wants each beer judged by at least one BJCP-certified judge and plans accordingly. If a new person is interested in learning, they are assigned as a steward, not a judge. Some judges ask to be paired with a senior judge so they can learn, and that request is honored if possible.

Mike Beattie has been handling the organizer job for nearly 10 years. He said they used to have a registrar role but that was eliminated when they started using competition software. They use BCOEM as a self-hosted system; they say it isn't perfect but there isn't much else available that can do the job. It took a few years to understand the software, and he rec-

ommends having a software person in charge of the task since there are often issues to work through on competition day.

Mike does much of the "back-office" role on competition day, while Jack gives the introductory speech and is the person judges go to first for problems. Mike handles the paperwork for the competition and manages the database. The head steward runs the table operations, including managing the staff of helpers.

Mike said it's very important to have the organizer and judge director roles separate. They both answer a lot of questions, and have distinct areas of responsibility on competition day. He cites planning as the key to success, and also identifies sorting day as the key event. The process needs to be understood ahead of time, and all the paperwork needs to be available or things can get misplaced. Having the bottles labeled and in the right place sets the competition day up for success.

Fabio Koerich Ramos ACervA Catarinense (Florianópolis, Brazil)

Fabito, as he is called by everyone, echoes many of the same success factors as Jack and Mike half a world away. He managed a 500-entry state championship competition with more than 50 judges that was easily completed in one weekend. All entries were judged on the first day, while all mini-BOS rounds and BOS were done in the second day. They were able to structure the competition this way by having a three-bottle competition instead of the more common two-bottle approach used in much of the US.

A three-bottle competition requires more sorting time and storage space, but ensures that a good bottle is available for mini-BOS, and also allows it to be done at a later time rather than trying to quickly judge an opened bottle again. In the morning session of the second day, I judged three different mini-BOS rounds and it went faster than a normal round of judging. This approach also allows a different team of judges to be used.

As with TRASH, the Brazilians

also use BCOEM in the self-hosted mode. They made some minor modifications to integrate a Brazilian payment system. Fabito said that it being open source software made it easy to modify and people with software experience could easily work with it. The software had a few bugs, but they were able to test the system in advance with simulated data so they could create workarounds.

Fabito cited the most important roles as the cellar master and sorting team. Having everything in the right place means that competition day runs smoothly. He mentioned a short entry and shipping window is important — ACervA Catarinense allows for a three-week entry and drop off window, closing a week before sorting. He said this means that only people with beer ready enter the competition. Even with this limitation, about 5% of the entries still don't show up.

Communication was also stressed as a key factor to success. They start planning about three months in advance, and they send a "Save the Date" email to judges and participants then. As information matures, they let people know what is happening and when.

I was impressed with the turnout of judges (they had around 50 judges, while all of Brazil has less than 200).


I asked what factors increased judge participation, and he cited:

- Inviting a well-known judge, writer, or brewer to attend and speak (he was talking about me, but they like to have a technical program as part of their competition).
- Sending invitations well in advance so people can plan accordingly.
- Paying some of the costs (negotiating discounted hotel rooms, having meal coupons for lunch).
- Maintaining a good reputation (past competitions were a good time for judges, so word-of-mouth helped increase the participation).
- Florianópolis is a great destination (on the sea, it's a beautiful city).

I think I would also add that drawing a good mix of judges is a great educational and training experience, especially for an area still developing its judge base. I found it somewhat similar to the National Homebrew Competition in the US where the second round is known for having high-ranking judges. This is a great experience for lower-ranked judges to judge with more experienced judges and learn.

The socialization aspect among the judge community is a positive experience for most judges.

Unlike many competitions in the US, the Brazilians don't run this competition as a fundraiser. They decided a few years ago to offer technical training for free, and to keep competition entry fees low. When they have party-like events, prices are higher. They found this encourages people to study and evolve as homebrewers, and to participate in more events. Within the first two years of this approach, they found the number of members in their organization and the amount of money available for events more than doubled. So, like Pittsburgh, they are also playing the long game.

My final point is that competitions can be run many ways and be successful. There are some common factors to success, but having a local character makes competitions interesting to those who judge in many events. Organizers that have a strong customer service mentality and take care of their judges seem to have an advantage over those that don't. Even though the event itself is hard work, having a good attitude and making volunteers and judges feel welcome goes a long way to building a competition that survives and thrives year after year. 



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pastry beers

by Josh Weikert

DESSERT

IN A

GLASS

Photo by Charles A. Parker/Images Plus



Comedian Denis Leary had a famous riff on how all he wants is coffee-flavored coffee. It wasn't exactly original, but it was energetic, and a lot of people were nodding along and pointing out that these days it can be hard to find "coffee" on the coffee shop menu because it's buried underneath two dozen mocha caramel frappuccinos with sprinkles. A lot of folks have made the same argument about craft beer — and you know what? They're right. There's a lot of atypical beer out there these days that features unusual ingredients and flavor profiles that focus on sweeter ingredients. Where they're wrong is in thinking that this is somehow not in keeping with "beer culture" — on the contrary, beer has always had a set of practitioners brewing up things based on popular appeal. So, in an age of unbridled experimentation and a world of specialty ingredients, why is it somehow surprising or negative that we see a boom in things like pastry beers? The short version (too late) is that it isn't. These are, often, world-class beers. And they are beers, and not just for dessert, either.

If you're playing the purist and holding up your nose at something because it contains cacao nibs or peanut butter or crushed up cookies, then you're missing out. And if you're a brewer who sleeps under a framed copy of the Reinheitsgebot and refuses to even look at the lactose when you stroll through your local homebrew shop, then you're not only missing out but denying a great experience to the friends and family who drink your beers. You're also, let's face it, missing a great opportunity to challenge yourself! This piece will look at the definitional aspects of "pastry beers" (and they're not all stouts, by the by), review some recipe considerations for those taking the plunge, discuss some process considerations that will increase your odds of making the next great pastry beer, and, of course, provide some awesome clonebrew recipe examples. I can feel the sugar coursing through my veins already . . .

DEFINING THE PASTRY BEER

I don't know that there's an authoritative definition of "pastry beer," but let's try this on for size: "A beer, potentially brewed with adjunct culinary ingredients, featuring a flavor profile reminiscent of baked goods or their identifiable ingredients." It seems to encompass most of what we think of as pastry beers, which, even when they're not specific emulators of a finished pastry product, do nearly always showcase their ingredients. So, is this "beer?" Yes, of course it is.

First, beer doesn't have to be bitter, or even non-sweet. I think that ship sailed when we acknowledged sweet stout as a defined classic style, and it's hardly the only one – English barleywine, especially in its aged forms, is often a sweet showcase of graham cracker and caramel flavors. Second, there is a long history in brewing of using adjunct ingredients to make beer more palatable, so this isn't some new-fangled thing. Heck, we use hops in beer because they produced better flavor than the medicinal roots and herbs of an earlier age. Third, brewers have always tinkered with recipes and styles to reach or appeal to a broader market. Pale beer (in the form of Pilsner) swept the world in part because we made beer a less-aggressive and more-appealing product. Pastry beer is beer, just as much as Pilsner is beer and sweet stout is beer.

RECIPE CONSIDERATIONS

OK, so pastry beer is beer. Now that we've settled that for all time (right?) the nomenclature questions, let's talk about building them.

First, start with what traditional beer ingredients can already offer us, in terms of flavors, and use them appropriately. We can already count on cocoa, bread, banana, cherry, butter, coffee, caramel, sugar, raisin, and a lot more from traditional brewing ingredients. The advantage of leveraging these first (if not exclusively) is that we have a dense base of brewing history and experience and knowledge to apply to their use. If you're looking for banana, or apricot, or plum, you

already know which yeasts or hops or malts to use to introduce or complement those flavors. Start with what you know.

Second, don't assume these beers have to be high-ABV. Yes, there are a lot of strong, sweet beers out there — many brewers take advantage of the fact that they're not hiding sweetness and leverage the native sweet flavor of ethanol to create a certain impression — but it isn't a requirement. Impressions of sweetness can come from natural process-created flavors (esters), added sugars (lactose — more on that in a bit), and more.

Third, in terms of hops, think fruit. Don't get me wrong, there are hops out there that taste like almost everything (I'm looking at you, Phoenix, with your cocoa flavors . . .), but fruit is complementary to nearly all of the typical pastry, chocolate, coffee, and sugar flavors that we are potentially adding as well. Even if you're not using flavor hops and are just adding a few IBUs of balancing bitterness, some small measure of flavor might translate through, and so we should be thinking about what flavors work best. If you are using hops for flavor or aroma, choose hops that complement your overall flavor profile. In one lemon-rosemary recipe I lean heavily on German and New Zealand hops that showcase lemon-lime and floral-herbal flavor compounds. Even when adding the ingredient itself, choose amplifying hops that will reinforce that flavor impression. The one recommendation I'd have is avoid pine. As a flavor, it cuts right through the palate, and if you're not specifically looking for it you might end up with something that presents much more strongly than you'd like.

Fourth, and maybe most importantly, let's talk about adjunct ingredients, several of which you'll likely be using. I avoid store-bought extracts whenever possible; even when used well, they still taste like it. We were at an event for a brewery famous for its extract usage. The head brewer was presenting and said, "see, you can't even tell it's an extract!" even as every beer judge at our table was wrap-

ping up a lot of head-nodding that yes, indeed, we definitely all noticed an artificial, chemical flavor in every sample. Use the real ingredients when you can, and as fresh, fresh, fresh as possible!

Two of your best friends in this endeavor will be lactose and vanilla. There's a smooth, soft sweetness to lactose that you just won't get from other sources — not from residual sugars from underattenuation, not from ethanol, and not from other unfermentable sugars. Vanilla will help here in that it creates an impression of sweetness (but isn't actually all that sweet, so cloying finishes are less likely), and in addition vanilla is a pretty ubiquitous baking/pastry ingredient, so it's going to do a lot of the "pastry impression" heavy lifting for you. Whatever adjuncts you use, consider the final flavor impact, both in terms of the targeted flavor and secondary/tertiary flavors and textures. I once attempted to add coconut flavor to a beer by using shaved coconut (flavorless), coconut milk (gross), and coconut extract (the only thing that worked). Experimentation will teach you a lot, but learn from others' mistakes, too. Finally, always be willing to set aside authenticity for effect: Maple syrup tastes like maple, but not after fermentation. Don't even try — it'll all ferment off. Instead, swallow your pride and use fenugreek instead, which tastes like maple. Brew with the end in mind.

Last, but not least, use more fruit. This is a surprisingly under-fruited sector that leans far more on chocolate, coffee, and caramel than it does on fruit. Fruit adds terrific complementary flavors, especially in lower-ABV or lighter-colored varieties, and so long as you consider the flavor impact of tartness and tannins and the recipe impact of additional fermentable sugars on ABV, you can add a lot of complexity and evocative flavors without too much effort!

PROCESS CONSIDERATIONS

I'm a big believer in the "process is king" view of brewing, so I can't help but recommend that you keep your

process as consistent as you can, even if the target isn't your typical German Pilsner. Sometimes it's unavoidable, but try to limit the extent to which you're tinkering with your mash temperatures, boil length, fermentation temperature, etc. Most of what we want we can get out of our ingredients, and ingredient adjustment is more reliable than process adjustment!

Probably the most important process consideration is the timing of additions for your non-traditional ingredients. In other words, what can/should you boil? For how long? And what can/should be added in primary or secondary, and how? I don't have any hard-and-fast answers for you here, because of the wide range of ingredients you're probably considering, but I do have some defensible rules of thumb. First, if I don't have to boil it, I don't. Some ingredients are just easier to add on the hot side — lactose jumps immediately to mind, which I typically add with 15 minutes remaining in the boil by turning off the heat and stirring

until it dissolves, then bringing back to a boil — but if you don't need to boil it, don't. Ingredients added in the boil are being put into an extreme environment that might change their flavors or even their chemical composition and add or remove things in ways that mess up our finished product.

Instead, add everything you can (with one exception) at the very end of fermentation, pre-packaging, to taste. Adding to taste right at packaging lets you build your exact flavor profile with all of the flavors "in" except for carbonation effects. This lets you use just the right amount of each, and also allows you to "stack" subtler flavors to make a nuanced, specific profile. Tinctures made with vodka are handy to create simple, sanitary extracts of your own. So, what's the one exception?

Fruit. Add fruit first, either in primary or early in a proper secondary fermentation (but don't necessarily feel you need to do a transfer into a new vessel, even in that case). Why the

"fruit exception?" Because fruits often contain highly-fermentable sugars that we don't want lurking around in our packaged beer, especially since they're sometimes a lot more sugar-rich than we think. Always know how much sugar you're adding, because that additional alcohol can be meaningful in the final product.

Carbonation matters here, too, but for that I have a pretty straightforward recommendation: Aim low. Carbonic burn isn't likely to add much in terms of desirable flavors, and we're also not usually looking to build in more mouthfeel and body. While there are always exceptions, you'll probably find that most of your pastry beers are either better or no worse when served on more modest levels of CO₂, and some genuinely shine on nitrogen.

Finally, let's talk a moment about wood. Barrel-aging or the addition of oak cubes, spirals, or chips soaked in booze can be a great addition to your beer, but it's also easy to overdo. This is a final-step ingredient, and is very much a perfect candidate for the "to taste" methodology noted earlier. Take the advice of the brewing world, but take it with a big grain of salt. My beer aged for four weeks on Bourbon-soaked oak might be perfect, but your version of that same beer might be a tannin-riddled hellscape that was "ready" two weeks ago.

Process matters. Set yourself up for success.

THINKING BEERS

A good friend who modestly did not want to be mentioned by name in this piece told me that pastry beers are "thinking beers." What he meant by that was not just that they require careful planning by the brewer — that's something that's true of almost all beers — but that they're beers that you should brew with an eye towards making the people who drink them scratch their head and think, "how did they do this?" and "however they did it, it reminds me so much of _____!" Use your imagination. Go wild. Make what you want to drink.

And make people think.



Photo courtesy of Shutterstock.com

PASTRY BEER RECIPES



CONSHOHOCKEN BREWING CO.'S GLAZING SADDLES CLONE



(5 gallons/19 L, all-grain)
OG = 1.055 FG = 1.014
IBU = 11 SRM = 4 ABV = 5.5%

INGREDIENTS

10 lbs. (4.5 kg) American 2-row pale malt
0.75 lb. (0.34 kg) flaked oats
Half of one glazed donut
(brewer should eat the other half)
3 AAU Columbus hops (60 min.)
(0.25 oz./7 g at 12% alpha acids)
8 oz. (0.23 kg) lactose sugar
(whirlpool)
0.5 oz. (14 g) cinnamon sticks
(whirlpool)
0.25 oz. (7 g) vanilla extract
(post-fermentation)
Wyeast 1056 (American Ale) or
White Labs WLP001 (California Ale)
or Fermentis US-05 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Mill the grains (and break up the glazed donut half) and mix with 3.4 gallons (12.7 L) of 164 °F (73 °C) strike water to reach a mash temperature of 152 °F (67 °C). Hold this temperature for 60 minutes. Vorlauf until your runnings are clear. Sparge the grains with 4.3 gallons (16.2 L) and top up as

necessary to obtain 6 gallons (23 L) of wort. Boil for 60 minutes, adding hops at the beginning of the boil. Whirlpool for 15 minutes after flameout, adding cinnamon sticks and lactose at the start of the whirlpool.

After the whirlpool, chill the wort to slightly below fermentation temperature, about 65 °F (18 °C). Aerate the wort with pure oxygen or filtered air and pitch yeast.

Ferment at 68 °F (20 °C) for 7 days, then raise the temperature to 70 °F (21 °C) for 72 hours. After completion of fermentation, add the vanilla extract. Crash the beer to 35 °F (2 °C) for 48 hours. Then bottle or keg the beer and carbonate to approximately 2.5 volumes.

CONSHOHOCKEN BREWING CO.'S GLAZING SADDLES CLONE



(5 gallons/19L, partial mash)
OG = 1.054 FG = 1.013
IBU = 11 SRM = 5 ABV = 5.4%

INGREDIENTS

6 lbs. (2.7 kg) extra pale liquid malt extract
0.75 lb. (0.34 kg) 2-row pale malt
0.75 lb. (0.34 kg) flaked oats
Half of one glazed donut
(brewer should eat the other half)
3 AAU Columbus hops (60 min.)
(0.25 oz./7 g at 12% alpha acids)
8 oz. (0.23 kg) lactose sugar
(whirlpool)
0.5 oz. (14 g) cinnamon sticks
(whirlpool)
0.25 oz. (7 g) vanilla extract
(post-fermentation)
Wyeast 1056 (American Ale) or
White Labs WLP001 (California Ale)
or Fermentis US-05 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Bring roughly 3 quarts (3 L) of water to approximately 162 °F (72 °C) and hold there. Place the pale malt, flaked oats, and donut in a grain bag and submerge in the water, being sure to wet all the grains and donut. Hold for 45 minutes, maintaining a temperature above 150 °F (66 °C) but below 162

°F (72 °C). Remove the grain bag and place in a colander. Wash the grain bag with 1 gallon (4 L) hot water. Add malt extract while stirring, and stir until completely dissolved, then top off to 6 gallons (23 L). Boil for 60 minutes, adding hops according to the ingredient list. Whirlpool for 15 minutes after flameout, adding cinnamon sticks and lactose at the start of the whirlpool.

After the whirlpool, chill the wort to slightly below fermentation temperature, about 65 °F (18 °C). Aerate the wort with pure oxygen or filtered air and pitch yeast.

Ferment at 68 °F (20 °C) for 7 days, then raise the temperature to 70 °F (21 °C) for 72 hours. After completion of fermentation, add the vanilla extract. Crash the beer to 35 °F (2 °C) for 48 hours. Then bottle or keg the beer and carbonate to approximately 2.5 volumes.

TIPS FOR SUCCESS:

Conshohocken Brewing Co.'s Andrew Pope ("Keg Slinger"), Andrew Horne (Director of Brewing Operations), and Co-Founder Ken Buonocore very generously offered up this smooth, creamy, blonde "krapfen-style ale" (from the German word for "donuts") recipe that every brewer should attempt at least once. It is deceptively simple in its construction, but the flavors come through as clear as day. Clean bake shop notes abound, and the traditional brewing grains and yeast stay well out of the way. One important process note: Andrew says that "one of the batches might have been missing a donut or two..." and in consequence the conversion scaled down the 0.63 donuts to be added in the mash to a baseline half-donut, but you might consider adding more to increase your donut-perceivability (if you're willing to forgo eating it for yourself).

Those who want to try this beer "live" can find it on special occasions at CBC's Bridgeport Brew Pub in Bridgeport, Pennsylvania.

PASTRY BEER RECIPES



FORGOTTEN BOARDWALK BREWING CO.'S FUNNEL CAKE CLONE

(5 gallons/19 L, all-grain)
OG = 1.054 FG = 1.014
IBU = 26 SRM = 3 ABV = 5.4%

INGREDIENTS

9 lbs. (4.1 kg) Pilsner malt
1.25 lbs. (0.57 kg) flaked oats
0.5 lb. (0.23 kg) light Munich malt (6 °L)
0.25 lb. (0.11 kg) flaked maize
0.25 lb. (0.11 kg) lactose sugar (60 min.)
0.5 oz. (14 g) vanilla beans (dry hop)
7 AAU Magnum hops (60 min.) (0.5 oz./14 g at 14% alpha acids)
Wyeast 1056 (American Ale) or White Labs WLP001 (California Ale) or Fermentis US-05 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Mill the grains and mix with 3.5 gallons (13 L) of 164 °F (73 °C) strike water to reach a mash temperature of 152 °F (67 °C). Hold this temperature for 60 minutes. Vorlauf until your runnings are clear. Sparge the grains with 4.3 gallons (16.2 L) and top up as necessary to obtain 6 gallons (23 L) of wort. Boil for 60 minutes, adding lactose and hops at the start of the boil.

Conduct a 15-minute whirlpool

after flameout and then chill the wort to slightly below fermentation temperature, about 65 °F (18 °C). Aerate the wort with pure oxygen or filtered air and pitch yeast.

Ferment at 66 °F (19 °C) for 7 days, then raise the temperature to 70 °F (21 °C) for 72 hours. After completion of fermentation, add the vanilla beans and rest for three days. Crash the beer to 35 °F (2 °C) for 48 hours then bottle or keg the beer and carbonate to approximately 2.5 volumes.

FORGOTTEN BOARDWALK BREWING CO.'S FUNNEL CAKE CLONE

(5 gallons/19 L, partial mash)
OG = 1.054 FG = 1.013
IBU = 26 SRM = 3 ABV = 5.5%

INGREDIENTS

4.5 lbs. (2 kg) Pilsen dried malt extract
0.5 lb. (0.23 kg) Pilsner malt
1 lb. (0.45 kg) flaked oats
0.5 lb. (0.23 kg) light Munich malt (6 °L)
0.25 lb. (0.11 kg) flaked maize
0.25 lb. (0.11 kg) lactose sugar (60 min.)
0.5 oz. (14 g) vanilla beans (dry hop)
7 AAU Magnum hops (60 min.) (0.5 oz./14 g at 14% alpha acids)
Wyeast 1056 (American Ale) or White Labs WLP001 (California Ale) or Fermentis US-05 yeast
¾ cup corn sugar (if priming)

STEP BY STEP

Bring 1 gallon (3.8 L) of water to approximately 162 °F (72 °C) and hold there. Place the crushed grains in a large grain bag and submerge in the water, being sure to mix the grains well to avoid dough balls. Hold for 45 minutes, maintaining a temperature above 150 °F (66 °C) but below 162 °F (72 °C). Remove the grain bag and place in a colander. Wash the grain bag with 1-gallon (4-L) of hot water. Add dried malt extract while stirring, and stir until completely dissolved, then top off to 6 gallons (23 L). Boil for 60 minutes, adding lactose and hops at the start of the boil.

