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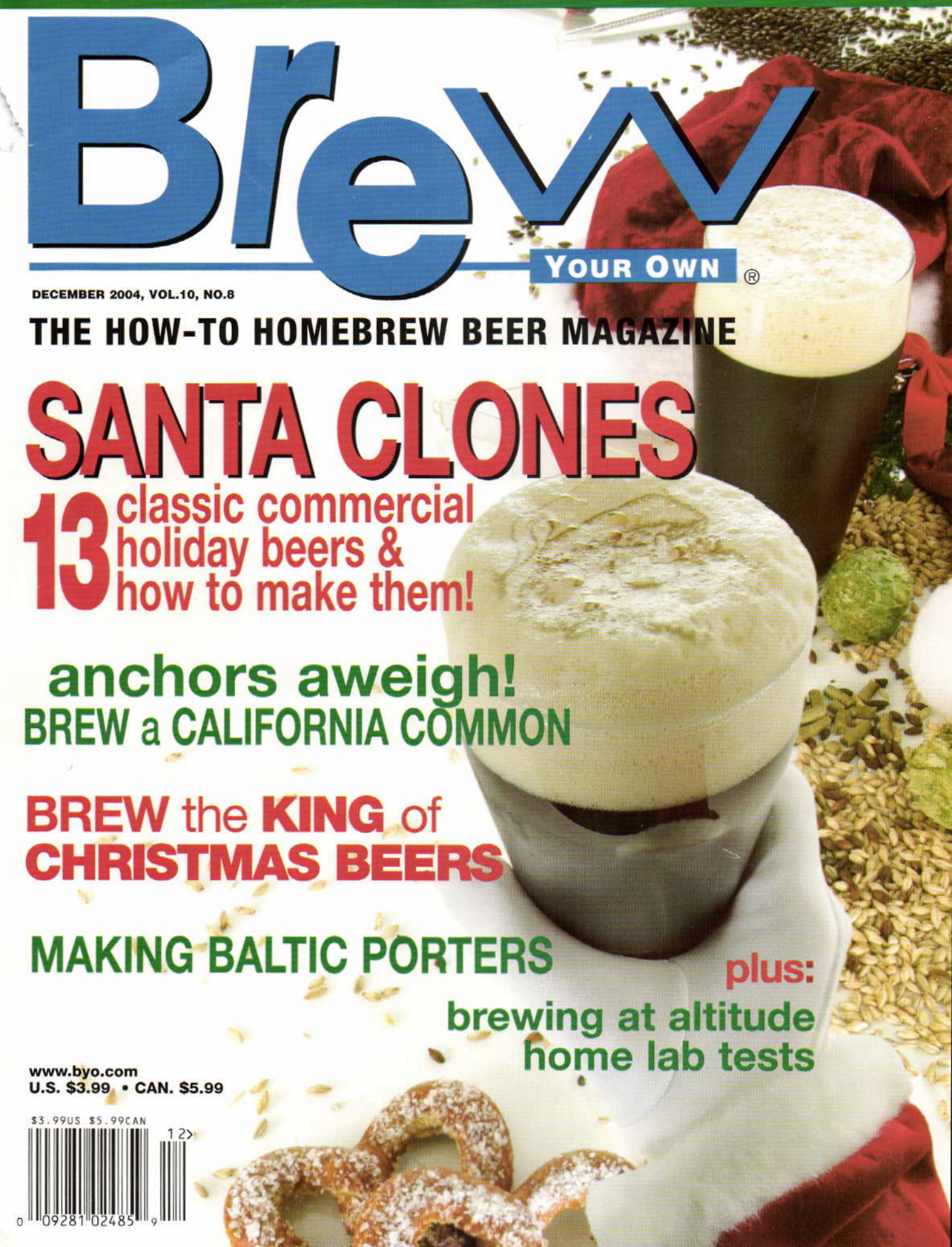
BrewYour Own®