Conduct a 15-minute whirlpool after flameout and then chill the wort to slightly below fermentation temperature, about 65 °F (18 °C). Aerate the wort with pure oxygen or filtered air and pitch yeast.

Ferment at 66 °F (19 °C) for 7 days, then raise the temperature to 70 °F (21 °C) for 72 hours. After completion of fermentation, add the vanilla beans and rest for three days. Crash the beer to 35 °F (2 °C) for 48 hours then bottle or keg the beer and carbonate to approximately 2.5 volumes.

TIPS FOR SUCCESS:

Forgotten Boardwalk Brewing Company, located in Cherry Hill, New Jersey, describes their Funnel Cake sweet cream ale smelling like “old-fashioned Nilla wafer” and tasting like classic Jersey Shore boardwalk funnel cake. The light Munich, flaked oats, and flaked maize create a rich pastry background, while the lactose and vanilla (a light touch of each) provide just enough sweetness. If you find your version is a bit cloying, just bump up the bittering hop addition by a few AAUs.

PASTRY BEER RECIPES



IMPRINT BEER CO.'S BLACK FOREST CAKE STOUT CLONE



(5 gallons/19 L, all-grain)
OG = 1.100 FG = 1.028
IBU = 65 SRM = 69 ABV = 9.6%

INGREDIENTS

15.5 lbs. (7 kg) American 2-row pale malt
1.5 lbs. (0.68 kg) Munich malt
1 lb. (0.45 kg) Carafoam® malt
1 lb. (0.45 kg) British chocolate malt (350 °L)
1 lb. (0.45 kg) British crystal malt (65 °L)
1 lb. (0.45 kg) roasted barley
12 oz. (0.34 kg) Carafoam® Special III
3 lb. (1.4 kg) Vintner's Harvest sweet cherry puree
16 AAU Magnum hops (90 min.)
(1 oz./28 g at 16% alpha acids)
1.5 lbs. (0.68 kg) Cholaca liquid cacao (original flavor) or 12 oz. (0.34 kg) toasted Ecuadorian cacao nibs
5 Madagascar vanilla beans
Wyeast 1968 (London ESB) or
White Labs WLP002 (English Ale) or
Lallemand London ESB
English-Style Ale yeast
⅓ cup corn sugar (if priming)

STEP BY STEP

Several days before brewday, scrape open and cut the 5 vanilla beans into

1-inch (2.5-cm) segments and soak in vodka or Bourbon until ready to add to the secondary.

Mill the grains and mix with 6.8 gallons (25.7 L) of 167 °F (75 °C) strike water to reach a mash temperature of 155 °F (68 °C). Hold this temperature for 60 minutes. If you have soft water, you may want to hold off on adding the roasted grains and British crystal malts until the final 15 minutes of the mash. Vorlauf until your runnings are clear. Sparge the grains with enough water to obtain 7 gallons (26.5 L) of wort. At this point, you may want to test the wort's gravity. The goal should be to have 7 gallons (26.5 L) of 1.072 SG wort at the start of the boil. You can add dried malt extract (DME) at this point if the SG is low or you may want to wait until the beer is in the fermenter. If you wait to add the DME, be sure to add it after fermentation begins to calm down.

Boil the wort for 90 minutes or more, adding hops according to the ingredient list. After the boil, turn off heat and chill the wort to slightly below fermentation temperature, about 65 °F (18 °C). Aerate the wort with pure oxygen or filtered air and pitch yeast. There should be 5 gallons (19 L) of cooled wort in the fermenter. Be sure to have room in your fermenter for the cherry puree.

Ferment at 66 °F (19 °C) for 10 days (adding the fruit puree on day 6), then raise the temperature to 70 °F (21 °C) for 3–4 days. Carefully rack into a secondary vessel containing Cholaca/ cacao nibs and vanilla extract, and age to desired taste. Crash the beer to 35 °F (2 °C) for 48 hours. Bottle or keg the beer and carbonate to approximately 2.25 volumes.

IMPRINT BEER CO.'S BLACK FOREST CAKE STOUT CLONE



(5 gallons/19 L, extract with grains)
OG = 1.127 FG = 1.033
IBU = 65 SRM = 69 ABV = 14.6%

INGREDIENTS

11 lbs. (5 kg) extra light dried malt extract

1 lbs. (0.45 kg) Munich dried malt extract
1 lb. (0.45 kg) Carafoam® malt
1 lb. (0.45 kg) British chocolate malt (350 °L)
1 lb. (0.45 kg) British crystal malt (65 °L)
1 lb. (0.45 kg) roasted barley
12 oz. (0.34 kg) Carafoam® Special III
3 lb. (1.4 kg) Vintner's Harvest sweet cherry puree
16 AAU Magnum hops (60 min.)
(1 oz./28 g at 16% alpha acids)
1.5 lbs. (0.68 kg) Cholaca liquid cacao (original flavor) or 12 oz. (0.34 kg) toasted Ecuadorian cacao nibs
5 Madagascar vanilla beans
Wyeast 1968 (London ESB) or
White Labs WLP002 (English Ale) or
Lallemand London ESB
English-Style Ale yeast
⅓ cup corn sugar (if priming)

STEP BY STEP

Bring 4.9 gallons (18.5 L) of water to approximately 162 °F (72 °C) and hold there. Steep milled specialty grains in grain bags for 15 minutes. Remove the grain bags and let drain fully. Add dried malt extract while stirring, and stir until completely dissolved. Bring the wort to a boil.

Boil for 60 minutes, adding hops according to the ingredient list. The remainder of this recipe is the same as the all-grain version.

TIPS FOR SUCCESS:

Brewer and Co-Founder Ryan Diehl of Imprint Beer Company in Hatfield, Pennsylvania, says he subscribes to the approach of building a luscious, deep chocolate stout that can stand on its own, and then adding elements specific to the individual beer. Diehl recommends Crisp and Fawcett malts for the grist, and strongly suggests a large yeast starter — this gravity level is tough on the yeast! Or, you may want to repitch yeast from a smaller beer such as a mild ale or ESB. This yeast often attenuates better when it gets repitched. He also says they sometimes boil their pastry stouts for two to four hours, but if doing so be sure to adjust your sparge water to account for greater evaporation.

PASTRY BEER RECIPES



NESHAMINY CREEK BREWING CO.'S MAXIMUM MOCHA PORTER CLONE



(5 gallons/19 L, all-grain)
OG = 1.066 FG = 1.017
IBU = 30 SRM = 32 ABV = 6.8%

INGREDIENTS

9.5 lbs. (4.3 kg) American 2-row pale malt
1 lb. (0.45 kg) crystal malt (120 °L)
0.5 lb. (0.23 kg) chocolate malt (350 °L)
4 oz. (113 g) black patent malt
1.5 lb. (0.68 kg) lactose (30 min.)
5 AAU Target hops (90 min.)
(0.5 oz./14 g at 10% alpha acids)
2.25 AAU Fuggle hops (15 min.)
(0.5 oz./14 g at 4.5% alpha acids)
2.5 AAU Willamette hops (15 min.)
(0.5 oz./14 g at 5% alpha acids)
8 oz. (0.23 kg) roasted Colombian coffee beans
4 oz. (113 g) coffee-infused dark chocolate
Wyeast 1968 (London ESB) or
Wyeast 1056 (American Ale) yeast
(see Tips for Success for more)
¾ cup corn sugar (if priming)

STEP BY STEP

Mill the grains and mix with 3.5 gallons (13.3 L) of 164 °F (73 °C) strike water to reach a mash temperature of

152 °F (67 °C). Hold this temperature for 60 minutes. Vorlauf until your runnings are clear. Sparge the grains with 4 gallons (15.3 L) and top up as necessary to obtain 6 gallons (23 L) of wort. Boil for 90 minutes, adding chocolate at the start of the boil and hops and lactose according to the ingredient list (remove beer from heat when stirring in lactose).

After the boil, turn off heat and chill the wort to slightly below fermentation temperature, about 65 °F (18 °C). Aerate the wort with pure oxygen or filtered air and pitch yeast.

Ferment at 68 °F (20 °C) for 7 days, then raise the temperature to 70 °F (21 °C) for 72 hours. Add the coffee beans and age for 5–7 days or to taste. Crash the beer to 35 °F (2 °C) for 48 hours and then bottle or keg the beer and carbonate to approximately 2.5 volumes.

NESHAMINY CREEK BREWING CO.'S MAXIMUM MOCHA PORTER CLONE



(5 gallons/19L, extract with grains)
OG = 1.064 FG = 1.016
IBU = 30 SRM = 32 ABV = 6.7%

INGREDIENTS

6 lbs. (2.7 kg) extra pale liquid malt extract
1 lb. (0.45 kg) crystal malt (120 °L)
0.5 lb. (0.23 kg) chocolate malt (350 °L)
4 oz. (113 g) black patent malt
1.5 lb. (0.68 kg) lactose (30 min.)
5 AAU Target hops (90 min.)
(0.5 oz./14 g at 10% alpha acids)
2.25 AAU Fuggle hops (15 min.)
(0.5 oz./14 g at 4.5% alpha acids)
2.5 AAU Willamette hops (15 min.)
(0.5 oz./14 g at 5% alpha acids)
8 oz. (0.23 kg) roasted Colombian coffee beans
4 oz. (113 g) coffee-infused dark chocolate
Wyeast 1968 (London ESB) or
Wyeast 1056 (American Ale) yeast
(see Tips for Success for more)
¾ cup corn sugar (if priming)

STEP BY STEP


Bring 5.4 gallons (20.4 L) of water to approximately 162 °F (72 °C) and hold there. Steep milled specialty grains in grain bags for 15 minutes. Remove the grain bags and let drain fully. Add liquid malt extract while stirring, and stir until completely dissolved. Boil for 90 minutes, adding the chocolate at the beginning of the boil and hops and lactose according to the ingredient list (remove beer from heat when stirring in lactose).

After the boil, turn off heat and chill the wort to slightly below fermentation temperature, about 65 °F (18 °C). Aerate the wort with pure oxygen or filtered air and pitch yeast.

Ferment at 68 °F (20 °C) for 7 days, then raise the temperature to 70 °F (21 °C) for 72 hours. Add the coffee beans and age for 5–7 days or to taste. Crash the beer to 35 °F (2 °C) for 48 hours and then bottle or keg the beer and carbonate to approximately 2.5 volumes.

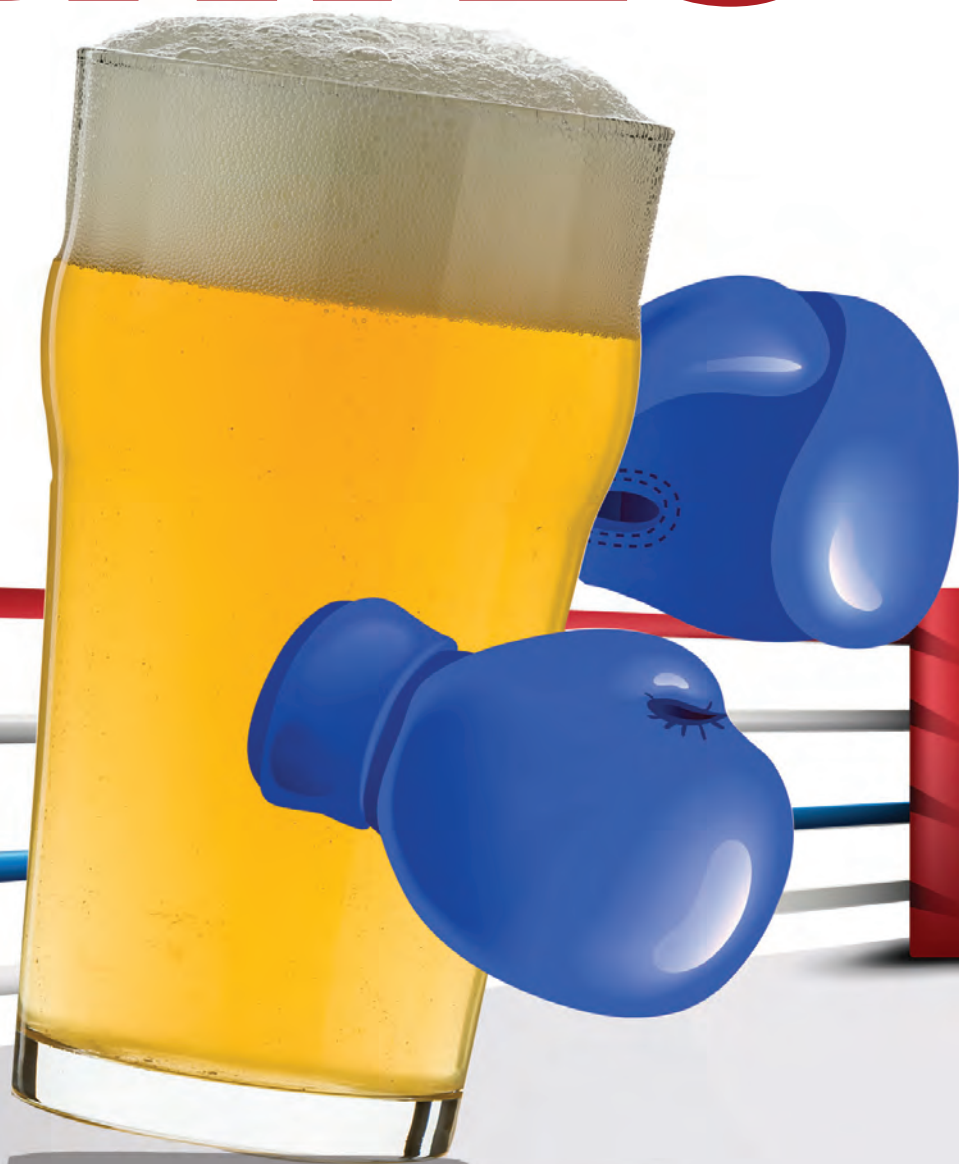
TIPS FOR SUCCESS:

Co-Founder and Brewmaster (and multiple time Great American Beer Festival medal winner) Jeremy Myers offers two choices on yeast for this recipe. At Neshaminy Creek Brewing Company, in Croydon, Pennsylvania, they prefer the British yeast, pairing its esters with the coffee, but for those who prefer a cleaner chocolate-coffee flavor the American ale approach also produces a great beer. Expect discrepancies in the final gravity though, as the attenuation range between these two strains is fairly significant.

The gang sourced their chocolate from a local chocolatier (Pierre's of New Home, Pennsylvania) who infused Colombian coffee (single-sourced, just like that used in the beer) into their house dark chocolate. Your commitment doesn't need to be as high, and you can sub in any high-quality dark chocolate, but feel free to get creative! 

MORE GREAT HOMEBREW DEBATES

Photos by Charles A. Parker/Images Plus



Experts weigh in on boil vigor, the importance of precise mash temperatures, secondary fermentation, and Belgian candi sugar

Scouring homebrew discussion pages and blogs on the internet in search of an answer to what you believed would be a simple question makes it very apparent that there is rarely an “easy question” when it comes to homebrewing. Everybody has their own way of doing things. Even when two answers are completely different, it’s possible both are correct in particular cases, depending on equipment differences, brewing styles, etc. Then again, a lot of opinions from unnamed Internet sources are simply incorrect.

Last year, to illustrate that there are often multiple ways of doing things, we had trusted experts in the homebrewing hobby share their opposing views on controversial topics in quick-hitting, straight-to-the-point arguments. And we had them put their names on it. “The Great Homebrew Debates” ran in the March–April 2017 issue of *BYO*, but we were not able to tackle all of the topics we wanted to, so now we’re ringing the bell to start round two.

In the ring this time are Steady vs. Vigorous Boils, Secondary Fermentation vs. Primary Straight to Packaging, Precise Mash Temperature vs. Close Enough, and Candi Syrups vs. Less Expensive Substitutes. Let’s get it on!



Steady boils are all you need

By Josh Weikert



To paraphrase Gertrude Stein, a boil is a boil. Brewers who tell you that you “need” (my favorite red flag to go do some research) to reach a heavy, violent, rolling boil in order to brew good beer are, I propose, mistaken, and losing more wort than they should be through evaporation. Let’s briefly look at what a boil is, and what we need from it, and then

see if the difference between a low and a high boil makes a difference.

Water boils at 212 °F (100 °C). What that means in practice, though, is that within a pot of water, some amount of that water is at boiling temperatures. Temperature varies within a liquid over heat, and it’s not all at 212 °F (100 °C). However, thanks to the miracle of convection, the hot liquid at the bottom of the pot is rising to the top, giving up a few degrees, and then sinking back to the bottom as other hot liquid replaces it. This is true in both the low boil and the violent, rolling boil; it’s just happening at a higher rate in the rolling boil.

Now, what do we need from the boil, as brewers? We need coagulation of unwanted proteins (hot break), elimination of unwanted compounds (Dimethyl Sulfide, oxygen, etc.) by volatilization/evaporation, solubilization and isomerization of alpha acids from hops, and sterilization of the wort. As a bonus, we get some color development, some concentration, and we stop enzymatic activity.

Does our gentler boil get us these things? Yes, with just two basic caveats that shouldn’t be a problem. If our boil is sufficiently vigorous to produce convection (it almost certainly is) and if we have a rippled surface that’s producing steam (it definitely is, or we wouldn’t say it’s boiling), then these things are all accomplished by a low, steady boil. They just might take a little longer . . . but still far less time than a standard (or even a shortened) boil. If the hallmark of a gentle boil is less-violent movement of wort (but still movement) and less surface break (but still some), then all we’re talking about is a slightly slower but just as robust process.

Let’s look at our boil “needs,” and how long it takes to achieve them:

- Hot break forms early in the boil, as anyone who’s had a boilover knows.
- Most compounds in wort are volatile, and rapidly decrease at boiling temperatures. Dissolved oxygen is driven off in about five minutes. Sulfurous compounds are boiled off in ten minutes. DMS (according to one lab experiment¹) in 30 minutes. Even doubling those times (and that seems like a very pessimistic assessment of what our easy boil can accomplish), we’re still “done” in 60 minutes.
- Alpha acids achieve about half of their isomerization “potential” in less than 40 minutes, after which the isomerization curve flattens out, with diminishing returns over time.
- Boiling wort sterilizes in about two minutes.
- Enzymatic activity will halt anyway, concentration (boil loss) can be accounted for by recipe, and color adjustment can be accomplished in other ways.

Even if most of these take longer in a gentler boil, they’re still happening, and by the end of a 60- or 90-minute boil, there’s no likely functional difference. Idiosyncratic, system-based, or recipe-based differences may crop up here and there, but that’s true of any brewing decision.

Boil easy. Keep your brewery violence-free.

REFERENCES: ¹ www.scottjanish.com/examination-of-studies-hopping-methods-and-concepts-for-achieving-maximum-hop-aroma-and-flavor

Hard, vigorous boils are necessary

By Aaron Ritchie



There's a time in every brewer's life when they need to decide whether they are going to boil hard and vigorously, or steady and calm. Call it a slightly pre-mature midlife crisis, my love of '80s tough-guy movies, or predilection for hard-rocking music, but I've made my decision to turn the burner "up to 11" and now I'm

going to convince you to follow suit. I will use a lot more than sheer bravado and insanely big muscles (alright, that's dreaming) to debate my point; Using some science, hearsay, and personal experience, I'll deliver a proverbial roundhouse kick to the face of weak boils.

There are multiple reasons why we boil wort when making beer. Boiling sanitizes your wort, it boils off undesirable compounds, coagulates proteins, extracts alpha acids from your hops, decreases pH, alters color via Maillard reaction, and removes water via evaporation. All of these are important features of a boil, and typically obtainable in some manner from either a weak or a vigorous boil. So why am I advocating to boil strongly?

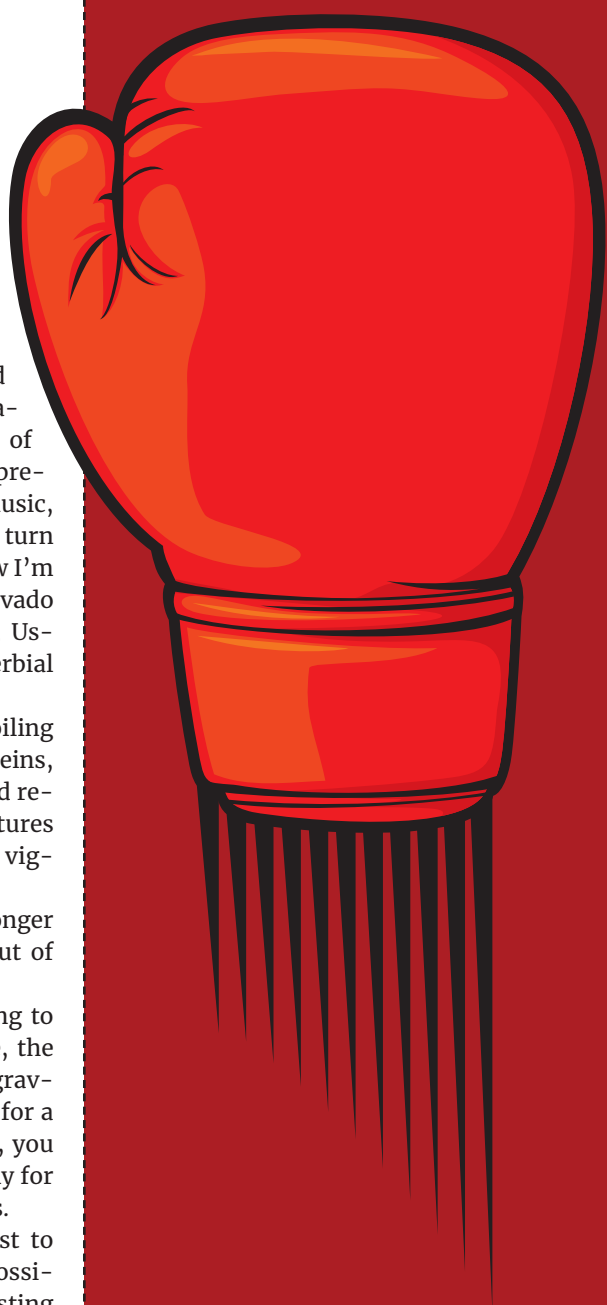
The first reason to boil vigorously is the coagulation of proteins. A stronger boil helps these proteins clump together, which gets you clearer beer out of your whirlpool.

The second reason you may want to boil vigorously is if you are trying to increase the gravity of your beer. The more evaporation that takes place, the more highly concentrated your wort will be, leading to a higher starting gravity. This is not typically a large consideration for a session style beer, but for a big beer such as an imperial stout, barleywine, or other high-ABV styles, you want a high starting gravity. You could achieve this result by boiling weakly for longer, but time is money, so turn up the heat a bit to speed up this process.

The third reason to boil vigorously, and perhaps nearest and dearest to me, is to evaporate as much Dimethyl Sulfide (DMS) from the wort as possible. DMS is a fairly common off-flavor in beer, and is best described as tasting like creamed corn or cooked vegetables. The compound S-Methyl Methionine (SMM) is produced during the malting of barley. Very light malts, especially Pilsner, have much higher levels of SMM. SMM is a precursor to DMS and when it is heated it breaks down into DMS. Luckily, DMS is volatile, and a vigorous boil evaporates it and drives it off into the air with the steam.

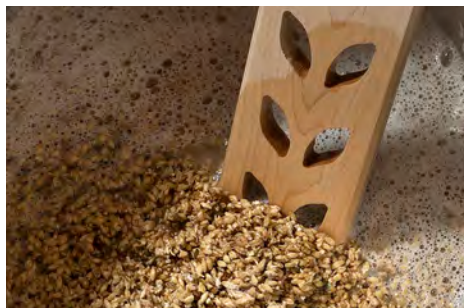
Story time. Last winter I had to squeeze a garage brew session in on a cold 18 °F (-8 °C) day. I was brewing 28 gallons (106 L) of a golden sour beer for a solera barrel. The propane tank was freezing up, and while there was a very gentle rolling boil the whole time, it lacked any semblance of vigor. The grain bill was almost entirely Pilsner. Fast forward two weeks later, when I excitedly took a sample off the fermenter. It tasted like I was drinking a creamed corn and cooked vegetable smoothie. Could it have been from the weak boil? I think so. There was a study published in the *Journal of the American Society of Brewing Chemists* by Zangué S.C. Desobgo in 2015 ("Dimethyl Sulfide Stripping Behavior During Wort Boiling Using Response Surface Methodology") that looked at boil vigor and how it affects DMS rates. The results of the study showed that increasing the power input of a burner during a boil significantly reduced the levels of measured DMS over a given period of time.

So I implore you - rather than simply accepting the common wisdom of boiling gently for extended periods of time to solve the above problems, take a closer look at boiling with vigor!



Mash temperatures don't need to be exact

By Denny Conn



When you read through beer recipes, you'll often see great attention given to the temperature of the mash. Read through any beer forum, and you'll see answers to questions about controlling beer body relying on adjusting the mash temperature. For many years, I followed this same advice and it was fairly good advice.

But maybe not so much anymore.

Over the last 30 years, there have been many advances in the malting of barley. Many of these are economically driven. If a brewery can get the same result with a single temperature mash that they can with a complicated step mash regimen, it will save them time and therefore money. So, maltsters started taking on the role of the brewer to a certain extent by producing malts that allowed the brewer to skip steps in the mash.

But that also means that conversion takes place over a much wider temperature range than it used to. Diastatic power is the measure of the "strength" of the enzymes on malted barley. The more diastatic power the malt has, the more readily it converts.

Every maltster has their own idea of what their malt should be like and how it should react in a mash. Some have more diastatic power than others. Domestic US malts seem to be particularly high in diastatic power compared to some continental malts. This has led many brewers to use shorter mash times, since conversion happens so quickly. It has also made the use of mash temperature to adjust beer body and final gravity much less relevant.

This was dramatically shown to me as I developed the recipe for my American mild. I was set on using only American ingredients. I mashed the first version at 153 °F (67 °C) and was disappointed to find that the low gravity beer had all the body to it as a glass of water. I decided for the next batch I'd crank the temperature up to get the body I was looking for. I mashed the next batch at 168 °F (76 °C). I was shocked to find that both the final gravity (FG) of the beer and the subjective body were exactly the same as when I mashed at 153 °F (67 °C). Maybe if I had shortened the mash time for the higher temperature mash things would have been different. But I'm not certain of that.

The point is that how much effect mash temperature will have on your beer is very much dependent on the particular barley variety, how it was malted, and the malt specs. So using mash temperature to control FG and body is a very uncertain way of doing it. You never really know what temperature to use and how it might affect the beer without doing a few test batches first. To gain the most control over your FG and body, I recommend looking to ingredients and recipe design, not mash temperature. You'll have a much easier time of it.

For instance, if you're not getting the body you want in the beer, look at using some type of crystal/caramel malt. Very light ones, like carapils, can add body without adding much in the way of flavor. Darker crystal malts will impact the flavor, but that might end up being a positive for you. A bit of lactose can add some body, too, but keep it minimal to avoid extra sweetness.

To reduce body, my go-to is to add 4–8 oz. (113–227 g) of plain old table sugar. Just be sure to account for the extra gravity points it adds and reduce your base malt by a similar number of gravity points.



Precision is key when it comes to mash temperature

By Gordon Strong



beer when fermented by yeast.

The types of sugars and other carbohydrates in the wort affect several aspects of the finished product – clarity, body, mouthfeel, attenuation, and flavor. Whether or not you think precise mash temperatures are important can be answered by whether or not you think clarity, body, mouthfeel, attenuation, and flavor in your beer is important. Are you trying to create a beer with a particular style or profile in mind, or are you just trying to create alcohol?

The question about precision turns on whether “close enough” is good enough. But what’s “close enough,” anyway? When you go to a restaurant and order a steak, do you tell them to, “just cook it”? They’ll make something that won’t kill you but how much hope do you have that it fits your expectations or palate preferences? Or do you not care about flavor, texture, and appearance?

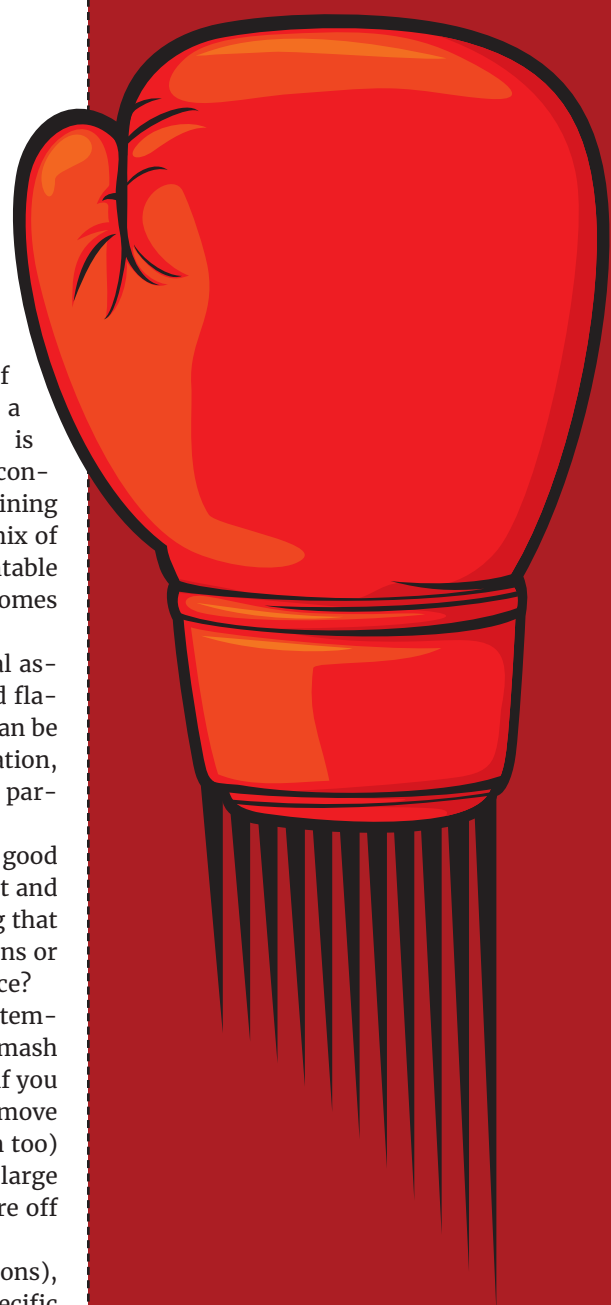
This question exposes problems that many brewers have; accuracy of temperature measurement and consistency of temperatures across the entire mash bed. There is some natural variation even when you use precise controls; if you don’t care about accuracy, how far off are you really? Next time you mash, move a quick-read thermometer across different points in the mash bed (depth too) and see how much variation you have. If you don’t care, you may have a large portion of your mash outside the active range of enzymes. And all bets are off if your thermometers aren’t calibrated.

When you control mash temperatures (and more broadly, mash conditions), you are selecting what enzymes are active. These enzymes break down specific structures (which may take place over multiple temperatures) and create a particular wort composition. The fermentability of the wort affects attenuation, the dextrin content affects body and mouthfeel, and some mash programs prepare the wort to be fermented by particular yeast strains (e.g., *Brettanomyces*).

If you are shooting for 145 °F (63 °C) but are really at 135 °F (57 °C), instead of performing a saccharification rest, you are really performing a protein rest. So you may not even be converting some of your mash, and your efficiency will suffer. Or if you want 149 °F (65 °C) but are really at 159 °F (71 °C), your beer will not attenuate properly and have a heavy body.

If your wort composition is off, the balance of your beer will be off. You can try to adjust your recipes to compensate, but often that is a trial-and-error process, and the results won’t be the same. And you can’t hide behind “people can’t tell the difference” excuse because people with trained palates will tell the difference. So if you can’t tell the difference between different approaches and techniques and you don’t care if the people drinking your beer like it or not, by all means use the “close enough” approach. But if you have a goal in mind, you have to take specific steps to get there.

If you don’t care what mash schedule you use, why not just use malt extract? You won’t know what ingredients they used or what mash program they performed, but it will make beer. If you can’t tell the difference between ingredients or mash programs, it’s probably close enough for you. But not for me.



Secondary fermentation has primary benefits

By Gordon Strong



I never really liked the term “secondary fermentation” since there is rarely what most brewers think of as fermentation occurring during this phase (conversion of sugars to alcohol). I prefer to call this phase “conditioning,” since that’s what’s actually going on.

Professional brewers typically ferment and condition in a conical unitank, where after fermentation is complete, the yeast and trub is dumped and the beer continues to mature in the same vessel. They will then move the beer from a unitank to a bright tank, where the beer is carbonated and packaged or served, possibly with an intermediate filtration step.

Homebrewers most frequently will ferment in one vessel and then transfer the beer into a second vessel for conditioning, or will simply package the beer after fermentation in the primary fermenter.

Since there is an additional transfer step for homebrewers when using a secondary fermenter, there is concern that oxidation of the beer may occur, or the beer may become infected. Oddly, the same people rarely complain about the transfer from a primary fermenter to bottles or kegs, though. There are always risks introduced during transfers and when moving the beer to new vessels, but that is a skill all brewers should have since it must be done with every batch.

If we want to discuss whether conditioning is necessary for beer, let’s review what actually happens when a beer is in the secondary. The yeast continues to clean up the beer, reducing fermentation by-products such as acetaldehyde, diacetyl, esters, and other “green beer” flavors. The beer may continue to attenuate slightly, and the beer clarifies as the yeast goes dormant. The beer may undergo dry hopping or other post-fermentation treatments, such as additions of fruit, coffee beans, etc.

Removing the beer from trub and the bulk of the yeast mass after fermentation reduces the risk of autolysis, which adds meaty, glutamate-like flavors to beer. For brewers that harvest yeast for additional batches, the transfer phase allows the yeast to be collected. With the beer off most of the yeast, the conditioning phase becomes less time-sensitive, and the beer can then be bulk-conditioned.

There is nothing wrong with doing a single-vessel fermentation for some styles; I use this method myself. Some styles, like weissbier, are best when young and the yeast adds some necessary character to the beer. Other beers are designed for quick consumption, and the “turn and burn” method gets the job done faster. New England IPA sometimes uses dry hopping during fermentation, so it’s not really necessary to wait until a secondary to dry hop.

If the beer doesn’t have time to clarify and condition, you may have to carefully decant the beer from bottles or be prepared to dump the first few pints from a keg. Or maybe you don’t care about clarity. Homebrewers are notoriously lazy, so you can certainly save some time and effort by using this route. But I would only do it with certain styles, or if I was sure the beer would be consumed quickly.

So unless you ferment in a conical unitank, I firmly believe that for the majority of beer styles, your homebrews will taste better and have a longer shelf life if you condition your beer in a secondary vessel. Just make sure you know how to transfer beer without introducing oxygen.

Secondary fermentation is a risk not usually worth taking

By Dave Clark



While an argument can be made to the contrary with dry-hopped beers, meads, or even lagers, there is no real need to transfer most traditional beer styles. The risks simply outweigh the benefits.

First, let's discuss the potential for degradation of quality. Anytime a beer is transferred, the

two biggest concerns are the potential for contamination and oxygen uptake. While experienced brewers can usually keep sanitation issues under control, an unnecessary transfer opens up the possibility for a rogue contaminant to make its way into the beer. Even the best sanitation practices can occasionally go awry, so the less a beer is moved around, the less likely it is to become contaminated.

Though oxygen may be an ally during the yeast reproduction phase, it becomes the enemy of beer after primary fermentation is underway. Oxygen will shorten the shelf life of beer, breaking down the flavor components and introducing new, unpleasant ones in their place. When oxygen comes in contact with finished beer it increases the opportunity for the introduction of staling aldehydes. With few exceptions, these aldehydes can and will negatively alter the flavor and aroma of the beer. Heat and motion accelerate oxidation. The best way to avoid this is to minimize splashing, shaking, pouring, or anything else that may increase the presence of oxygen — such as transferring your beer. Oxidation can produce a myriad of flavors and aromas, most of which are considered flaws in beer, such as umami, soy sauce, and “paper-like” character. Other undesirable qualities including dullness, harshness, reduced hop character, and/or increased malt sweetness can result from oxidation. A vicinal diketone (VDK) known as pentanedione 2,3, created during primary fermentation, can be increased to perceptible levels with an increase in oxygen, resulting in an unwanted honey-like aroma. While proper aging may or may not eliminate this, it is still not what the brewer likely intended when crafting the beer. Paper-like and honey flavors and aromas tend to be much more prevalent in lighter beers, especially those with large quantities of Pilsner malt as the base, while a Sherry and caramel oxidative effects tend to be found in beers with higher alcohol content and darker base malts.

While those in favor of transferring to secondary will argue the potential of yeast autolysis, rest assured that autolysis typically doesn't manifest until well past the timeframe needed to properly ferment a typical ale, assuming temperatures are held in the proper fermentation range.

Outside of quality control issues, there is also the issue of beer loss. Anytime a transfer takes place, some of your prized beer is left behind in the process. Why leave it at the bottom of a vessel when it would be so much more enjoyable in your glass?

Lastly, there's the subject of time and energy. No matter how much a person loves to brew, time is a valuable commodity. Why spend a bunch of time sanitizing additional equipment and transferring beer when that time can be better spent brewing another batch?

If you really want to age your beer, a better practice is to simply keg the beer and let it age in the keg. Put a couple pounds of CO₂ pressure on the beer to reduce the possibility of oxygen uptake. Especially in the case of lagers, kegging the beer and storing it this way at lager temperatures will create the desired effect without requiring unnecessary transfer.

With little to gain and much to lose: Just say no to secondary transfer.



Candi syrup is critical in Belgian beer styles

By Denny Conn



Photo by Michael Tonsmeire



When I began homebrewing in 1998, some of the first beer styles I got interested in were all things Belgian. I'd never encountered anything with those flavors before and I wanted to know how they did it so that I could do it for myself. I had started a love affair with Chimay Premiere (the red label version of Chimay), so I decided to

make that my first Belgian-style homebrew. I ran down to my local homebrew shop and picked up their Belgian beer kit. As I recall, it came with amber extract, a couple packs of Hallertau hops, some English ale yeast (yeah) and a package of dark candi rock sugar. I brewed it up and proudly served it to Charlie Papazian when he was in town for an event. He very kindly told me it was great, but I knew it wasn't.

Not only was the yeast character not right, but it completely lacked the full, fruity flavor I get from Chimay. Thinking it had to be the recipe, I researched what was actually in Chimay and gave it a try as an all-grain brew, using Wyeast 1214 (Belgian Abbey Style), which is the Chimay yeast. But I kept using the dark candi sugar. And I kept thinking something was missing.

Finally, I decided to do a blind tasting of various colors of candi sugar. Yeah, I was into experimenting from the very start. Wanting to not be influenced by the color of the sugars, I blindfolded myself after separating them into 3 piles according to color. I tasted a rock of sugar from each pile, taking a drink of water in between each. I was astounded to find I couldn't distinguish one from another! Now, this shouldn't be a big surprise. After all, rock candi sugar is simply cane or beet sugar that's been dissolved and left to recrystallize. There may be a bit of color to it, but that color doesn't translate into a distinct flavor.

And that was the state of things for several more years. I resigned myself to brewing Belgian-style beers that just didn't have "it." I tried a Rochefort-style beer with the same disappointing results. I was stumped. Then a company named darkcandi.com appeared. They were selling candi syrup from Belgium and touting it as the flavor that was missing from your Belgian beers. And they were right! Using their syrup — and later syrups from other companies — got me as close to authentic Belgian beers as my brewing skill allowed me to get. Up until that point, homebrewers had been trying to recreate the dark fruit flavors found in some Belgian styles by using Special B or other malts. These syrups delivered the fig/plum/dark fruit flavors that authentic dark Belgian beers had and homebrewers lacked. The lighter syrups are pretty much like using cane or beet sugar, but the darker ones add flavors that can't otherwise be replicated. A 45 °L syrup adds a bit of toffee flavor. A 90 °L ups that with a bit of dark fruit in addition to the toffee notes. A 180 °L syrup brings big dark fruit flavors that are unmistakably noticeable in Belgian styles. A 240 °L candi syrup keeps some of the dark fruit, but also has strong notes of coffee and chocolate.

So, I encourage you to try the same experiment that I did. Get ahold of some rock candi sugar of various colors, blindfold yourself, and taste it. See if you can tell one from another and what kind of flavor you get from it. Then try the same with some of the various candi syrups. Finally, get ahold of a bottle of Chimay or Rochefort and analyze the flavors in those. I think you'll quickly realize that those flavors couldn't have been created without candi syrup. Then go get yourself some syrup and get your Belgian brew on!

There are substitutes for candi syrup

By Dave Green



I'll admit it; Belgian candi syrups are a great ingredient that both professional brewers and homebrewers can benefit from the use of in their beer. Especially the darker colored candi syrups — they can add flavor elements that are hard to derive from specialty malts. But that's not to say that they are irreplaceable. Belgian


candi syrups can escalate the price of a homebrewed beer quickly, and while there are some dedicated homebrewers who have gotten very close to reproducing the commercial products at home, that method can be time-consuming and messy; making the syrup production feel like a second brew day.