DECEMBER 2004, VOL.10, NO.8

THE HOW-TO HOMEBREW BEER MAGAZINE



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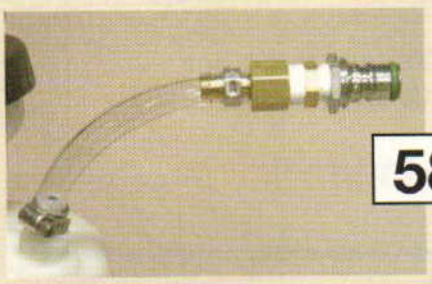
Volume 10 Number 8

BrewYour Own

Departments



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COVER PHOTOGRAPHY: Charles A. Parker

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2004 American-Style Dark Lager Category

Brew Your Own

THE HOW-TO HOMEBREW BEER MAGAZINE

How to reach us

Editorial and Advertising Office
Brew Your Own
5053 Main Street, Suite A
Manchester Center, VT 05255

Tel: (802) 362-3981
Fax: (802) 362-2377
E-Mail: BYO@byo.com

Advertising Contact
Kiev Rattee
kiev@byo.com

Editorial Contact
Chris Colby
chris@byo.com

Subscriptions Only
Brew Your Own
P.O. Box 469121
Escondido, CA 92046

Tel: (800) 900-7594
M-F 8:30-5:00 PST
E-mail: byo@pcspublink.com
Fax: (760) 738-4805

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DARK ABBEY type for 9 1.
Starting specific gravity : 1.070 Alcohol content : 8 %.
One of the most well known Belgian specialties : an Abbey style beer with vinous character due to its high alcohol content. Deep amber, full flavoured with lots of malt aroma with caramel notes. Improves with long maturation times and can be kept for several years !

AMBIORIX type for 15 l.
Starting specific gravity : 1. 060 Alcohol content : 6,5 %.
Amber beer with a red copper tint. Slightly acidic palate at first but with a nice fruity aroma. Moderate hop bitterness. Comparable with the well known beer of Roeselare.

DIABOLO type for 9 1.
Starting specific gravity : 1.071 Alcohol content : 8 %.
Belgian specialty beer : Strong, golden coloured beer with a thick and long lasting head (lacy). Characteristic aroma of devil type Belgian beers, soft palate with a slightly sweet aftertaste. Improves with long maturation times and can be kept for several years !

KRIEK type for 12 1.
Starting specific gravity : 1.053 Alcohol content : 5,5 %.
Kriek is the best known of the famous Belgian fruit-beers, made by macerating cherries in beer. A slightly acidic, sweet aromatic beer with a red topper tint. Each kit contains pure cherry juice of at least 3 kg of cherries ! This beer gives you the perfect balance of fruitiness without tasting like grenadine as some commercial kriek's do.

OLD FLEMISH BROWN type for 12 1.
Starting specific gravity : 1.060 Alcohol content : 6 %.
A dark brown beer with a woody notes flavor a slight liquorice aftertaste that also compares with the Dutch Bock-beers.

CHRISTMAS type for 7 1.
Starting specific gravity : 1.065 Alcohol content : 8%.
Dark, strong and full-bodied Belgian beer, sweeter than Abbey style beers. Strong malt flavour and aroma. Improves with long maturation times and can be kept for several years !

WHEATBEER type for 9 1.
Starting specific gravity : 1.053 Alcohol content : 5%.
Very similar to the well known Belgian "Witbieren" : pale, opaline colour with low alcohol content. A real summer beer with a pleasant aroma, mild hops and a smooth malt character. Slightly acidic and thirstquenching. Based on an old recipe using barley, wheat, oat flakes and a secret herb mixture with coriander and sweet orange-peel.

GRAND CRU type for 9 1.
Starting specific gravity : 1.075 Alcohol content : 8%.
Gold opaline coloured, with strong flavour of grains and even bread. Very little hop aroma. Very mouthfull with light fruit notes and a pleasant sweetness. Also this kit contains wheat malt and a special herb mixture.