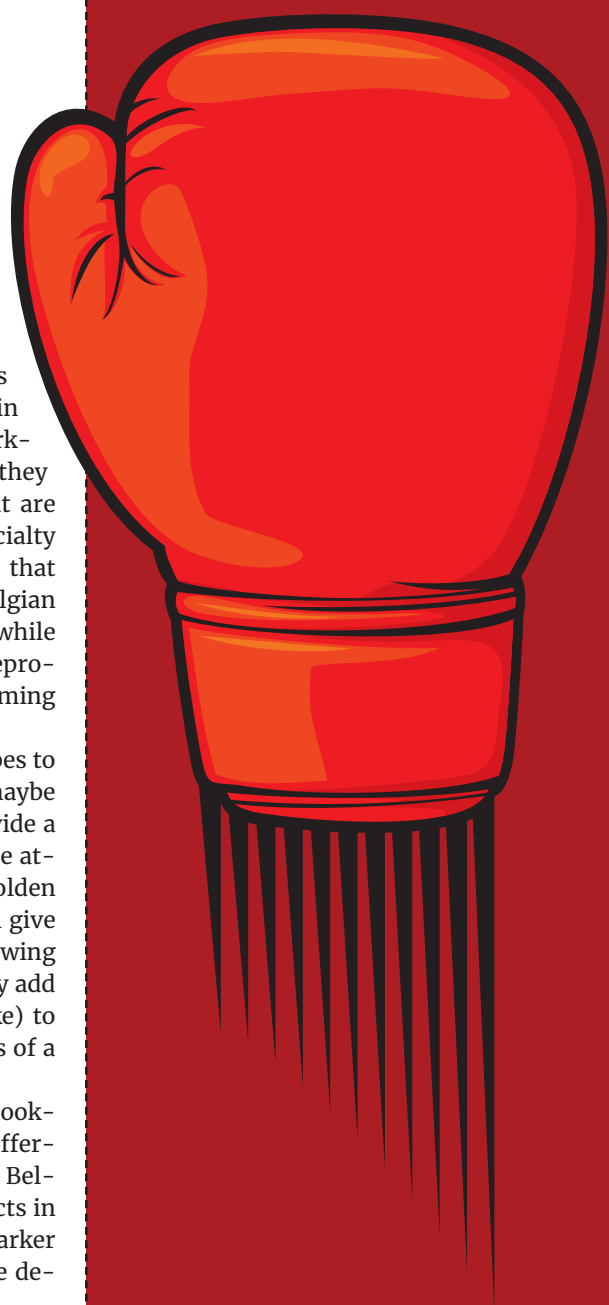
Light-colored Belgian candi syrups are the first thing I drop from recipes to cut corners. Replacing them with simple table sugar or corn sugar and maybe a touch of citric acid since golden Belgian candi syrups are known to provide a slight citric taste — use a $\frac{1}{4}$ tsp. per 5-gallon (19-L) batch to simulate the attributes from candi syrup. Often brewers like the slight acidity that the golden candi syrups provide, so a simple deconstruction of the final product will give you something in the ballpark. I find this happens very often in homebrewing — sure it's fun to add Cocoa Crisps to your next porter, but you can simply add some rice and unsweetened cocoa powder (and maybe sugar if you'd like) to get the same effect. Because when you simply deconstruct the ingredients of a finished product, you can simplify and save money.

When brewing many darker colored Belgian-style beers, brewers are looking for complexity from Maillard products. Sure, there are going to be differences between the mainly invert sugar-derived Maillard products found in Belgian candi syrup and the mainly maltose/glucose-derived Maillard products in crystal malts, but just look at the descriptions found on the two such darker grade candi syrup and crystal malt products . . . often you'll see the same descriptions of “adds notes of fig, raisin, plum, etc.”

Homebrewers often complain that using crystal malts will overly sweeten their dubbel or quad. Yes, if you add a ton of it then you can expect a more syrupy final product. But if you keep the crystal malts constrained, supplement with some table sugar, and provide a little color from a de-bittered roast malt, then a rich, dark color, and subtle flavors of raisin and fig can shine through. Be sure to layer in the crystal malts too, don't just add Special B. Open with some of the darker crystal malts, but add in some of the 40–60 °L and a touch of 80–100 °L. This will add some complexity to the Maillard products found in the beer. I do not go more than 10% crystal malts and always mash for dryness in the final beer (low conversion temperature and 60–90 minute mash).

Obviously Special B is the first malt that most brewers think of when it comes to specialty malts found in a dubbel. Another malt that I suggest homebrewers keep in mind is Simpson's DRC (Double Roasted Crystal). It adds some intense caramel, dried plum, and raisin notes that, if kept restrained, is a very nice addition to a darker abbey- or Trappist-style beer. Aromatic malts are another that should not be overlooked when developing these recipes.

With all that said, most of my light-colored abbey- and Trappist-style beers don't contain a Belgian candi syrup, while most of my darker abbey- and Trappist-styles do in a moderate percentage. As noted, I do find plenty of complexity in the darker candi syrups that are very tough to emulate with specialty malts, but using the right grain bill will still decrease the amount required. 



PIWO GROD ZISKIE

Story and photos by
Aaron Ritchie & Andrew Becker



Reviving the historic Polish smoked beer

Picture this — two Vermont guys meet for the first time at a homebrew club event, bond over their love of a once nearly extinct Polish beer style, and go on to produce countless batches in an attempt to master this elusive Polish brew. At the same time in Poland, the professional brewers of Piwo Grodziskie were working hard to produce their own version of a “Vermont IPA” (some may call it a New England IPA, but not Vermonters). Fellow homebrewers, as exciting and ironic as this sounds, this isn’t the trailer for a blockbuster buddy comedy; this is a real life tale that includes homebrewing nearly 60 gallons (227 L) of Piwo Grodziskie, countless trials and sensory analysis, and a trip to the homeland of this Polish style.

Armed only with a bag of fresh Vermont IPAs to share with the brewers in Poland (this style of IPA is quite popular in Poland right now) and a change of clothes, Andrew (and his partner, Carson) traveled across the globe to get to the bottom of what Piwo Grodziskie is all about, and how we all can properly make it back here in the United States. Andrew also had a few bottles of something else in his suitcase, but we’ll get to that later.





The brewery Browar Grodzisk in Grodzisk Wielkopolski, Poland, which opened in 2015 and revitalized the Piwo Grodziskie beer style.

HISTORY OF PIWO GRODZISKIE

Piwo Grodziskie, a historic smoked beer style also known as “Gratzer” or “Polish Champagne,” is a low-alcohol, highly-carbonated, refreshingly light-bodied wheat ale that has an oak-smoked flavor melded with a clean hop bitterness.

Piwo Grodziskie, literally translated to “beer from Grodzisk” (a small town in the east of Poland), had been brewed in Grodzisk Wielkopolski for at least 700 years. Production peaked in the late 19th and early 20th century with over 85,000 barrels produced per year. Production continued through World War I and World War II, but declined slowly during the post-war Soviet years. The number of breweries was reduced, no advertising was allowed, and production of specialty food items such as Grodziskie was discouraged. After the collapse of the Soviet Union in 1989 the last brewery producing Piwo Grodziskie was purchased by Lech, and proved not to be

profitable. As a result of this, the old brewery that had been in continuous operation in the same building since 1880, was closed in 1993.

In 2011 the Polish Homebrewers Association (www.pspd.org.pl/en) decided to try to bring the style back. They began a program called the “Grodziskie Redivivus” project to promote homebrewers and professional brewers to make Grodziskie again. They collected information and original documentation on what is most important to the style and compiled it as a guide to other brewers. Unfortunately, the key ingredients — oak smoked wheat malt and Tomyski hops — were not available at the time. It wasn’t too long after when Weyermann began producing oak smoked wheat malt (by smoking their red wheat malt with oak), but the original hops used during the late 19th and early 20th century are still not available.

In 2015, after being closed for 23 years, the brewery in Grodzisk was

reopened under the name Browar Grodzisk and began commercial production of true Piwo Grodziskie. In order to brew their Grodziskie, Browar Grodzisk commissioned Bruntal malts in the Czech Republic to create oak smoked wheat malt in the traditional way by drying the wet malt with oak smoke. They are currently working with Paweł Piłat, a hop grower outside of Lublin, to bring back Tomyski hops so they can produce a historically accurate version of Piwo Grodziskie. They use only the Grodziskie yeast strain, described as a grandchild of the strain from the original brewery, in the production of their beers. They are truly committed to producing and promoting the historical Piwo Grodziskie.

We have brewed several versions of Piwo Grodziskie using the Beer Judge Certification Program (BJCP) Style Guidelines along with information from several articles to formulate recipes. But sometimes these guides don’t show the whole story. To

try to get a full comprehensive picture of Grodziskie, Andrew visited Poland and went to Browar Grodzisk. He talked to Polish brewers, brewery owners, homebrewers, and drinkers to get a sense of what this beer means to the country, and how it can be recreated in the other parts of the world.

VERMONTERS IN POLAND

The flight from Vermont to Poland was overnight and took around 16 hours for us to touch down. After settling into our hostel in Warsaw, Carson and I took a trip to the closest restaurant: A burger joint that was decidedly American, rather than Polish. On tap were two mass-produced lagers, Tyskie and Lech. We tried both, and they were undoubtedly more flavorful than many of the American equivalents. They were hoppier and fuller than the common North American lagers found stateside.

After some time spent doing a little historic sightseeing, we then visited a small craft beer pub, Kufle i Kapsle Żoliborz. The most striking thing initially was the selection. Out of seven taps, four were IPAs or pale ales, one was a sour, one was a Belgian ale, and one was a hand-pulled porter. This sort of abundance of very hoppy beers is something that has recently become commonplace in Poland. The craft revolution really only began around 2011 there, and began with mostly Baltic porters and dark, rich styles. As it's progressed, and access to new and interesting hop varieties improved, hoppier beers as well as sour beers have overtaken the craft scene. Of note on tap was Bałwan, a 4.5% ABV pale ale by Browar Artezian. Intensely hoppy, yet full-bodied enough at sessionable levels to balance.

The next day, we took a crowded train to Krakow. Krakow has a different feel than Warsaw. Nearly 90% of the buildings were leveled in Warsaw during WWII, but in Krakow almost everything was preserved. It's old, the streets curve at every chance they get, and navigating can be a pain. But as you walk around a corner getting lost for the third time that morning, you don't see a dingy shop, but a 17th

Piwo Grodziskie Style Guidelines

OG: 1.028–1.032

FG: 1.006–1.012

SRM: 3–6

ABV: 2.5–3.3%

IBU: 20–35

Ingredients: Oak smoked wheat malt (available through Weyermann and Viking Malt), red wheat malt, rice hulls, noble hops (Preferably Lubelski/Lublin), 'Grodzisk' yeast, finings

Appearance: Crystal clear, golden-yellow, with a billowing, white head

Aroma: Light smoke, not BBQ or bacon-ey, and a slight touch of herbal-spicy hops

Flavor: Again, light smoke, with more present herbal-spicy hops on the palate, and perhaps some acidity from high carbonation and the water profile. Bitterness should be present on the palate.

Mouthfeel: Prickly carbonation on the tongue, relatively high body for such a low ABV beer

Overall impression: A quaffable, flavorful, session beer. Good for summer drinking on the porch or winter drinking with a meal. The smoke, moderate IBUs, and herbal spicy hops bring you back for bottle after bottle

century cathedral, an ancient cobblestone walkway, and watchtowers still waiting for Tatars to invade. The food is excellent, the alcohol is cheap and varied, and it's acceptable to get a little too drunk and take the tram home.

While in Krakow we took advantage of the excellent public transport and visited numerous bars and five different breweries and brewpubs, including a traditional English brewpub called T.E.A. Time (Traditional English Ale). We got a tour from the owner, James, and decided to come back in to talk to him about Polish brewing culture, and share some cans of various Vermont IPAs with him. T.E.A. Time has ten taps, eight of which are hand-pulled casks that they brew exclusively. The other two are Tyskie, and a Polish hard cider variety. James isn't a brewer, but his father was an award-winning homebrewer and many of his father's recipes are used in the brewery. Much of the beer brewed is an homage to his father, and the brewery itself honors English brewing culture, being one of the only places in Poland that has true cask beer. It thrives, mostly due to expats and tourists from the UK com-

ing in for a taste of home, but it also seems to provide a different variety of beer from what is served in most bars and even craft beer pubs.

After nine days in Krakow we caught a train, and then another, to Grodzisk Wielkopolski, the home of Browar Grodzisk. With some Vermont beer in tow (the brewers got a kick out of trying it!) we trekked half a kilometer through the town square to the brewery.

VISITING BROWAR GRODZISK

Upon arriving we were greeted by Magda Hutniczak, one of the brewers and managers at Browar Grodzisk, and quickly brought inside to meet the rest of the crew: Krzysztof and Karolina were Browar Grodzisk staff members, and Paweł, Daniel, and Adrian were brewers and hop growers visiting to talk about beer.

Magda showed me around the brewhouse and answered my questions about the brewing process. The brewery in Grodzisk Wielkopolski is smaller than you would expect. Magda helps run the 85-barrel brewhouse. Four 250-barrel fermenters that are almost always in use pro-



Paweł (right) a hop breeder in southeastern Poland outside of Lublin and his Marketing Manager Adrian (left), are working to bring back the Polish Tomyski hop variety that was traditionally used to brew Piwo Grodziskie.

duced a strong smell of sulfur, which I was assured was normal from the Grodzisk yeast strain. Everything was what a modern brewery should be on their scale: Stainless equipment, electric fermentation controls, closed loop cooling, and piping from every location within the brewery. The only manual labor that really occurs is scrubbing out the tanks and pouring the grain into the hopper of the grain mill.

Magda helped oversee the reconstruction of the brewery in 2015 and has helped design many of the beers they brew. They've kept as much of the original building as they could. The new kettles and fermenters have been placed in the same location they were when it was built, and are of the same size. The wooden frame and brick walls remain the same, aged almost 140 years. While their commitment to historical integrity is astounding, Magda admitted that some of this was a result of the town's historical commission insisting that they restore the building in a very particular way. Many buildings from this period in Poland were lost in the years of occupation, so those remaining are treated very carefully.

Krzysztof Panek, the CEO of Browar Grodzisk, is a food engineer with

a focus on brewing and malting. There were no documents covering how Grodziskie malt was made in detail, but they did know that it was dried in oak smoke, which gives it a characteristic flavor. Krzysztof collaborated with Bruntal Malt out of the Czech Republic to make malt in this traditional way, using a recipe he developed. This is more traditional than the malt made by some other major maltsters where they smoke the malt after it's been dried. The malt from Bruntal is available for purchase by homebrewers and other breweries, but Krzysztof insists on approving each purchase.

Krzysztof worked through all of the documentation remaining from the brewery to develop a historically accurate recipe circa 1900. The 700-year history of Grodziskie means that it has changed considerably, and at times been significantly different, from the style brewed today. But one thing has remained a constant: Oak smoked wheat. At the turn of the century, the style was low alcohol, exclusively brewed using wheat (though not all of it was smoked), highly-carbonated, and crystal clear. It also used the Polish hop variety called Tomyski, which will hopefully be used to brew the fall 2018 batch, thanks to the hard work of Paweł, a hop grower out of

southeastern Poland. This style, and how to brew it, is outlined later. But first, about that suitcase . . .

A POLISH HOMEBREW COMPETITION

In what seems like miraculous serendipity, we found out shortly before the trip to Poland that Browar Grodzisk was hosting a Piwo Grodziskie homebrew competition. We happened to have recently brewed a home-smoked version of the style. The recipe was similar to the one provided in this article, except using an electric smoker we smoked some wheat malt ourselves using un-toasted French oak chips. The smoker was set up for cold-smoking, and the wheat malt was smoked for about an hour, with the temperatures of the malt never going over 100 °F (38 °C). We then let the malt sit in a paper bag for a couple weeks to mellow a little. Home smoking malt is a very rewarding experience and allows you to make some truly custom beers. If you have the ability, we strongly suggest giving it a try!

Andrew brought bottles of this homebrew to Poland and submitted it into the big competition, in the semi-open Piwo Grodziskie category (Grodziskie recipes that were not 100% standard). The beer was well liked and was a finalist in this category, but was edged out by a few other specialty brews. We were very proud of how it performed against dozens of Polish homebrewed Grodziskies, and think with some of the new tips learned from the trip, we could score even higher next time.

HOW TO BREW GRODZISKIE

Piwo Grodziskie is light, drinkable, and flavorful. The ABV typically hovers around 3% with Browar Grodzisk's Piwo coming in at 3.1%. It's also fairly highly hopped for such an old style, with the IBUs hovering around 25 and a good portion of the hops being used for aroma rather than bittering. Yeast contribution to flavor is minimal. At Browar Grodzisk they use Grodzisk yeast, which is a clean top-fermenting ale yeast that has its roots in the original beer brewed in Grodzisk.



GRODZISKIE

(5 gallons/19 L, all-grain)

OG = 1.030 FG = 1.007

IBU = 30 SRM = 3-4 ABV = 2.9%



INGREDIENTS

5 lbs. (2.3 kg) Weyermann oak-smoked wheat malt
1 lb. (0.45 kg) red wheat malt
1 lb. (0.45 kg) rice hulls
3.75 AAU Lubelski hops (60 min.)
(0.75 oz./21 g at 5% alpha acids)
6.25 AAU Lubelski hops (10 min.)
(1.25 oz./35 g at 5% alpha acids)
Isinglass
Wyeast 1007 (German Ale) or
White Labs WLP003 (German Ale II)
or Safale K-97 yeast
1 cup (200 g) corn sugar (if priming)

STEP BY STEP

My water profile (in ppm) was as follows: Ca^{2+} 55, Mg^{2+} 34, Na^{+} 32, SO_4^{2-} 145, Cl^{-} 67, HCO_3^{-} 80. On brew

day, crush the grains and mash in with 1.75 gallons (6.5 L) of strike water at 134 °F (57 °C) to stabilize at 122 °F (50 °C). This is a strike water to grain ratio of 1.15 qts./lb. or 2.4 L/kg. Hold at this temperature for 30 minutes for a protein rest. Infuse mash with 1.15 gallons (4.4 L) of boiling water to raise mash temperature to 152 °F (67 °C). Hold at this temperature for 60 minutes for a saccharification rest. Sparge with 4.4 gallons (16.7 L) for a pre-boil volume of 6.25 gallons (23.7 L).

Boil for 60 minutes, adding hops as per the recipe. When the boil is complete, cool to 64 °F (18 °C), aerate, and pitch yeast. Allow to ferment and condition for 10–14 days prior to packing. Carbonate (preferably by bottle conditioning) to 3.5 volumes of CO_2 and cold condition for two weeks.

ADDITIONAL INFORMATION:

Grodziskie also makes a good base for other flavors. There are many varieties of fruited, soured, dry-hopped, and dark Grodziskie on the market. We tend to gravitate towards hoppiest beers in general, and by keeping the same grain bill as above, but tweaking the hop schedule, we can make a “New England Grodziskie” that’s got a lot more of that hoppy, herbal, spicy flavor. For that recipe we add 1 oz. (28 g) Lubelski at the start of the boil, 1 oz. (28 g) at the beginning of a 15-minute whirlpool, and 1 oz. (28 g) dry hop addition at high krausen.

Because this recipe relies so heavily on oak-smoked wheat malt, formulating an extract with grain version would be very difficult.

German ale yeast, or even an American ale yeast fermented at low temperatures, will work for this beer if need be.

The grain bill is typically one of exclusively wheat with a healthy portion being oak-smoked wheat. Rice hulls or oat hulls are added to allow for proper sparging after the mash. Browar Grodzisk uses oat hulls, but only because they are more available than rice hulls in Poland. Krzysztof says that rice hulls would probably make a cleaner product in the end. Mashing should have a protein rest included to help clarify the final product, though using proper finings may make this step unnecessary.

Grodzisk water has always been linked to the quality of its beer. A story is told of a Bishop blessing the dry well in town in the 12th century, and the water that then flowed out led to the success of the beer industry in Grodzisk. The water is unique. It's high in magnesium, and the sulfate:chloride ratio of 2.2:1, meaning that the bitterness of the beer is emphasized by the water itself. While not a necessity in brewing this style,

the water profile called for in the recipe will make a more traditional Grodziskie. Browar Grodzisk matches their water to the original profile of the well, as the old well in town doesn't provide the volume needed to brew commercially.

If you only want to modify your water slightly, make sure to add a generous portion of Epsom salt for magnesium and sulfate content, and a much smaller portion of calcium chloride. Lactic acid should also be added to the mash in lieu of a long acid rest to attain good mash pH. The mash used by Browar Grodzisk is a four-step mash without infusion. They spend 30 minutes at 100 °F (38 °C), 45 minutes at 125 °F (52 °C), 30 minutes at 145 °F (63 °C), and 30 minutes at 158 °F (70 °C), and finally mash out.

Once mashed and sparged, the beer is boiled — historically for three hours, which results in increased efficiency due to the increase in sparge water. Browar Grodzisk doesn't seem to think this is important as far as any flavor characteristics are concerned. They try to minimize any carameliza-

tion during the boil, and only boil for an hour. Hops are added during the boil — typically a Polish hop variety called Lubelski (also known as Lublin or Lubliner) is used since Tomyski hops are not yet available — with the final addition occurring within the last 30 minutes for flavor and aroma. This hop is not widely available in the U.S. but can be found online. If you'd rather purchase from your local homebrew store, Czech Saaz or Sterling both make good substitutes.

Once the boil is complete, the beer is chilled and the yeast is pitched. Fermentation is quick, and once it's over the beer is fined with isinglass. After clarification, more yeast is added along with sugar to bottle condition, and then it cold conditions for several weeks after that. Isinglass is made from fish bladder, but there are several vegan and vegetarian options for fining that can be substituted, or you can skip using a fining agent and simply cold condition until it's clear.

Our recipe for a classic Grodziskie, tweaked slightly by the brewers at Browar Grodzisk, can be found on page 75. **BYO**



Magda Hutniczak, one of the brewers and managers at Browar Grodzisk, offers a tour of the modern brewery.

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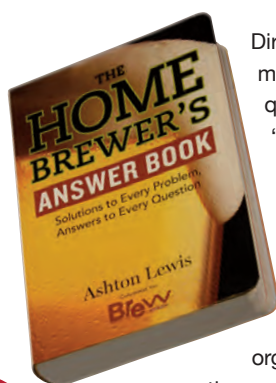
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RECORDING YOUR

The importance of documentation

By Jason Simmons

Most professional brewers have had a prior career path before deciding to become a brewer. It is neat to see how each brewer uses their past talents to solve a brewing situation in their own unique way. Before my professional brewing career, I had a few years experience in the emergency medical services (EMS) field. During our training, we were taught about proper documentation, and that “if you don’t write it down, then it didn’t happen.” From early on it has been programmed into my head the importance of proper documentation. Over the years, a few EMS calls have been brought to court due to the nature of the incidents, and it was my detailed note taking in my reports that swung the case in one direction or the other. When I got into brewing beer I continued to use this same practice of detailed note taking and documentation in an attempt to become a better brewer. I enjoy the results of being able to review the data I need to make the right decisions during my brewing day.

As most new brewers are, I was overwhelmed with trying to fully understand all the processes that go into making a batch of beer all at once. As I continued to learn, got more hands-on experience, and then moved into the professional world of brewing, I slowly started to change my brew log sheets to fit all the information that I would need to properly document a batch of beer to my liking. As I look back on my earlier batches, I see so much information that I didn’t re-



BREW DAY



Photo courtesy of Shutterstock.com

cord because I just wasn't aware of it, or didn't understand the importance of the data.

To help calibrate your system you need to first understand what your batch targets are.

What is a 5-gallon (19-L) batch? Is it 5 gallons (19 L) in the kettle pre-boil, 5 gallons (19 L) post-boil, the volume in the fermenter, or is it the packaging volume?

Seeing that the original gravity is first able to be taken, along with a volume reading, at post-boil, this is where I consider my equipment size. While you must know your pre-boil volume to get the mash efficiency, the post-boil volume will allow you to start measuring your volume losses through each process. For this reason, and because recipes are written to post-boil numbers, I always refer to my equipment by post-boil volume numbers. While some may claim "5-gallon/19-L batches," I personally target 9 gallons (34 L) pre-boil, 6 gallons (23 L) post-boil (I do a 90-minute boil), 5.5 gallons (21 L) in fermenter, and close to 5 gallons (19 L) packaged. All of this said, and I refer to my batches as 6-gallon (23-L) batches to make sure I hit my gravity target.

Over the years, while working at several breweries, I have been told

by numerous people that I document more information on batches than most brewers they have come across. I have always taken much pride in this. Being in the process of starting and building a new brewery, I have made our brewery logs to include all the important key data points that I feel are necessary to properly document a batch. When taking notes, it helps to understand the recipe writing process, gravity points, points per gallon (PPG) of malts and grains, mash efficiencies, and things of that nature so that you know what information you should record. In this article, I will go over what I feel are key data topics to document so that you can better evaluate your beer, procedures, and other useful data so that you can adjust your brewing practices if needed to hit your targets.

WHY IS DOCUMENTATION IMPORTANT?

I would like to think that there are two types of brewers out there. One that follows directions well by adding in the ingredients at the right time and temperatures, and then there is the academic brewer who is looking to make a better product each time by fully understanding every aspect of the brew session. Despite what type

of brewer you may be, it is always nice to be able to look back on your notes to evaluate a full day's worth of hard work if you choose to do so. If there is any need for troubleshooting, then you will be armed with all the information needed to correct the problem, or prevent that issue from happening again in the future.

In my 15+ years experience as a brewer, I have had only a handful of batches that were 100% textbook perfect where all targets were met with no mishaps. This is a very rare experience, and feels like a great triumph and victory when it does occur.

Other than troubleshooting, another good reason for meticulous note taking is to calibrate your system. The more factors and data that you collect on a system or batch will help you dial in recipes. Whether you like to brew only one-off beers that you created, your favorite "tried and true" recipe, a clone, or a professional brewery's actual recipe to their brewery specifications, with an abundance of notes you can see where the deficiencies and influxes are so you can adjust accordingly to your system specifications and habits. Once your system is fully calibrated, and you can expect to hit your targets, you might decide to try another brewer's recipe that they

The image shows a two-page spread of a handwritten brewing log. The left page is dated "Monday 8 August 1866" and includes sections for "Malt No. 1 Tun", "No. 2 Tun", and "Heat of Liquor Ex Tun". It lists various measurements like "Mashed Temperature 60°", "Boiled to 104", and "Gravity before boiling 104". The right page continues the log with "Youth the Pilsener", "1st Wort Bril. and Gvt.", and "2nd Wort Bril. and Gvt.". It includes calculations for "Total Bril. and Gvt." and "Pitching Heat". The log is filled with handwritten numbers, units, and some corrections, showing a detailed record of the brewing process.

The brewing log kept at Fuller's Brewery in London, England, where hand-written notes for every batch dating back to the 1800s are still used.

wrote using their system. Knowing all of their specs, and being able to apply it to your brewhouse, will help keep the consistency of the beer.

Not all brewers are the same. Even at breweries that have two or more brewers, it takes much practice and training to all become accustomed to each other's style and the way each operates on a particular brewing system. Minor differences between brewers can change the targets of a beer. Being able to read detailed notes and learn from every batch will help you be consistent in hitting all of your targets.

Some newer brewers might come across a few topics that you are unable to record. With collecting as many notes as you can, you are able to better make educated guesses on the missing topics using the other data. Also, always feel free to add any bit of other information that you feel you might need, as these lists are always evolving. Here are the main key data topics that I like to gather while producing a batch of beer.

BREW DAY NOTES

At the top of my brew sheet I include my favorite highlights that I often use for easy reference. They include: **Date, Batch Name, Batch Number, Beer Style, Brewer's Names, Boil Time, TGU (total gravity units), Pre-Boil Volume, Post-Boil Volume, IBU, CGravity** (correcting gravity factor due to higher gravity wort and the increasing harder ability to isomerize the hops alpha acids as the wort gravity rises), **Original Gravity, Final Gravity, ABV %, ABW %, Mash Efficiency %, Yeast Strain, and Yeast Attenuation %**.

When listing any ingredients, make sure to document the manufacturer, lot numbers, crop year, and expiration dates if given for later reference. Also, when listing the malt varieties make sure to include the Points per Pound per Gallon (PPG) that you are using in your calculations. This may be given by the malt supplier as an actual analysis number, or an overall average estimate that can be found on one of many

homebrewing sites that offer a PPG list of common malts and grains. Beersmith.com and Brewunited.com are two sites that offer PPG lists.

Most PPGs listed are maximum extracts that come from a fine grind (0.2 mm grind) / dry base, which is obtained through a congress mash in a laboratory. As brewers, we obtain our malts with moisture content and normally mill our malts coarsely (around 0.7 mm). If you have a few specs you can dial in an actual PPG. Malt analysis reports usually include fine grind / dry base percentage (FG/DB%), fine grind / coarse grind difference percentage (FG/CG%), coarse grind / dry base percentage (CG/DB%), and moisture content percentage. We are more interested in the coarse grind / as-is percentage (CG/As-Is%), as it is more relevant to normal brewing conditions.

For example, the malt analysis report for Crisp Malting Group's Maris Otter English pale 2-row gives a FG/DB of 81.5%, FG/CG difference of 0.9%, and a moisture of 3.5%. To find the CG/DB%, you take the product of FG/DB% and FG/CG% then subtract it from the FG/DB%, which totals 80.77%. You now take the product of CG/DB% and moisture %, and subtract that from the CG/DB to get the CG/As-Is percentage. In this case, Crisp Maris Otter has a 77.94% extract. This extract percentage is an extract of sucrose, which has a PPG of 46, therefore $46 \times 0.7794 = 36.85$ CG/As-Is PPG. Many brewing sites list Crisp Maris Otter at 38 maximum FG/DB PPG. When you take into consideration the moisture content and FG/CG difference, the new PPG is now 36.33 PPG for CG/As-Is.

For the most part these numbers are fairly close and produce results within the expected ranges, but the numbers can differ enough to notice from lot number to lot number. The same applies for hop varieties with consideration to crop years, alpha acids, hop storage index (HSI), and storage conditions. With having a premade brew sheet to use on brew day that lists your target data points in order of the time that you would

collect it helps in keeping organization, as well as reminding you to take a reading at the correct time.

For my brew day I try to record the following data: **Start/End Times, Start/End Propane Tank Weight** (fuel consumption), **Water Source, Water Report** (if available), **Dough In Time, Start/End Hot Liquor Tank (HLT) Volume** (mash in water volume), **Salt Additions** (if any), **Strike Temperature, Target Mash Temperature, Initial Mash Temperature, pH Readings** (I like to take these every 10 minutes), along with **Gravity/Brix** readings at recorded **Volume and Temperature, Start/End Lauter Times, Start/End Sparge Time, Sparge Water Temperature, Start/End HLT** (for sparge volume and salt treatment), **Total Water Used, Total Water Retained By Grist, Pre-Boil Volume, Pre-Boil Gravity Unit (GU)** divided by 100% **Efficiency Gravity GU** to get **Mash Efficiency Percentage, Kettle Full Time, Type Of Kettle Heat** (direct flame, electric elements, electric stove top, steam, Etc.), **Kettle Heat On Time, Kettle Heat Off Time, Boil Time, Kettle Additions** (with **Weights, Times, Alpha Acids, Hop Utilization Percentage**, and any **Finings and Yeast Nutrients**).

You also want to keep notes on your times and temperatures of your whirlpool and knockout methods (glycol heat exchanger, counterflow wort chiller, immersion wort chiller). A 20-minute whirlpool and transfer will leave the wort at hot temperatures for longer periods of time the bigger the equipment gets. I find it to be quicker to chill wort and transfer a 5-gallon (19-L) batch than I can a 500-gallon (1,900-L) batch even though the hoses and pumps are also in proportion to the kettle size.

WEATHER

Something that I have picked up over many batches was to record the current weather. I always homebrew outside, and the weather is different each time, causing much difference in each batch. Knowing the weather during mashing as well as during the boil can help you plug in

a few variables that might help predict the correct strike temperature to hit your target; or to estimate the boil off resulting in higher or lower gravity and/or volume. I personally have used the weather app “eWeather HD” for the past five years to collect the following data on batches with outstanding results:

Current Temperature, Dew Point, Humidity Percentage, Chance Of Precipitation Percentage (indicates possible future pressure drops, increases, or stagnant stalls in air pressure that can cause poor boil-off leading to improper evaporation), **Yesterday’s Pressure** (in hg), **Current Pressure** (in hg), **Sea Level Pressure** (in hg), **Wind Direction** and **Wind Speed**.

I have found that, even when brewing indoors at breweries, this information plays a major role in boil-off rates when using a kettle-out exhaust column to relieve steam with and without kettle fans.

ELEVATION

Elevation is another factor, but is for the most part a constant one as your brewing location rarely changes. High altitude definition is 3,000 feet above sea level, and even at 2,000 feet you can notice that the boiling point has dropped from 212 °F (100 °C) at sea level to 208 °F (98 °C). The higher you get in elevation the lower the boiling evaporating temperature becomes, changing the chemistry of boil-off and hop isomerization rates. Household cooking instructions suggest that you boil longer when in higher elevations, so I would suggest 90-minute boils when brewing at higher elevations. I have had only a few experiences brewing at high altitudes, and had great boil-off rates.

FERMENTATION / CELLAR WORK NOTES

There is some key information that you should get during the fermentation and cellaring process. During knockout, was the wort oxygenated, and if so with what method? Make sure to log the **Yeast Manufacturer** and **Strain, Preparation Before Pitch**

such as a yeast starter or propagation vs. direct pitch, **Number Of Generations, Viability Percentage, Cell Density, Pitching Volume, Pitching Wort Temperature, Fermentation Temperature**, and the **Volume of Wort** being pitched into.

I don’t expect homebrewers to take samples of their gravity every day, but if you choose to do so you can learn a whole lot about how a particular yeast strain works under your current brewery conditions. If you are able to take pH readings you can see how the pH changes from water to mash, sparge, and fermentation to a final pH. No matter if you are a brewer who uses a bucket fermenter or a fancy conical stainless steel fermenter with capping and spunding valve options, make sure to take notes on your dry hopping or finings procedures, when you cap the fermenter, and any pressure PSI readings that need to be taken. Remember to degas all samples for accurate readings. When you have reached terminal gravity and completed a diacetyl rest, you will then be ready to cold crash the beer. Document all times and temperatures. If you do yeast harvests, be sure to document the temperature, how much volume you pull, and any yeast specifications like those already mentioned. The more information you have on how your yeast works the better you can predict its outcome and timeframe. A 78% attenuated beer tastes much different than an 82% attenuated beer.

TRANSFERRING

In a brewery setting, this is a major task that takes up the majority of the work day and requires its own paperwork. Transfers in homebrewing should only take a minimal amount of time, and usually are as simple as syphoning beer from the fermenter to a bottling bucket or keg. There are some brewers who have the equipment and means to filter their beer through any of the multiple filtering gadgets that are out on the market. Over the years, I have noticed close to a 10% loss from fermenter to brite tank (a beer vessel to prepare beer for packaging), and

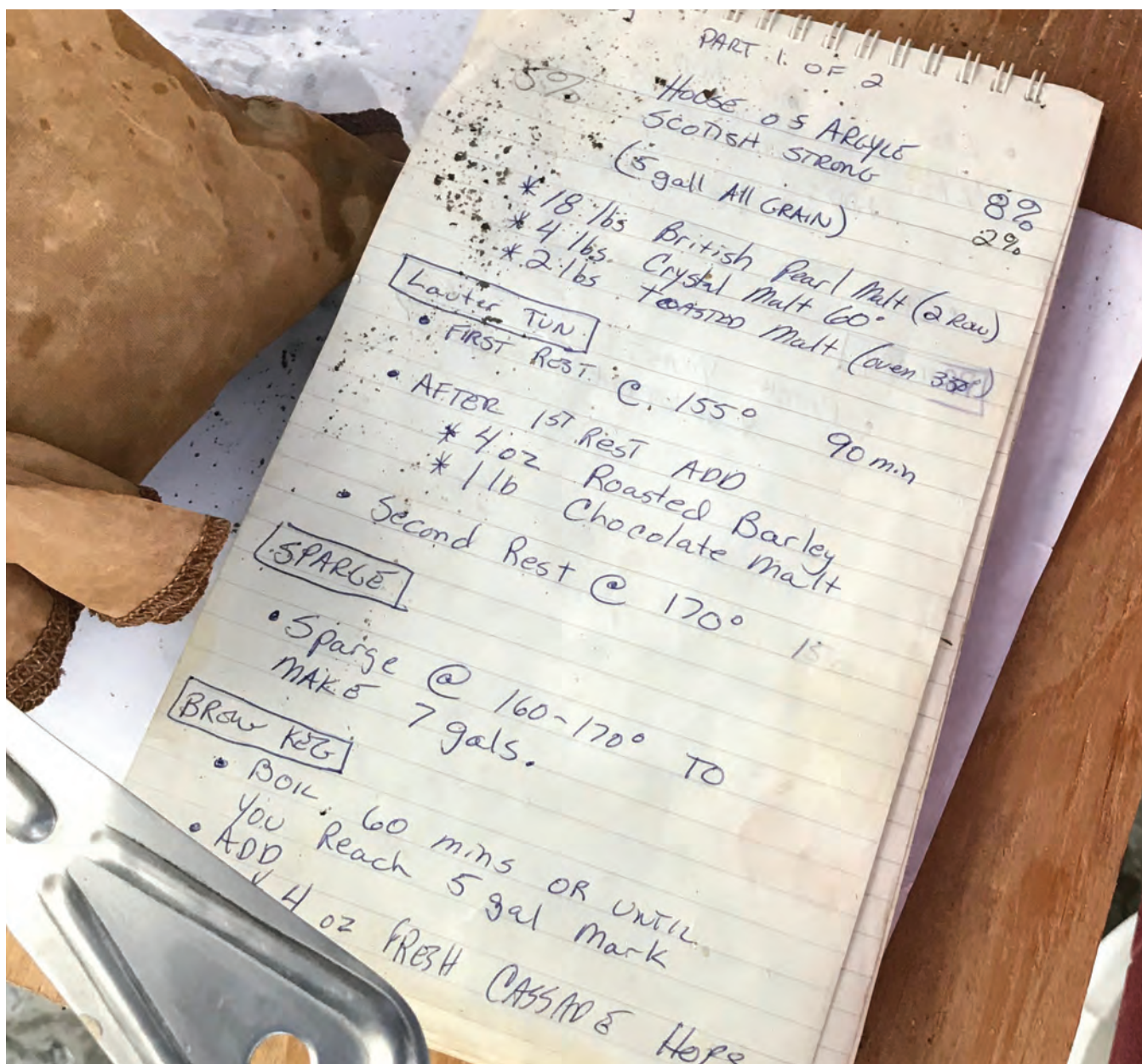
close to a 12% loss for filtered beer. The significant loss is largely due to trub and yeast, and these numbers will change from batch to batch with different styles, filtering methods, and operator methods and/or error.

Knowing how much volume to expect from each step of the process will allow you to make future adjustments to hit target volumes of a particular gravity or ABV. When transferring beer, be sure to record vessel, temperature, and pressure from fermenter prior to transfer, and the same in the brite tank after transfer. Recording Start/End transfer times plus clean up time will allow you to better manage your time. If using any fining agents such as Biofine Clear, isinglass, or gelatin, document the amount and method being dosed into the final brite tank volume. Most homebrewers don’t use industry-style brite beer tanks/vessels, but a bottling bucket or secondary fermenter to pull the beer off the yeast (and to measure volume) before kegging are also forms of brite beer vessels.

PACKAGING

Depending on your equipment, your method of carbonation, and packaging procedures, at this point your beer should be in some sort of brite beer tank. This may be a stainless steel bright vessel with a carbonation stone, a bottling bucket for bottle conditioning, a secondary before keg conditioning, or a direct closed system pressurized transfer to a keg for forced carbonation. No matter the method you decide to use, you have already pulled beer off the trub and yeast in the fermenter, and prepared it for final packaging with volume measurements.

With final packaging volumes tallied, you will now know the full batch loss and the amount lost in each section to adjust to better hit your target packaged volume. Is your beer under-carbonated or do you have bottle bombs? If you took detailed notes on the carbonation method, weights and type of priming sugars, and an accurate volume of beer, then you should be able to easily diagnose any



carbonation problems. This information will help keep consistency and allow for brewers to adjust for future batches. I also use the same information while homebrewing to better calibrate my system and hit my targets.

ANALYSIS OF DATA


While I love to brew beer, one of my favorite things to do is to go over my brew sheets and analyze my careful planning and hard day's work. How close did I come to my targets? If I did miss a target, then where and what caused the deviation in course? Often the answers to a problem are right there in front of you if you have taken

the right notes and data to properly analyze a batch of beer. Many of these times the difference between targets and actual readings are minor, and don't stray far away from the overall desired spirit of the beer. In these cases just a little tweaking might be in order.

If a major problem occurs, it should be fairly clear with proper documentation where and what caused the problem. Even if you cannot redeem your batch, or it has taken an entire new character than the original recipe called for, you will be able to learn from mistakes and adjust for future batches.

As I mentioned earlier, I have had

only a handful of 100% perfect text-book brew days. I feel the reason that this was possible was mainly due to persistent note taking, detailed documentation, reviewing of the data to come up with a new approach, then repeating the process to narrow in my variables. With practice, experience, and a wealth of detailed documentation, you can take ahold of your brew-house, and sail it through any beer adventures that may be in store.

Downloadable blank copies of the six brewing logs I use, with space for every criteria covered in this story, are available with the online version of this story at <https://byo.com/article/recording-your-brew-day> 



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HIGHLIGHTS



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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 VERMONT BEER RECEPTIONS

Wrap up your full day of learning with sampling some of Vermont'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 regularly sells out at our past events.



OPTIONAL PRE- AND POST-CONFERENCE VERMONT BREWERY TOURS

Here's your chance to easily check out Vermont's famed craft beer scene. We'll offer two different tours on both the day before and the day after NanoCon. One trip will head out to the Stowe, Vermont region including a stop at The Alchemist to drink some Heady Topper at the source while the second tour hits Burlington-area craft breweries.

ONE-YEAR PRINT SUBSCRIPTION TO BREW YOUR OWN

Included with your NanoCon registration, a \$29.99 value. Features our regular Nanobrewing column by Technical Editor Ashton Lewis.

NANO LEARNING TRACKS



BREWERY OPERATIONS

- Quality Control Testing for the Nano
- Mobile Packaging Do's & Don'ts Roundtable
- Nano-Sized Yeast Management
- Cleaning Secrets & Small-Scale CIP Systems
- Evaluating Raw Materials
- Recipe Scaling
- Brewing Safety in Tight Quarters
- Nano Peer-to-Peer Table Topics

START-UPS

- Creating (and Financing!) Your Brewery Business Plan
- Infrastructure Sizing for Your Nano Building
- Planning & Starting Up a Quality Control Program
- Transitioning to Working Directly with Ingredient & Supplier Vendors
- Pro Options for Heating: Choosing Between Steam, Electric, Gas, Direct Fire & More
- Start-Up Brewery Law 101
- Brewery Branding 101
- Nano Peer-to-Peer Table Topics

BUSINESS OPERATIONS

- How Much Was That Last Batch?: Brewery Cost Accounting
- Accurately Forecasting Ingredient Purchases
- Top 10 Legal Mistakes Made By Small Breweries
- 1 Person, Many Hats: Keys to Being the Business Owner & Head Brewer
- Conducting an Operations Audit to Achieve Savings
- Can I Get "X" Hop?: Contracts, Spot Buys & Locking Down What You Need
- Maximize Brewing Flexibility While Minimizing Expenses on Less Equipment
- Nano Peer-to-Peer Table Topics

SALES & MARKETING

- Social Media Strategies to Build Your Nano
- Tasting Room Special Events Roundtable
- Make Your Brewery's Website Work Harder
- Maximizing Customer Clubs to Boost Sales & Loyalty Roundtable
- Building on Your Brewery Branding
- Strategic Email Marketing to Pack Your Tasting Room
- Build a Tasting Room Community Roundtable
- Nano Peer-to-Peer Table Topics



PRE-CONFERENCE

- Starting Up a Commercial Brewery (2-day class)
- Burlington-Area Craft Brewery Tours
- Stowe/Waterbury-Area Craft Brewery Tours

POST-CONFERENCE

- Burlington-Area Craft Brewery Tours

CREATING (AND FINANCING!) YOUR NANO 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. Plus even after writing a business plan figuring out how to finance that vision is a huge hurdle for most start-ups. Luckily we have Audra Gaiziunas who helps craft breweries in planning write better business plans that will in turn help raise money to get your new brewery off the drawing board and into business.