TRIPLE type for 9 1.
Starting specific gravity : 1.075 Alcohol content : 8%.
Triple is a well known, deep golden coloured, Belgian specialty. Due to its high malt contents it has a very pleasant aroma and taste, mouthfull, full bodied and even a bit herbaceous. High alcohol content.

FRAMBOOS type for 12 1.
Starting specific gravity : 1.053 Alcohol content : 5,5%.
FRAMBOISE or raspberry beer, is a Belgian specialty. Together with the BREWFERM KRIEK, this FRAMBOISE is the only fruitbeer kit available in the world. Each kit has an equivalent of 2 kilo of raspberries. This FRAMBOISE beer han a very delicate aroma and is ideal as a refreshing summer-beer or as a surprising aperitif !

PILSNER type for 15 1.
Starting specific gravity : 1.042 Alcohol content : 4,6 %.
Light, blond beer, with a moderate bitterness and dry finish, comparable with the commercial Lager or Pilsner beers. Low alcohol content.

GOLD type for 12 1.
Starting specific gravity : 1.053 Alcohol content : 5,5 %.
A real deluxe pilsner type with more malt flavor than the normal Lagers. Moderate hop bitterness. Comparable with the Scandinavian deluxe-Beers.

GALLIA type for 12 1.
Starting specific gravity : 1.055, Alcohol content : 5,5 %.
The latest addition in our range: A thirstquenching pale amber beer with a refined bitterness and a soft finish, a worthy alternative to the commercial Belgian ales.

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Contributors

Another GABF (Great American Beer Festival) has come and gone, and so it's time once again to congratulate our technical editor **Ashton Lewis** for his medals. This year he won Gold in the European-Style Pilsner category and Bronze in American-Style Hefeweizen. Ashton has been the technical editor of *Brew Your Own* magazine since it began in 1995 and is the Master Brewer of Springfield Brewing Company. The brewery, located in Springfield, Missouri, is a state-of-the-art brewery built by the Paul Mueller Company to showcase its equipment fabrication. As such, it has many features that would normally only be found in much larger breweries making one of the most technologically advanced brewpubs in the world.

On occasion, Ashton also writes something for us. Most recently, he supplied Tom Miller some tips on making apple cider in our "Tips from the Pros" department. His most famous, or perhaps infamous, article was 2001's "Beano Brew," in which he discussed how to make a light beer using Beano.

Michael Heniff brewed his first few homebrew batches in college in 1994 at the University of Illinois in Urbana-Champaign. After relocating to Houston, Texas, he began regularly brewing in 1997. Since then, he has brewed over 100 batches of beer and mead on his 5-gallon (19-L) Gott cooler system. He has won numerous medals and an occasional major award in competitions all over the country. His most recent accomplishments are winning the Dixie Cup Templeton Award (most points in the contest) and the Gulf Coast Homebrewer of the Year. His favorite beers to brew are "anything hoppy, anything big or anything Belgian."

Mike is a member of the Houston Foam Rangers Homebrew Club where he is currently the Grand Wazoo (club president). In his other life, he is a chemical engineer in the specialty polymer industry.

On page 26, Mike discusses Baltic porter and why he feels that this interesting, but often overlooked, big beer style deserves more attention in the homebrewing community.

Glenn BurnSilver is a frequent contributor to *Brew Your Own* and current Entertainment Editor at the Fort Collins Weekly in Fort Collins, Colorado, home to New Belgium and Odell breweries, where he exploits his influence for free beer. Although situated near some fine breweries, he prefers his own homebrew, and is particularly proud of his East African Maasai Cucumber Beer, which was featured in *BYO* in the January 2001 issue. For some odd reason, many of his articles in recent years have fallen in the December issue. In the December 2002 issue, he wrote about brewing with coffee. In December 2003 issue, he wrote about brewing with spices.

Now, for the December 2004 issue, Glenn pulls double duty. For the Winter Beer clones story on page 42, he contacted a slew of breweries, talked with the brewers and came up with 12 holiday beer clones that will add some warmth to even the coldest winter night. On page 32, he writes about brewing at high elevations.