AUDRA GAIZIUNAS - OWNER, BREWED FOR HER LEDGER, LLC

EVALUATING RAW MATERIALS BREWERY OPERATIONS

Your next batch of beer is only as good as the ingredients you are using, but many commercial brewers don't take the time to properly evaluate the malts, hops, and other materials they'll be using. Veteran craft brewer Ashton Lewis also works within the supply chain of ingredients as a rep for BSG Craft Brewing so he knows both sides of the business. He'll walk you through what you should be doing before you add that next item to your next batch so you can make sure your beer will be as good as it can be.

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

SOCIAL MEDIA STRATEGIES TO BUILD YOUR NANO SALES & MARKETING

Anyone can use social media, but how to use it correctly 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 loyal community of potential customers. Find out the key strategies for a successful Nano social media program from Tabitha Tice who spends her workdays managing social media for several different breweries.

TABITHA TICE
COMMUNICATIONS AND MARKETING SPECIALIST, ALCHEMY & SCIENCE BREWING

ONE PERSON, MANY HATS: KEYS TO BEING BOTH THE BUSINESS OWNER & HEAD BREWER BUSINESS OPERATIONS

Juggling all the various duties of being a small business owner is always challenging, but when one of those responsibilities is also brewing beer in addition to running a business your workday gets pretty complex. Doing everything as well as it needs to get done takes some careful planning and organization so key items don't fall through the cracks in the brewery or at your desk. Steve Parkes who wears both the Brewmaster and Business Owner hat at his Drop In Brewing as well as running the American Brewers Guild will help you make better decisions on how best to divide your time and duties so things run smoothly.

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

FRIDAY, NOVEMBER 2, 2018 | 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

QUALITY CONTROL FOR THE NANO

BREWERY OPERATIONS

Establishing and following through with a quality control program is key to the success of your brewery – no matter what the size of your output. Even the smallest of breweries need to run certain key tests on their beer and can without taking up too much space, resources or cost. QC expert Amy Todd will walk you through what you should be doing as a small-scale commercial brewery to make sure the beer you are selling to customers is truly good to go.

AMY TODD

OWNER AND ANALYST, ZYMOLOGY LABS

BUILDING ON YOUR BREWERY BRANDING

SALES & MARKETING

You make great beer, but many Nanos forget that they also need to keep building a brand around their beer. Have you emphasized the right back story to tell and is that story and personality reinforced through design and all marketing materials? Plus does your marketing voice work with or against other efforts? Craft beverage branding expert Glenn Clark will help you take a look at doing a branding audit to make sure you are focused on the most effective stories, but are also united in reinforcing that story with customers.

GLENN CLARK

PRESIDENT, CRAFTING A BRAND, CO.

TOP 10 LEGAL MISTAKES MADE BY CRAFT BREWERIES

BUSINESS OPERATIONS

Are you unknowingly making legal mistakes that will negatively hurt your brewery? From intellectual property to trademarks to navigating permits to employment law, there are plenty of legal mistakes a Nano can make in the course of just doing business. Lawyer Matthew McLaughlin who specializes in representing craft breweries and distilleries will walk you through the 10 most common legal pitfalls other commercial breweries have faced so hopefully you don't have to as well!

MATTHEW MCLAUGHLIN

FOUNDER, MCLAUGHLIN, PC

INFRASTRUCTURE SIZING FOR YOUR NANO

START-UPS

When you are looking for locations and space for your new Nano there are quite a few things to consider other than just the cost. From utilities like electric, gas, and water to other key items such weight loads, ventilation, floor drain possibilities, ease of inbound/outbound deliveries, and wastewater there are plenty of items to add to your location checklist. Brewing equipment guru and engineer John Blichmann will help you sort out what to keep on your radar as you hunt for a home for your new Nano.

JOHN BLICHMANN

PRESIDENT, BLICHMANN ENGINEERING



LUNCH & NANO IDEA-O-RAMA ROUNDTABLE

GROUP SESSION

NANO EXHIBITS

Get ready to listen in as fellow Nanobrewers 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.

12:15 – 1:45PM



SPECIAL EVENTS TO PACK YOUR TASTING ROOM ROUNDTABLE

SALES & MARKETING

Find out from your fellow Nanobreweries 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, Nanobreweries 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 opening up discussions for the entire room so everyone can learn new ideas from each other.

2:00 – 3:00PM



HOW MUCH WAS THAT LAST BATCH?: BREWERY COST ACCOUNTING BUSINESS OPERATIONS

82% of existing breweries have no idea how much one run of their beer even costs. Learn the keys to make sure you don't fall into that trap as well as keeping an eye on other important cost aspects of your Nano business with Audra Gaiziunas who has helped over 120 craft breweries and cideries in the last five years make sense of the cost-side of your business so you can make better decisions overall.

AUDRA GAIZIUNAS
OWNER, BREWED FOR HER LEDGER, LLC

TRANSITIONING TO WORKING DIRECTLY WITH INGREDIENT & SUPPLIER VENDORS ROUNDTABLE START-UPS

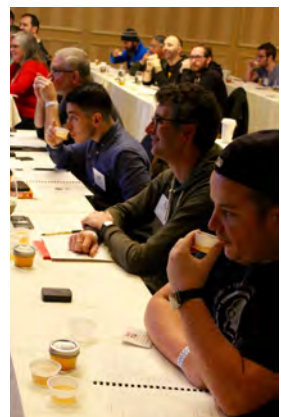
One area of change for homebrewers launching a commercial brewery is working for the first time directly with the companies that sell their brewing ingredients and supplies instead of just purchasing the same items from a local or online retailer. And there is definitely more of a learning curve involved than you would think. You'll learn from a panel made up of different vendors you might end up doing business with after launching your brewery about the best ways to start off what will be an important business relationship for the success of your new Nano.



CLEANING SECRETS & SMALL-SCALE CIP SYSTEMS BREWERY OPERATIONS

We all know how important a clean brewery is for quality beer. But knowing the ins and outs of small-scale CIP (clean-in-place) systems as well as secret trouble spots to keep an eye on when cleaning any commercial brewery is not always clearly understood or given enough attention or consideration. Plus there are a host of different cleaning products out there to consider. Get the inside dirt from a fellow craft brewer on how to best clean your way to better beer with Vilija Bizinkauskas, Lead Brewer at Drop In Brewing in Middlebury, Vermont.

VILIJA BIZINKAUSKAS
LEAD BREWER, DROP IN BREWING COMPANY





3:00 –
3:45PM

VERMONT NANO BEER BREAK & EXHIBITS

NANO EXHIBITS

Sample some local Vermont Nano craft beer 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

ACCURATELY FORECASTING INGREDIENT PURCHASES BUSINESS OPERATIONS

One of the keys of running a successful brewing business is accurately managing the ordering of ingredients for future batches of beer. Not having enough of a certain ingredient will keep you from brewing what you want when you want. But having too much of another ingredient will just tie up your financial resources that could be used elsewhere. Veteran craft brewer Ashton Lewis also works within the supply chain of ingredients as a rep for BSG Craft Brewing so he has both handled the forecasting of ingredient purchases personally for his own brewery as well as helped other breweries strategically manage how they accurately predict ingredient purchases. He'll help walk you through what you need to know to be as accurate as you can be with your own ingredient purchase forecasting.

ASHTON LEWIS

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

BREWERY BRANDING 101 START-UPS

Get ready to be immersed in the world of branding your brewery. Creating a brand behind your beer, defining your brand's personality, reinforcing the brand through design, and finding your brewery's public voice are all key elements that will attract and keep future customers in addition to the great beer you'll be brewing. Glenn Clark works with breweries on branding every day and he'll share the keys you need to consider before even opening your doors.

GLENN CLARK

PRESIDENT, CRAFTING A BRAND, CO.



MOBILE PACKAGING DO'S & DON'TS ROUNDTABLE 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 option from a panel made up of both Nanobrewers as well as mobile packaging companies so you can better take advantage of the flexibility these can provide you as a brewer and as a business.

STRATEGIC EMAIL MARKETING FOR YOUR BREWERY SALES & MARKETING

Strategic email use can be a cost-effective way to boost beer sales, brand awareness, customer loyalty, and 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 how to best use email effectively to build your brewery's business from Alex Standiford who helps craft breweries with their digital strategies.

ALEX STANDIFORD

DIRECTOR, FILLYOURTAPROOM.COM



VERMONT CRAFT BEER OPENING RECEPTION

NANO EXHIBITS

We've invited some of our favorite Vermont 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, Vermont brewers, and visit with our exhibitors before you head out on the town to check out Burlington's breweries and craft beer taprooms for the evening.

START-UP BREWERY LAW 101

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 have a better overview on the legal side of your business well before you ever pour your first pint.

MATTHEW MCLAUGHLIN
FOUNDER, MCLAUGHLIN, PC

RECIPE SCALING

BREWERY OPERATIONS

As you work on different sized brewing systems there are many factors to consider when you want to scale up a favorite beer recipe. As most brewers know it isn't a matter of just proportionately increasing ingredient amounts when you boost your batch size, but what is truly the most accurate way to adapt your old recipes to a larger system? Steve Parkes of the American Brewers Guild and Drop In Brewing Company will give you all the details you need to scale up that recipe so you recognize that beer in the glass as the same recipe you used to make on a smaller system.

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

MAXIMIZING CUSTOMER CLUBS TO BOOST SALES & LOYALTY ROUNDTABLE

SALES & MARKETING

Hear great ideas from fellow Nanobreweries using different variations of customer clubs to help drive sales and build a loyal core of customers. From exclusive limited release beer clubs to traditional mug clubs to monthly beer CSA-type clubs, breweries are creating specific customer communities within their communities to boost sales and goodwill. We'll have a panel as well as opening up discussions for the entire room so everyone can learn new ideas from each other.

OPERATIONAL AUDITS TO ACHIEVE SAVINGS

BUSINESS OPERATIONS

Unless you take a step back and truly make an objective audit of your brewery business you won't know if there is room to operate more efficiently, effectively, and consistently. Learn what the key metrics are to keep in mind and how to best tackle this internal audit with Audra Gaiziunas who regularly works with craft breweries on operational audits and how to improve their processes, accounting procedures, and other key aspects often overlooked in small-scale breweries.

AUDRA GAIZIUNAS
OWNER, BREWED FOR HER LEDGER, LLC

5:00 –
6:30PM

SATURDAY, NOVEMBER 3, 2018 | 9:30 – 10:30AM





10:30 – 11:00AM

NANO EXHIBITS & COFFEE BREAK

NANO EXHIBITS

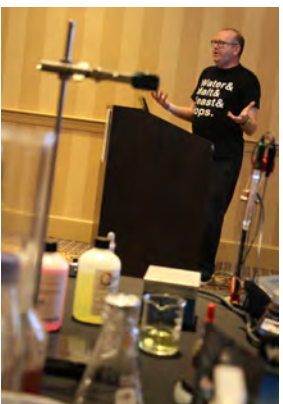
Refuel with a cup of coffee and check out the latest in Nano-sized equipment, gear, ingredients, and supplies from dozens of craft brewing's top vendors.



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 Nanobreweries 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 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.



2:00 – 3:00PM

NANO-SIZED YEAST MANAGEMENT

BREWERY OPERATIONS

Yeast is obviously the workhorse of any brewery, but what are some of the ways a small-scale commercial brewery can get the most of their yeast? Learn about the keys to managing your yeast in a small-scale brewery from re-pitching, taking yeast counts, and keeping the yeast healthy for a good fermentation with Dr. Chris White of White Labs, one of the top suppliers of yeast for the craft beer industry.

DR. CHRIS WHITE
PRESIDENT, WHITE LABS, INC.

MAKE YOUR BREWERY'S WEBSITE WORK HARDER

SALES & MARKETING

You've got a website for your brewery, but is it getting the job done to boost interest in your beer and events resulting in more income for your business? From selling swag, event tickets, tours, and customer club memberships to up-to-date tap lists, beer release calendars, and avoiding age verification search headaches, you'll learn some easy and actionable ways to make your brewery website help drive interest in your brand and drive customers to your brewery while generating online income. Join Alex Standiford who specializes in website strategies for craft breweries and helps them get the most of their digital efforts.

ALEX STANDIFORD
DIRECTOR, FILLYOURTAPROOM.COM

CAN I GET “X” HOP? ROUNDTABLE: CONTRACTS, SPOT BUYS & LOCKING DOWN WHAT YOU NEED ROUNDTABLE

BUSINESS OPERATIONS

Today's hop market is constantly changing so we're pulling together a panel of hop industry experts to talk more about how you as a small-scale brewery business can best navigate getting the hop varieties you want in the quantities you need. Are spot buys the way to go? What's the current take on contracts? And where is the hop market heading? It's a moving target lately and our experts are here to share their advice as you look to fulfill your brewery business' hop supply needs.

PRO OPTIONS FOR HEAT: CHOOSING BETWEEN STEAM, ELECTRIC, GAS & MORE

START-UPS

There are quite a few choices when you take a look at how you will supply heating for your start-up Nanobrewery. There are pros and cons to consider whether to go with steam, electric or gas. And do you keep using direct fire from your homebrew days? Utility costs will also become a factor to consider in addition to equipment choices for your set-up. You'll understand the pluses and minuses of each after this session with John Blichmann of Blichmann Engineering.

JOHN BLICHMANN
PRESIDENT, BLICHMANN ENGINEERING

VERMONT NANO BEER BREAK & EXHIBITS

NANO EXHIBITS

We've invited a new group of local Vermont Nanobreweries 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.

BUILDING A TASTING ROOM COMMUNITY ROUNDTABLE

SALES & MARKETING

The most loyal of your customers see themselves as part of your community. But how do you go about fostering that sense of community in your taproom? We'll hear from a panel representing several Nanobreweries who have helped create this key dynamic at their taprooms and we'll also open up the floor for free-flowing discussions so everyone can learn from each other about strategies to build customer community that will end up driving more sales for you.

BREWERY SAFETY IN TIGHT QUARTERS

BREWERY OPERATIONS

Commercial brewing, no matter the scale, is filled with potential hazards if you don't have a solid safety plan in place. These possible problems can increase when the size of your brewery doesn't allow much extra space around your equipment. But above all else you need to have your safety procedures identified, documented, and in place to protect yourself and anyone else in the brewery. "Safety Matt" Calcagnie is the Safety Manager overseeing two longtime Vermont craft breweries – Long Trail and Otter Creek. He'll help give an overview of what you need to establish for brewery safety – no matter the size of your system – and why it so important.

MATT CALCAGNIE
SAFETY MANAGER, OTTER CREEK BREWING COMPANY & LONG TRAIL BREWING COMPANY

2:00 – 3:00PM



3:00 – 3:45PM



4:00 – 5:00PM





4:00 – 5:00 PM

PLANNING & STARTING UP A QUALITY CONTROL PROGRAM

START-UPS

If you are going to charge the public money for your beer and want repeat customers you have to put a solid quality control program in place for your new brewery. That means budgeting some space and resources to run some basic QC tests on your beers before they head out to customers. Having a QC program is more than simply troubleshooting beer faults, it is a business necessity no matter the scale of your new brewery. Learn what you need to budget for and have in place from day one at your brewery with Amy Todd who runs her own commercial beer and cider testing lab after a career in craft beer QC.

AMY TODD

OWNER AND ANALYST, ZYMOLOGY LABS



MAXIMIZE BREWERY FLEXIBILITY & SAVE MONEY WITH LESS EQUIPMENT

BUSINESS OPERATIONS

You can cut costs using less equipment and gain flexibility with your brewing? Craft brewing veteran Ashton Lewis says yes and he'll walk you through ideas targeted just for the smaller-scale Nano market by marrying equipment with raw materials in efficient ways including milling, augmenting wort strength, hop extracts, and multi-tank fermentation and aging strategies.

ASHTON LEWIS

BREWMASTER & CO-OWNER, SPRINGFIELD BREWING COMPANY

SALES REPRESENTATIVE, BSG CRAFT BREWING

TECHNICAL EDITOR, BREW YOUR OWN



5:00 – 6:30 PM

VERMONT CRAFT BEER CLOSING RECEPTION

NANO EXHIBITS

We've invited some more of our favorite Vermont craft breweries 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, Vermont brewers, and visit with our exhibitors before you head out on the town to check out Burlington'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 Lake Champlain Exhibit Hall.

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



GREAT CONFERENCE HOTEL IN CRAFT BEER-LOVING VERMONT!

Burlington Doubletree Conference Center • Burlington, Vermont

The 2018 NanoCon is being held at the Burlington Doubletree Conference Center. Burlington is a fun college town with a vibrant craft beer scene with dozens of local breweries and tap rooms 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 you can also explore Vermont's craft beer scene at night and see for yourself what all the hype is about.

Telephone Reservations: 800-325-3535

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

Web Reservations:

byo.com/nanocon

Group Discounted Room Rate:

\$155 per night for a room with either one king/queen bed or two double 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 or until October 12, 2018, whichever occurs first. 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 OCTOBER 15 TO SAVE \$50

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

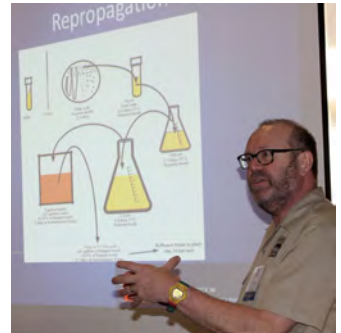


WEDNESDAY, OCTOBER 31 & THURSDAY, NOVEMBER 1 STARTING UP YOUR OWN COMMERCIAL BREWERY BOOT CAMP

10 a.m. – 4:30 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 has 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. 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.



THURSDAY, NOVEMBER 1 AND SUNDAY, NOVEMBER 4 STOWE/WATERBURY, VERMONT AREA CRAFT BREWERY TOURS (\$150)

Thursday, November 1

11 am to 4:00 pm

SOLD OUT

This five-hour tour includes round-trip transportation between our NanoCon hotel, the Burlington Doubletree, and Stowe while tasting and visiting four different breweries. You'll have the chance to visit The Alchemist while in Stowe sampling the famed Heady Topper and other of their tough-to-find selections. A meal and more beer is included during your trip up to this Vermont ski town that's now become a craft beer destination.



BURLINGTON, VERMONT AREA CRAFT BREWERY TOURS (\$125)

Thursday, November 1

11 am to 3 pm

5 pm to 9 pm

Sunday, November 4

11 am to 3 pm

This four-hour tour includes round-trip transportation from our NanoCon hotel, the Burlington Doubletree, while tasting and visiting four different breweries in the Burlington area. A meal and more beer is included as you explore a variety of different craft breweries here in the big city in the little Green Mountain State.



SCHEDULE AT-A-GLANCE



Pre-Conference NanoCon Event • Wednesday, October 31, 2018

10AM - 5:00PM	Starting Up a Commercial Craft Brewery (Day 1)
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Pre-Conference NanoCon Events • Thursday, November 1, 2018

10AM - 5:00PM	Starting Up a Commercial Craft Brewery (Day 2)
11AM - 3:00PM	Burlington, Vermont-Area Craft Brewery Tours
11AM - 4:00PM	Stowe/Waterbury, Vermont-Area Craft Brewery Tours
5 - 9:00PM	Burlington, Vermont-Area Craft Brewery Tours

Day #1 Friday • November 2, 2018

8:00 - 9AM	REGISTRATION			
9 - 9:15AM	WELCOME & INTRODUCTION			
9:30 - 10:30AM	Creating (and Financing!) Your Nano Business Plan	Evaluating Raw Materials	Social Media Strategies to Build Your Own Nano	1 Person, Many Hats: Keys to Being Both the Business Owner & Head Brewer
10:30AM - 11:00AM	COFFEE BREAK & NANO EXHIBITS			
11:00AM - 12:00PM	Quality Control For The Nano	Building on Your Brewery Branding	Top 10 Legal Mistakes Made by Craft Breweries	Infrastructure Sizing For Your Nano Building
12:15 - 1:45PM	LUNCH & NANO IDEA-O-RAMA ROUNDTABLE			
2 - 3:00PM	Special Events to Pack Your Tasting Room	How Much Was That Last Last Batch? Brewery Cost Accounting	Working Directly With Ingredient & Supplier Vendors	Cleaning Secrets & Small-Scale CIP Systems
3 - 3:45PM	VERMONT NANO BEER BREAK & NANO EXHIBITS			
4:00 - 5:00PM	Accurately Forecasting Ingredient Purchases	Brewery Branding 101	Mobile Packaging Do's & Don'ts Roundtable	Strategic Email Marketing For Your Brewery
5:00-6:30PM	VERMONT CRAFT BEER OPENING RECEPTION			

Day #2 Saturday • November 3, 2018

8:30 - 9:30AM	REGISTRATION			
9:30 - 10:30AM	Brewery Law 101	Recipe Scaling	Maximizing Customer Clubs to Boost Sales & Loyalty	Operational Audits to Achieve Savings
10:30AM - 11:00AM	COFFEE BREAK & NANO EXHIBITS			
11:00 - 12:00PM	NANO TABLE TALKS			
12:15 - 1:45PM	LUNCH & NANO TRENDS ROUNDTABLE			
2 - 3:00PM	Nano-Sized Yeast Management	Make Your Brewery's Website Work Harder	Can I Get "X" Hop? Roundtable	Choosing The Right Heating Option
3 - 3:45PM	VERMONT NANO BEER BREAK & NANO EXHIBITS			
4-5:00PM	Build a Tasting Room Community Roundtable	Brewery Safety in Tight Quarters	Planning & Starting Up a Quality Control Program	Maximize Brewery Flexibility & Save Money with Less Equipment
5-6:30PM	VERMONT CRAFT BEER CLOSING RECEPTION			

Post-Conference NanoCon Event • Sunday, November 4, 2018

11AM - 3:00PM	Burlington, Vermont-Area Craft Brewery Tours
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Name _____
 Brewery _____
 Address _____
 City _____ State/Province _____
 Zip/Postal Code _____ Country _____
 Phone _____
 E-mail _____

SAVE \$50 BY REGISTERING EARLY!

LAST CALL DISCOUNT* - OCTOBER 15

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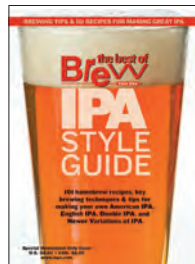
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BALANCING YOUR DRAFT SYSTEM

Patience is a draft-serving virtue

If there's one comforting thing about the internet, it's the warm familiarity of what are often endlessly repeated discussions on the same topics! One of the most common, at least in homebrewing circles, is this: "What pressure should I use to carbonate my finished and kegged beer?" The ensuing fusillade of recommendations tend to run towards some combination of "set it to X pressure for 48 hours, then reduce it to Y and serve it." I have to say, that advice always irks me. Not because it's wrong, per se — I'm sure you'll get carbonated beer — but because it's unnecessarily complicated. Instead, I tend to jump in and recommend a method that's both simpler, requires no tinkering with the CO₂ tank or regulator, and has the added benefit of ensuring smooth, easy pours: Just balance your draft system, once and forever. The steps are simple.

1. Decide on a carbonation level and serving temperature, and identify the appropriate pressure to set your regulator to deliver (for reference, I recommend the *Brewers Association Draught Beer Quality Manual*, but you can find plenty of temperature-PSI tables online).
2. Set your regulator and temperature controller to the appropriate pressure/temperature.
3. Create enough corresponding resistance so that your beer is pouring at a manageable rate.

It's Step 3 that most people need a little guidance on, and we'll come back to it, but before we get there let me make the pitch for this overall simplistic approach.

The trouble with the "adjust the regulator" route, where you're amping up pressure for a couple of days and then dropping it to "service" pressure, is that you're inviting trouble into your life. Yes, you can shorten up your conditioning time, but you're likely going to give back a lot of that time in the tinkering, irritating, nonstop "Dance of the Tweaked Regulator." You're coming down from your "pressurizing" PSI, and you either bleed the keg of gas or get a pitcher and let it blow out that first over-pressured gush of beer. Then you wait a couple of days to see if it's at the right carbonation level. It's too light, so you bump up the PSI. Now it's pouring too fast. You cut it back. Now it's pouring too slow. On and on it goes as you try to match your pressure to your desired carbonation level to your pour rate, and maybe you start playing with the temperature, too, and all the while you're guessing at whether you need to make one more adjustment ...

Instead, I prefer to just set it and forget it. Do the math on this once, and you'll never need to do it again. When you have a new keg to put on, you just hook it up to the gas and wait. Simple.

BALANCING THE SYSTEM

Balance starts in the keg. Whatever your desired carbonation level, there's an equilibrium point where the pressure on the head space is exactly what it needs to be to not only create your desired CO₂ level, but also to hold it there. If the pressure is too high, you'll keep gradually pushing more CO₂ into solution, slowly overcarbonating the beer. If it's too low, you'll gradually lose CO₂ into the headspace, flattening the beer. Temperature matters here, too,

Instead, I prefer to just set it and forget it. Do the math on this once, and you'll never need to do it again.



A perfect pour is a thing of beauty and easily attainable with some math and a little patience.

because CO₂ absorbs (or comes out) of your beer at different rates at different temperatures. So, we consult our handy PSI-Temperature table and find the required PSI. Let's say we want to serve our beer at 39 °F/4 °C (a little cool, maybe, but it'll warm up in the glass and this way you're extending your flavor stability/shelf life). If we want 2.5 volumes of CO₂, we find that we need right around 12 PSI (83 kPa) to create it and hold it at that carbonation level. Simple enough. Set your regulator, set your temperature controller, and hook up your keg.

the pressure to address a slow-trickle of a beer pour (less common, but not unheard of if you're pushing up from a basement kegerator or across a longer distance), you'll end up with beer that's slowly gaining carbonation and becoming more spritzzy.

Instead, let's balance that equilibrium pressure so that our beer stays at a constant carbonation level and pours smoothly. We have two tools at our disposal: Gravity and the beer line we're pouring through. We have 12 pounds (83 kPa) of pressure pushing on the beer as it comes through the

Determining Carbonation: Volumes of CO₂

Pounds per Square Inch Applied

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Temperature of Beer (Degrees Fahrenheit)	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi
30°	1.75	1.82	1.92	2.03	2.14	2.23	2.36	2.48	2.60	2.70	2.82	2.93	3.02																		
31°	1.73	1.78	1.88	2.00	2.10	2.20	2.31	2.42	2.54	2.65	2.76	2.86	2.96																		
32°	1.70	1.75	1.85	1.95	2.05	2.16	2.27	2.38	2.48	2.59	2.70	2.80	2.90	3.01																	
33°	1.68		1.81	1.91	2.01	2.12	2.23	2.33	2.43	2.53	2.63	2.74	2.84	2.96																	
34°	1.65		1.78	1.86	1.97	2.07	2.18	2.28	2.38	2.48	2.58	2.68	2.79	2.89	3.00																
35°	1.63			1.83	1.93	2.03	2.14	2.24	2.34	2.43	2.52	2.62	2.73	2.83	2.93	3.02															
36°	1.60			1.79	1.88	1.99	2.09	2.20	2.29	2.39	2.47	2.57	2.67	2.77	2.86	2.96															
37°	1.58				1.84	1.94	2.04	2.15	2.24	2.34	2.42	2.52	2.62	2.72	2.80	2.90	3.00														
38°	1.55				1.80	1.90	2.00	2.10	2.20	2.29	2.38	2.47	2.57	2.67	2.75	2.85	2.94														
39°	1.53					1.86	1.96	2.05	2.15	2.25	2.34	2.43	2.52	2.61	2.70	2.80	2.89	2.98													
40°	1.50					1.82	1.92	2.01	2.10	2.20	2.30	2.39	2.47	2.56	2.65	2.75	2.84	2.93	3.01												
41°	1.48						1.87	1.97	2.06	2.16	2.25	2.35	2.43	2.52	2.60	2.70	2.79	2.87	2.96												
42°	1.45						1.83	1.93	2.02	2.12	2.21	2.30	2.39	2.47	2.56	2.65	2.74	2.82	2.91	3.00											
43°	1.43						1.80	1.90	1.99	2.08	2.17	2.25	2.34	2.43	2.52	2.60	2.69	2.78	2.86	2.95											
44°	1.40							1.86	1.95	2.04	2.13	2.21	2.30	2.39	2.47	2.56	2.64	2.73	2.81	2.90	2.99										
45°	1.38							1.82	1.91	2.00	2.08	2.17	2.26	2.34	2.42	2.51	2.60	2.68	2.77	2.85	2.94	3.02									
46°	1.35								1.88	1.96	2.04	2.13	2.22	2.30	2.38	2.47	2.55	2.63	2.72	2.80	2.89	2.98									
47°	1.33									1.84	1.92	2.00	2.09	2.18	2.25	2.34	2.42	2.50	2.59	2.67	2.75	2.84	2.93	3.02							
48°	1.30									1.80	1.88	1.96	2.05	2.14	2.21	2.30	2.38	2.46	2.55	2.62	2.70	2.79	2.87	2.96							
49°	1.28										1.85	1.93	2.01	2.10	2.18	2.25	2.34	2.42	2.50	2.58	2.66	2.75	2.83	2.91	2.99						
50°	1.25										1.82	1.90	1.98	2.06	2.14	2.21	2.30	2.38	2.45	2.54	2.62	2.70	2.78	2.86	2.94	3.02					
51°	1.23											1.87	1.95	2.02	2.10	2.18	2.25	2.34	2.41	2.49	2.57	2.65	2.73	2.81	2.89	2.97					
52°	1.20											1.84	1.91	1.99	2.06	2.14	2.22	2.30	2.37	2.45	2.54	2.61	2.69	2.76	2.84	2.93	3.00				
53°	1.18											1.80	1.88	1.96	2.03	2.10	2.18	2.26	2.33	2.41	2.48	2.57	2.64	2.72	2.80	2.88	2.95	3.03			
54°	1.15												1.85	1.93	2.00	2.07	2.15	2.22	2.29	2.37	2.44	2.52	2.60	2.67	2.75	2.83	2.90	2.98			
55°	1.13												1.82	1.89	1.97	2.04	2.11	2.19	2.25	2.33	2.40	2.47	2.55	2.63	2.70	2.78	2.85	2.93	3.01		
56°	1.10													1.86	1.93	2.00	2.07	2.15	2.21	2.29	2.36	2.43	2.50	2.58	2.65	2.73	2.80	2.88	2.96		
57°	1.08													1.83	1.90	1.97	2.04	2.11	2.18	2.25	2.33	2.40	2.47	2.54	2.61	2.69	2.76	2.84	2.91	2.99	
58°	1.05													1.80	1.86	1.94	2.00	2.07	2.14	2.21	2.29	2.36	2.43	2.50	2.57	2.64	2.72	2.80	2.86	2.94	3.01
59°	1.03													1.83	1.90	1.97	2.04	2.11	2.18	2.25	2.32	2.39	2.46	2.53	2.60	2.67	2.75	2.81	2.89	2.96	3.03
60°	1.00													1.80	1.87	1.94	2.01	2.08	2.14	2.21	2.28	2.35	2.42	2.49	2.56	2.63	2.70	2.77	2.84		

That's just the first two steps, though. Now we're on to step three – balancing the system so that it pours properly. To do that, we need to create the right amount of resistance between the keg and the faucet (and, ultimately, your glass). Now, you can work this from the regulator side, but as noted previously, doing that requires some trial and error, with no guarantees you'll find the right settings before you kick that keg! It has the added detriment of putting your beer in a state of flux. If you carbonate at high pressure but drop to 2–3 PSI (14–21 kPa) to serve at a lower pressure, you don't have that equilibrium in the headspace, so your beer is slowly decarbonating and trending towards flat (or, really, pétillant). Likewise, if you carbonate at one pressure but, because you have too much resistance, you need to increase

line. We need to create about 12 pounds (82 kPa) of resistance. Do that, and you get stable carbonation and a soft pour every time.

Let's start with gravity. It's not likely that you're deliberately adding height to your pours by lowering kegs or raising taps, so this is most likely something you're factoring in based on your draft system design rather than adjusting. All the same, it's still important to do so! If your kegs are one foot (30 cm) below your taps, you'll get about 0.43 pounds (3 kPa) of resistance. We back that off of our target "balance point" of 12 PSI (83 kPa), and we're down to 11.57 pounds (80 kPa).

Most resistance will come from your tubing. The wider the tube and the smoother the surface, the less resistance

you get. So, if we're talking commercial "barrier" tubing, there's very, very little resistance because it's commonly used in long-draw systems where the beer is traveling as much as a couple of dozen feet before it reaches the kegs. Most of us, though, will use 3/16-inch ID vinyl tubing (common in home kegging applications), which creates roughly three pounds (21 kPa) of resistance per linear foot (0.3 m) [Note: this resistance number is not a hard rule, numbers vary depending on the tubing manufacturer. Be sure to check their numbers if available.] If we need 11.57 pounds (80 kPa) of resistance, we need 3.86 feet (or three feet, ten inches, or 1.18 m) of tubing between the keg's out post and the faucet shank. Cut it, install it, and you're done. You should, at the pressure and temperature we've selected (in this example), have perfectly smooth pours, at just the right carbonation.

Hook up your kegs, and leave them be. In 5-8 days, you're pouring perfect beer!

RUSH JOBS

What if you don't have the time to give, though? It's the night before the graduation party, and you have three kegs that you've just filled because (like most of us) you lost track of it and didn't keg them last week when you should have.

This is where those high-pressure tricks come in handy. If you need carbonated beer in a hurry, start with leveraging pressure and temperature in your favor. If you have a temperature-controlled fermentation fridge, set your controller

to 34 °F/1 °C and get that keg in there. Then, put your backup CO₂ cylinder (you have one, right? If not, you can use your primary if it's not too difficult to detach from your kegerator) in there with it, with the pressure turned up to 35 PSI (240 kPa). A couple of hours later, you should have cold, at-least-partially-carbonated beer – hook it up to your system, and let it take it the rest of the way up over time. This is also the method I use when I don't have room in my kegerator for a finished keg, but might want it on hand as a backup for a party or event. Use this method to "pre-condition" a keg that you might need to put on at short notice. It's a bigger pain to bring carbonation down than it is to tolerate it being a little low while it comes up, and even a short period of high-pressure/low-temperature carbonation will yield a reasonable amount of CO₂ in solution, and you can still enjoy your homebrewed beer even if it's not at its perfect carbonation level in the meantime.

Another time-honored method is agitation. If you've ever had a CO₂ tank hooked up to your keg, you'll notice that you hear the gas running into the keg – but only for a few seconds. At that point, it'll go quiet. If you move the keg, though, you'll hear the gas start to "run" again. Why the change? Because agitating the beer breaks the surface tension, you're both increasing the surface area of the beer and the motion also "gulps" some of the gas in the headspace down into the beer. The result is quicker absorption of CO₂ into the beer. Some homebrewers will set the keg on its side and rock the

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keg to get it to quickly “gulp” CO₂.

Both of these methods come with a major caveat, though: They’re easy to screw up. I’m unaware of any particular formula or calculator that has reliably shown just how long to leave your beer on high pressure at low temperature to get a specific outcome — my approach to this is very much based on trial-and-error (about an hour at near-freezing and 35 PSI (240 kPa) of pressure, then onto my normal, balanced system). No one can tell you how, or how many times, or how long to shake your beer to get the “right” amount of carbonation. Far and away, the best method here is to plan ahead as best you can, and connect your kegs to a balanced system with at least a few days of time to let your beer get properly carbed.

SAFE, BORING, SMART?

There’s one last element of this to touch on, and it’s this: Using this method, all of your beers will be served at the same carbonation level and temperature, regardless of style. Saison at the same pressure as usually-more-still Scottish ale. German Pilsner at cellar-temperature English pale ale. It’s true, you’re giving up some control over an important contributor to beer flavor. I still think it’s worth it, though.

First, most of your beers are going to be about the same pressure anyway. Yes, Berliner weisse should be jamming at three-point-something volumes, but it’s still pretty solid at 2.5. Yes, that ESB should be hand-pump sparkling, but it’s still fine at 2.2.

Second, you have other options. If you have a beer that’s

spritzzy and highly-carbonated, consider bottle-conditioning it instead of putting it on keg. If it’s meant to be only lightly-carbonated you can do the same, or put it on your draft system and bottle it all up right off of the faucet when it hits the just-right barely-there carbonation level.

Last, consider making a “high” and “low” settings chart for yourself, and adjust by temperature. If you want a more-carbonated set of beers, drop the temperature down to increase absorption. You’ll need to be careful about overcarbonation and the service problems it presents (since you’re forcing more CO₂ into your beer than your system was designed to pour), but it’ll take time to get to that point. If you want it less-carbonated, increase the temperature. It’s not perfect, but it’ll work in a pinch, especially if it’s just for a few days to a couple of weeks.

And, of course, you can always use more than one regulator! Multi-body regulators allow homebrewers to hold kegs at varying pressure levels. Splitters and manifolds can be added along with a secondary regulator for more flexibility.

The relative advantages, though, of the safe, boring, set-and-forget method will usually be worth it. Make a good catch-all choice on carbonation levels, do the math (once) on pressure, temperature, and resistance, and enjoy your stress-free draft system and the freedom of not having to make constant adjustments or cleaning up after your Uncle Steve dumps head all over the place because your system is pouring a little too hard.

Just hook up your kegs and enjoy. 

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BREWING TABLE BEER

The challenges of making a 3% ABV beer

Triple NEIPAs and maple-Bourbon imperial stouts grab a disproportionate share of the hype, but quietly “session” beer is garnering excitement in the craft beer world. While there are classic session beer styles, as a style-modifier “session” denotes lower alcohol (typically 3-5% ABV). Session IPAs in particular have become big business. Typically they have enough character to scratch that hop-itch, while allowing hopheads to extend their drinking and enjoyment. As homebrewers we can go even lower though, under 3% ABV into table-beer territory.

Originally table beers were brewed to be consumed by the whole family with each meal (including breakfast). Beer was safer than water, but low alcohol was necessary to avoid both dehydration and perpetual drunkenness. Homebrewed beers under 3% ABV are still common in many parts of the world such as Africa (where four out of every five beers consumed is homebrew)¹ where the solution is often to drink beer that is still fermenting and thus not boozy. Table beers haven’t experienced commercial success because most people aren’t willing to pay for a beer that doesn’t have the usual effect.

When brewing between 1-3% ABV technical problems abound. There is little malt or hop character to hide flaws. Even more significantly, the miniscule amount of base malt required with typical processes and recipes leads to a diluted malt “backbone.” Many such attempts taste watered-down and unsatisfying: Thin, bland, and without much head.

While parti-gyle (aka combined grist brewing) was the traditional English process for crafting table beers, this technique often produces

underwhelming results. The first runnings contain most of the protein, color, and flavor leaving the second runnings beer even thinner and blander than the low gravity suggests. As an alternative method to split a batch, dilute the first runnings for the small beer, and add an extended-boil for the remainder of the wort to increase the gravity of the strong beer!

In order to produce a table beer that resembles beer rather than malt-seltzer, a brewer must take the recipe and brewing techniques for session beer and push them further: Finding ways to extract the compounds that contribute body, aroma, and color while minimizing carbohydrates; or loading up on high-protein grains to boost protein and body, mashing at a remarkably hot temperature to create mostly unfermentable dextrins.

GENERAL CONSIDERATIONS

Whether you are brewing a session or table beer there are general considerations for enhancing malt flavor, boosting body, and maintaining balance. Pick and choose what makes the most sense for your batch.

Enhance Malt Flavor

1. Select a flavorful base malt like Maris Otter, Vienna, Munich, or dark wheat.
2. Keep a constant amount rather than percentage of specialty malts compared to standard-strength recipes.
3. Eliminate refined sugar, and low-protein adjuncts like corn and rice, which add carbohydrates without increasing flavor or body.
4. Conduct a no-sparge mash to prioritize extraction of color/flavor compounds, and minimize tannins.
5. Increase the saccharification

Table beers haven’t experienced commercial success because most people aren’t willing to pay for a beer that doesn’t have the usual effect.



Photo by Michael Tonsmeire

rest temperature to favor alpha-amylase. This allows for more grain and a higher original gravity without yielding more alcohol.

Boost Body

1. Add high-protein grains (especially oats and rye).
2. Pitch a low-attenuating yeast strain. Alternatively, select a strain that produces a high amount of glycerol. French saison strains are an excellent choice.
3. Reduce carbonation. High carbonation causes table beers to taste seltzer-like. Serving on nitrogen through a stout faucet is a great option.
4. Select calcium chloride rather than gypsum for water treatment as chloride helps to increase the impression of body. Aim for a higher target than usual as grain itself adds chloride (and sulfate) – See “Mineral Profile in the Glass” – *BYO* September 2017.
5. Add lactose to taste at packaging to increase body and sweetness.

Maintain Balance

1. Reduce the IBUs proportionally to the lower expected residual extract. Maintaining BU:GU works too, but can lead to under-bittering if the beer has a high FG.
2. Do not trim late-boil and dry hop additions excessively; try to sustain hop aroma.
3. For dark beers, consider cold-steeping the dark grains to reduce harshness while preserving color and flavor.
4. Use a more expressive yeast or warmer fermentation temperature because less fermentation will result in a cleaner profile.
5. Serve the beer fresher as the lack of alcohol gives the beer a shorter shelf-life.
6. Increase acid additions, the minimal fermentation can leave the beer with a high final pH.

COLD MASHING

Rather than raising mash temperature, a recently suggested option is lowering the temperature of the mash so far that the enzymes are barely active. The goal is to extract the flavor, color, free amino nitrogen (FAN), enzymes, and the proteins responsible for head-retention and mouthfeel while at the same time leaving behind most of the carbohydrates. Only about 25% of the gravity is soluble at lower temperatures for base malts, closer to 50% for crystal malts.

Several informal tests have failed to find significant connection between dextrins and perceived body. Most of what dextrins contribute are empty calories. Beer was once an important nutritional store for the annual grain harvest, today that isn't a concern for most of us. Lowering the amount of carbohydrates is all the more justification for an extra pint of table beer!