His favorite color is purple.

RECIPE INDEX

BYO RECIPE STANDARDIZATION

Extract efficiency: 65%
(i.e. — 1 pound of 2-row malt, which has a potential extract value of 1.037 in one 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 IBU's based on 25% hop utilization for a one hour boil of hop pellets at specific gravities less than 1.050.

Real Cool Site Overlooked

I can't believe that Perry Launius didn't even mention RealBeer.com in his article about Internet homebrew sites ("Online Brewing Resources," November 2004). RealBeer has probably the best homebrewing community forum on the web. It is well moderated and the people are very friendly. Many of the moderators and members are brewmasters at craft breweries. Newbies are very welcome and questions are answered quickly by experts who truly enjoy sharing their knowledge.

Steve Antoch
North Bend, Washington

As the sponsor of this forum, you think we would have remembered to put realbeer.com in the article! (You can find them by going to www.realbeer.com and clicking on "community"). It's a very active site and we're sorry we overlooked it.

Project Idea on Ice?

I enjoyed the story "4 Great Projects" (November 2004). I am relatively new to homebrewing, however,

and wonder what the draft serving freezer is used for? I can understand using a fridge to store and serve beer from Corny kegs, but can a freezer be used? Won't the beer freeze?

Jim Marr
via email

Would you believe it's used for serving ice beers? No? Then let us give you the real answer. Chest freezers can be used for fermentation, lagering and serving if they are connected to an external thermostat. This thermostat overrides the chest freezer's built-in unit and allows for the user to maintain temperatures well above freezing. (-20 °F/-28 °C is a common temperature for a chest freezer.) All you do to use the external thermostat is plug it into the wall and then plug the chest freezer into the thermostat. A temperature probe extending from the thermostat is then placed in the freezer. Many homebrew shops carry these thermostats for around $50.

Extract Late in Full Wort Boil?

Great article on the extract experiment ("Extract Experiments: Four Extract Methods Go Head to Head," October 2004). Am I correct in assuming that the late extract approach can be used with either a standard (partial boil) or full wort boil method?

Archie MacLean
Fremont, California

Article author, and BYO editor, Chris Colby responds: "Yes, you can add malt extract late in a boil even with a full wort boil, but this technique is usually used when boiling a concentrated wort — for example, when you boil 3 gallons (11 L) of wort for a 5-gallon (19-L) batch. My experiment did not cover this option as generally the extract late method is used to compensate for the inability to perform a full wort boil. Adding extract late in a full wort boil may help extract brewers achieve very light colors when making a Kölsch or for other very light colored styles of beer. For most other, "normal" beers, I can't see a reason to add the extract late in a full wort boil. On the other hand, it probably wouldn't hurt, either."

Whole Lotta Misusage

It disturbs me when I see *BYO* print the usage of inaccurate colloquial phrases such as "whole leaf hops." See the September 2004 issue for two instances. A new brewer reading that may conclude, subconsciously or otherwise, that "leaf hops" is a proper and accurate thing to say.

Francisco Jones
Kankakee, Illinois

Editor Chris Colby responds: "You are absolutely right. The part of the hop plant used by brewers is the cone. As such, "leaf hops" are better described as "cone hops" or "whole hops." I always try to use the proper word in BYO, *even when it goes against common usage. (For example, I've purged the use of the word "infected" and now use "contaminated" when referring to homebrew that has unwanted microbiological growth.) I routinely change "leaf hops" to "whole hops" when that usage crops up and am not sure how these instances crept by me."*

Letter Leads to Another Letter

Reading your response to the question about leaving the lid on during the boil ("Lid on for Elissa?" November 2004) rekindled a concern of mine.

My brew-buddy read comments on a web site that stated that if you have "good water" available from your local water company — we do, it's just chlorinated and quite hard — the addition of one Campden tablet per 10 gallons (38 L) will remove the chlorine and reduce hardness. It is understood that you can then proceed and brew without further boiling of the water. I believe that this is intended to include water used to cool the wort.