Dan Bies of Briess Malt & Ingredients gave an excellent overview of the process entitled “How Cold Steeping Malt Can Elevate Your Beer,” at the National Homebrewer's Conference in 2016. Cold mashing can be used to make stronger beers as well (use the cold-extracted wort subsequently to mash-in a standard grain bill), but I won't cover that here. He also advocates using the leftover starch-rich spent grain as an adjunct to replace refined sugar, corn, or rice in macro lagers, tripels, and double IPAs!

I brewed a 2.2% ABV bitter using an adaptation of the process Dan described in his presentation.

1. Mill the malt erring toward a coarse crush. I used a grain mill designed for 6 gallons (22.7 L) of 1.060 extra special bitter (10 lbs./4.5 kg Maris Otter, 1.25 lbs./0.6 kg Carafoam, and 0.5 lb./0.2 kg Simpsons Extra Dark Crystal.)
2. Mix the grain with cold water (at least four times the weight of the grain). I added all of the water required, 8.5 gallons (32.2 L) for a no-sparge.
3. Let it mash for 8–16 hours cool. For times towards the long-end, refrigerator temperatures avoid bacterial spoilage.
 - a. Alternatively, if you have a pump, you can do a continuous vorlauf for one-to-two hours.
4. Separate the wort from the spent grain. The wort will be milky, but most of the starch will be left behind in the grain bed.
5. Heat to desired conversion temperature and hold for 30 minutes. Stir occasionally as there will be unconverted starch and grain particulate coating the bottom of the kettle.
6. Continue with your typical brewing process: Boil, hop, chill, ferment, and package.

I added a single dose of Challenger hops with 10 minutes left in the boil for 18 IBUs. Fermentation with Safale S-04 took the beer from 1.027 to 1.010 for 2.2% ABV. The finished beer appears close to the predicted 11 SRM and has good clarity and head retention. The malt aroma is delightful: Biscuity-toasty, with a hint of burnt sugar. There is a real grainy freshness to the flavor, helped by the fact I was able to keg it six days after brewing. Head retention



Photo by Michael Tonsmeire

was remarkably good! The body is OK, but certainly not close to what a 1.060 beer would have. The malt and hops were characterful enough to make it a true beer, albeit one that was slightly thin. It was pleasant enough that I often found myself going back for a guilt-free second pour.

ALL RYE AND OATS

Another approach to supply extra body and mouthfeel is with loads of oats and rye. Rather than use these as adjuncts, use malted versions for your base malt. Both oats and rye malt contain enough enzymes to self-convert. The beta glucans (soluble fiber) contribute to their silky, almost oily body, (and to how painfully slow they can make lautering). Cold mashing leaves beta-glucans mostly behind so these two techniques aren't compatible.

Inspired by James Spencer from Basic Brewing Radio and Video, who shared a bottle of one of his rye-heavy table beers with me, I decided to go with a brew-in-a-bag technique. I opted for 70% rye malt and 30% Simpsons Golden Naked Oats. I held the single-infusion mash at 162 °F (72 °C), hoping to encourage low attenuation and thus yield less alcohol from the 1.029 wort. Despite not starting with a beta-glucan rest or adding rice hulls the wort was easy to extract from the mesh bag.

One of my favorite rye IPAs is Alpine Brewing's Nelson, which derives most of its aroma from the titular Nelson Sauvignon. This New Zealand-grown variety has become scarce and expensive with rising popularity, so I replaced it with German Hallertau Blanc and American Mosaic®. All three varieties contain the thiol 3S4MP (3-sulfanyl-4-methyl-pentane-1-ol) which contributes a "grapefruit-like and/or rhubarb-like odor, similar to that of Sauvignon Blanc."² I made my only hot-side addition after force-cooling the wort to 185 °F (85 °C) to reduce the amount of bitterness contributed during the 30-minute whirlpool steep. I'd learned my lesson with a previously over-bittered 2.3% ABV NEIPA. I then dry-hopped two days into S-04's brief fermentation.

Don't trust FG . . . at 1.014 (52% apparent attenuation) this 1.85% ABV batch has a higher final gravity than many double IPAs, but it certainly doesn't taste nearly as sweet. That's because the considerably higher amount of alcohol in a DIPA "hides" the true residual extract. For example a 9.0% ABV DIPA that goes from 1.080 to 1.012 actual has a residual gravity of 0.023 (compared to 0.017 for this batch). Alcohol itself also adds perceived sweetness. To put the strength in context, a 64 oz. growler contains less alcohol than a single 12 oz glass of Russian River Pliny the Younger's 10.25% ABV.

The result is fairly convincing as a session IPA. The earthy flavor of rye is a wonderful complement to wine-like hops. The beer doesn't taste excessively thin or watery. During a blind judging at DC Homebrewers' "Irresponsibly Hopped" meeting, my friend Jake Grover jotted down "creamy" as well as "light" in his notes. The assertive dry hopping helps to distract from the lack of strong maltiness. The combination of Hallertau Blanc and Mosaic® is certainly Nelson-ish, with herbal notes mixed with the classic Sauvignon Blanc aroma.

JOIN THE TABLE

While it is an amazing technical achievement to brew a 15% or 20% ABV beer that "hides its alcohol well," it isn't one that captures my attention. I don't mind alcohol, but I'd rather drink two than one all else equal! What I'm excited to brew are beers that drink bigger than they are, full of malt and hops, not compromised "lite" beers. Sometimes we learn the most by pushing recipes to the breaking point. Even if you aren't planning a 2.0% ABV porter, you might apply elements of these techniques to create a 4% session beer that drinks like a full-strength version, or a 10% beer that is as thick as malt extract!

When it comes to brewing table beers, don't limit yourself to classic low-ABV styles, rather than a slightly smaller mild or Berliner weisse, don't shy away from brewing beers that

COMMERCIAL TABLE BEERS



Be careful as some beers named "table" are considerably stronger than 3%. Similar names exist in Belgium (tafelbier) and France (bière de table).

Brasserie de L'Improbable Petite Fille (2.1% ABV Session IPA)

Bissell Brothers Diavolotto (2.4% ABV Session IPA)

De Garde Bu Weisse (2.1% ABV Berliner Weisse)

Jester King Le Petit Prince (2.9% ABV Farmhouse Beer)

The Kernel Brewery Table Beer (2.7% ABV APA)

Right Proper COMRAD! (2.4% ABV Anti-Imperial Stout)

Verdant Brewing Track Truckee (2.6% ABV APA)

have big flavors like coffee sweet stouts or fruited Gose. Drinking in moderation doesn't need to mean drinking moderately! They are still remarkably food-friendly as well, especially with spicy food. (BYO)

¹ <https://www.economist.com/business/2012/03/24/from-lumps-to-lager>

² <https://www.ncbi.nlm.nih.gov/pubmed/19243103>

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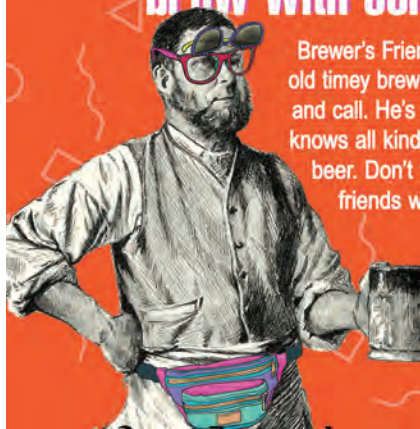


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RIB CAGE WORT CHILLER

Save time and water on brew day

PROJECTS

BY NICK PARKER



Here is a system that will quickly chill wort, plus make hot and warm water for post-brew cleanup, saving time and hassle on brew days. Many immersion chillers have their coils stacked directly on top of each other. The resulting metal-to-metal contact does not help transferring heat from the wort to the coils. This interleaved dual-coil design separates the coils, so each coil has maximum contact area with the hot wort.

The two coils are made of $\frac{3}{8}$ -inch soft copper pipe. The inlets and outlets are joined and connected to $\frac{1}{2}$ -inch copper pipe. The larger inlet and outlet pipes are needed because they carry the combined flow of both coils. Due to the fact that the volume of water a certain pipe can move is measured by squaring the radius of the pipe, we can easily calculate that $\frac{1}{2}$ -inch pipe will be able to move almost twice as much water as each individual $\frac{3}{8}$ -inch pipes.

Copper is the ideal material for the chiller. It has excellent heat transfer properties and is easy to cut and solder. I suggest that you shop for copper

at plumbing supply vendors. Their prices can be up to 50% less than most home improvement centers.

This rib-cage immersion chiller design can chill a 5-gallon (19-L) batch in 10-15 minutes. Initial chilling is done by recirculating from a 5-gallon (19-L) bucket of tap water. After several minutes, I will switch to recirculating ice water from an insulated cooler, which quickly brings wort to pitching temperature. The resulting hot and warm water is saved for use during post-brew cleanup. An inexpensive water transfer pump is used to recirculate the water. The Drummond $\frac{1}{10}$ horsepower model is available for about \$55 (USD). It comes standard with water hose connections. Using the cooling power of ice eliminates any limitations associated with ground water temperature. Since the system is self-contained, you are not limited to brewing near a cooling water supply.

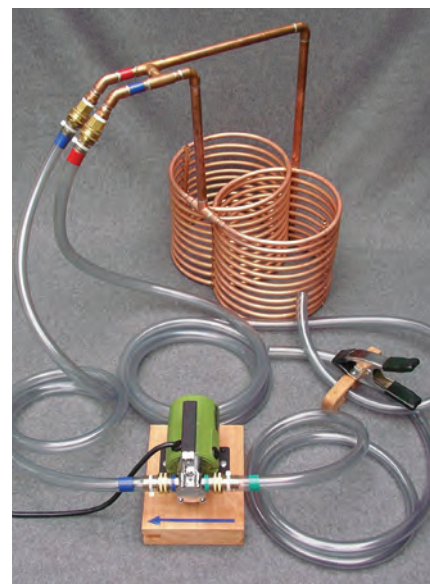
To use the system, fill a 5-gallon (19-L) bucket with tap water, and an insulated cooler with 5 gallons (19 L) of water and about 20 lbs. (9 kg) of ice. Shop around for ice because prices vary greatly. I get 20 lbs. (9 kg) of crushed ice for a little more than \$2. Worth every penny! Heat transfer from ice is dependent on surface area, so the greater surface area of small cubes or crushed ice will give the best results.

Cleanup time for this system is negligible, since water (not wort) is being pumped. The immersion chiller can be dunked and washed off in the insulated cooler (which will be full of warm water after use). There is no need to clean the pump or hoses because they are only exposed to clean water. There are no worries of residue building up inside the pump, hoses, or chiller (as is a problem with plate chillers, for example), because you are moving water, not wort. The pump and hoses are easily stored inside a 5-gallon (19-L) bucket.

This interleaved dual-coil design separates the coils, so each coil has maximum contact area with the hot wort.

Materials & Tools

Drummond $\frac{1}{10}$ -HP pump #63317
50 ft. (15.2 m) $\frac{3}{8}$ -inch O.D. soft copper pipe
4 ft. (1.2 m) $\frac{1}{2}$ -inch I.D. hard copper pipe
(4) $\frac{1}{2}$ -inch copper T joint
(2) $\frac{1}{2}$ -inch x $\frac{1}{2}$ -inch copper 90 degree elbow
(2) $\frac{1}{2}$ -inch x $\frac{1}{2}$ -inch copper 45 degree elbow
(4) $\frac{1}{2}$ -inch x $\frac{3}{8}$ -inch copper reducing coupling
(4) $\frac{3}{8}$ -inch x $\frac{1}{4}$ -inch copper reducing coupling
(2) $\frac{1}{2}$ -inch copper male threaded fitting
(2) Threaded hose adapter
6-inch (15-cm) spring clamp
Solder, soldering flux, Teflon tape



Photos by Nick Parker

I. MAKE THE SOFT COPPER COILS

The two 25-ft. (7.6-m) coils are made from 50 ft. (15.2 m) of $\frac{3}{8}$ -inch soft copper refrigeration pipe. The pipe will come in a coil, leave it that way! Don't uncoil or straighten it. Locate the middle of the coil and cut it into two coils of equal length. Get close, but don't stress about finding the exact middle, the ends will need to be trimmed later.

Determine what coil diameter will work best in your kettle(s). Find a form for coiling, a paint can, a corny keg, or a small plastic bucket; that is close to the diameter you need. Wrap the copper pipe tightly around the form. Do this without unrolling the coil, all you are doing is adjusting the diameter of the existing coil.

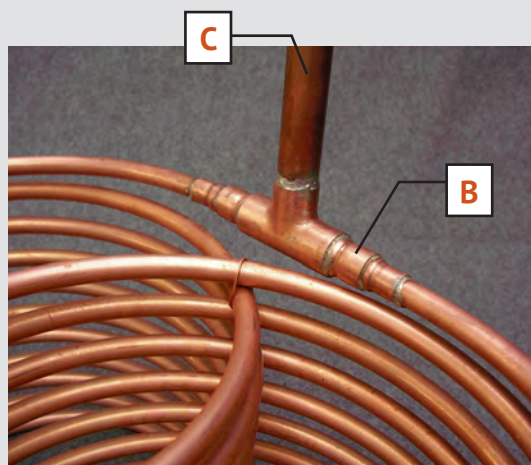
Interleave the two coils by sliding them together in alternating layers. This is easy to do. Orient the bottom ends of the pipe as shown in the photo, and slide on the reducing couplings and T fitting [A] that join them. Don't solder yet! You'll want to dry fit everything together before any joints are soldered.

Make sure the total width will fit inside your kettle.

2. CUT THE RISERS & HORIZONTALS

At the top of the coils, straighten the ends of the pipes, and trim them so they can be joined with reducing couplings and a T fitting. [B]

Place the coil assembly in your kettle. Cut two riser pipes [C] from the $\frac{1}{2}$ -inch hard copper. They should go to the top of the kettle rim. Slip 90 degree elbows onto the top of the riser pipes, then cut straight pipes that extend horizontally over the edge of the kettle.



3. PREPARE THE HOSE CONNECTION AREA

The two T joints [D] near the hose connections are for structural bracing only, the horizontal pipes go straight through them. Use a round metal file or a sanding drum on a Dremel tool to ream out the inside of the two T fittings. Cut a short cross piece of ½-inch pipe to join the two T's [E].

Slip 45 degree elbows [F] onto the horizontal pipes, then cut short pieces of pipe for joining the threaded adapters for the hose connectors.

4. SOLDER, THEN REINFORCE


Clean and prep all joints, apply soldering flux, then solder. Where the coils intersect, reinforce the intersection structurally by wrapping with small gauge solid copper wire. Also wire the coils to the riser tubes. Straight pieces of copper pipe and some wire can be used to brace the outer coils [G].

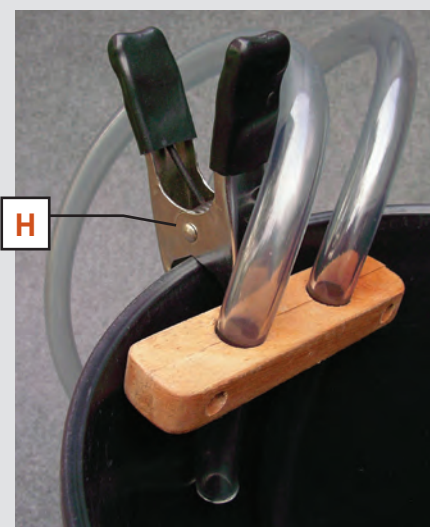
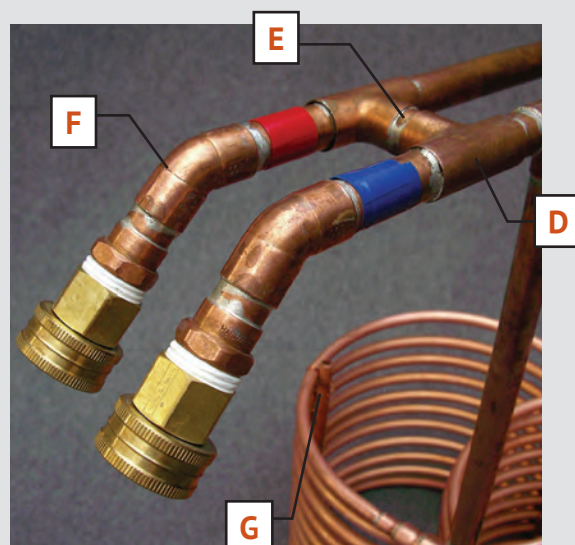
5. MAKE A HOSE CLAMP

Use a spring clamp and a block of wood to make a clamp that will secure the hose ends to the water containers [H]. Hoses can be made from clear ⅝-inch I.D. vinyl tubing and water hose fittings.

6. CUT THE RISERS & HORIZONTALS

Before using the chiller the first time, clean the outside of the copper with citrus cleaner and hot water. To sanitize the chiller, put it in the kettle for the last 10-15 minutes of the wort boil.

To chill wort, first pump from a bucket of tap water. When the temperature of the water in the bucket is roughly equal to the wort temperature, it has no more cooling capacity. Switch to pumping ice water to bring the wort down to pitching temperature. 



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MEET JUNIPER ROSE

Vermont's youngest female brewer

“June has a natural allure to help with any work that’s going on here,” Eckert shared, “So she was stoked to have her own beer.”

June Eckert, 5, wearing light pink overalls, fuchsia rubber boots, and an oversized grin, holds the mash paddle and climbs a few stairs to get a better view of the mash tun. She begins to stir in the grain for her first ever beer and namesake, *Juniper Rose*, a hibiscus IPA. June has been at Four Quarters Brewing since 6:30 am, eager to help in any way she can. Throughout the day, she’ll continue to help check the gravity throughout the sparge, shovel out the grain, and add the hops, all the way through pitching the yeast at the end of a 10-hour brewday — engaged in and excited for the entire process.

June’s dad, Brian Eckert, is the Owner and Brewer of Four Quarters Brewing, a now 10-barrel brewery in Winooski, Vermont. June was less than a year old when Eckert first started the brewery in 2014. She’s grown up around the place, its people and its activities, so Eckert naturally had a plan to brew something with her. Previously, he brewed *Great Bear*, an American-style brown ale, with his son Barrett, nicknamed Bear.

Eckert can’t keep June from pitching in. “We either have to give her a task or she finds something to do. She’s a little busy worker bee,” he said. On any given day, you might spot June with her signature smile and blonde ponytail squeegeeing the floors, washing tanks, labeling cans, washing the windows, handing out stickers, clearing glasses, challenging brewery guests to a game of Uno or making four-legged visitors sit for a spent-grain dog treat. “June has a natural allure to help with any work that’s going on here,” Eckert shared, “So she was stoked to have her own beer.”


The original recipe for *Juniper Rose* was a saison brewed with juniper berries, rose hips, and *rosa rugosa* rose petals, then aged in gin barrels. But, when Brian caught word that the Pink Boots Society created a hop blend,

he decided to switch up the recipe to a *Juniper Rose* IPA. The revised recipe is made with flaked oats and wheat, along with the Pink Boots hop blend of *Palisade*®, *Loral*®, *Simcoe*®, *Mosaic*®, and *Citra*®. Eckert and June used hibiscus to add the pink hue and a small amount of juniper berries and rose hips to finish off the IPA. June was five during the brew day; but turned six on July 3. So it’s no coincidence that the beer is 7.3% ABV.

The artwork on the *Juniper Rose* can was inspired by June’s own designs and doodles. “One day she randomly drew all of these beautiful flowers and smiley faces on our sandwich board,” Eckert remembered. “I loved it so much that I had to include them in the label. I drew the little girl in the middle but styled her after how June draws herself and, of course, added pink boots.”

The Pink Boots Society, founded in 2007, is an international non-profit with over 1,800 members with the mission to “assist, inspire, and encourage women beer professionals to advance their careers through education.” Every year, the organization’s chapters around the world brew a Pink Boots Brew based on a specific theme. This year, it was the specific hop blend Eckert and June utilized in *Juniper Rose*.

Eckert shared, “I’ve met some amazing women in the brewing industry here in Vermont and beyond. The Pink Boots Society is awesome to acknowledge all of the women working hard in such a male-dominated industry. We donated \$1 from every 4-pack of *Juniper Rose* IPA we sold to the Pink Boots Society. In the end, this totaled \$900.”

When asked if Eckert will be collaborating with June for future brews, he laughed, “She’s already trying to run the place, so yes, I think she’ll be the brewer down the road and her brother will be the art director.” 



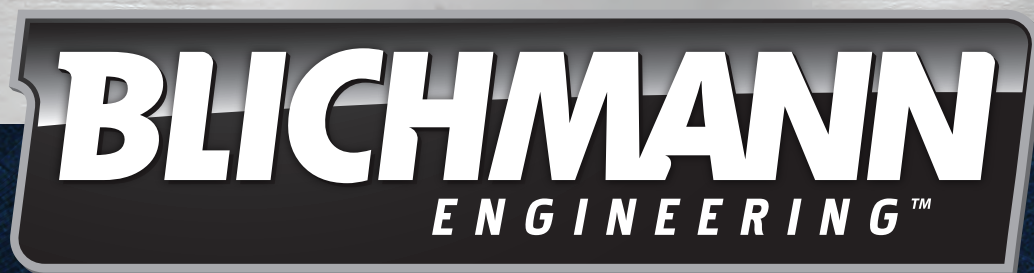
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