We intend to co-brew this beer and I'm concerned about the effects of this on our Kölsch. I have access to water from a reverse osmosis (RO) machine.

Should we go ahead and brew this with the Campden method? Should I suggest RO for the cooling?

Jim VanCise
Corry, Pennsylvania

One Campden tablet can be used to remove either chlorine or chloramine

from 20 gallons of water. (We haven't heard the suggestion that it affects water hardness.) Water treated with sulfite from a Campden tablet would not need to be boiled prior to its use in brewing. As for using it as "cooling water," we're assuming you mean the water used to top up the fermenter to 5 gallons (19 L) — or whatever your batch size is — after boiling a concentrated malt extract wort. If your wort is still warm (or even if it is hot), this water will help to cool it.

The water you add to top up should be free from organisms that will spoil your beer. Many homebrewers boil and cool this water before using it. Far more, however, just use tap water straight from the faucet. In practical terms, water from a municipal water supply should be safe enough to use for topping up. Likewise, using either your RO water or water treated with a Campden tablet should be fine.

Keep it Clean

Thanks for your "Beginner's Guide" issue. I'm about to start my fifth batch. (The first three were good. The fourth a disaster.) Perhaps I'm paranoid about the cleanliness issue (my wife thinks I am), or maybe I've read too much and not brewed enough. Regardless, here is my simple question: After cleaning and sanitizing (I use a solution of iodophor), what do you do with the items before you use them? Put them on paper towels, the counter, leave them in the bucket, wear gloves? This probably sounds silly but it's driving me nuts; I want to enjoy the process, not just the end result.

Archie Maclean
Fremont, California

This is not a silly question at all. And don't lose your "paranoia" about cleanliness; it will serve you well as a homebrewer. As for what to do with sanitized items, different homebrewers have different solutions. Most just make a clean spot and set items there where they won't get seriously contaminated. A layer of clean paper towels will not contaminate your equipment significantly. Others keep a bucket of sanitizing solution handy and dunk their spoons, racking canes, etc. in there. As long as your equipment is clean and sanitized to begin with, the small amount of contamination it picks up in a clean environment should not cause problems.

brewer PROFILE

Ed Seaman • St. Charles, Illinois

photo courtesy of Ed Seaman

Ed at work in his "Home Brew Shop" on Super Bowl Sunday after Beer Church.

I got into homebrewing during an extended lunch hour. As I was browsing through a book fair's endless volumes of discounted books, Charlie Papazian's "The New Complete Joy of Homebrewing" caught my eye. The cost of the book, $1, proved to be the best dollar I've ever spent. It changed my life forever. I immediately read the book from cover to cover and back again. Keeping in mind Charlie's advice to stay relaxed, I jumped right in. After six batches, I started mini-mashing and soon moved on to making my own equipment for all-grain brewing. I really enjoy the blend of art and science that homebrewing provides.

I stopped brewing during the summer of '96 in order to build a converted half-barrel system. Since the project nearly exhausted my supply of homebrew, I began to trade welding favors for precious homebrew when my supply ran dangerously low. After two months, when I was down to my last case of homebrewed beer, the garage brewery was finally complete.

With the new system, 10-gallon batches flowed into carboys at the rate of two to three times per month. Bottling really became a chore so Corny kegs, a second refrigerator and a tap system soon appeared in the "brewery." Homebrewing soon became my life. After falling victim to corporate downsizing in 2000, I realized my dream and opened my "Home Brew Shop" in St. Charles, Illinois. The only problem was that I no longer had time to brew all-grain. The business needed to succeed. After all, one doesn't live on homebrew alone.

Without time to brew, I had to do something fast. A vision from a drunk monk on a Sunday morning saved the brewery. Why not go back to extract brewing and teach new brewers how to brew it at the store? Homebrewing 101 (Beer Church) at 9:30 a.m. on Sunday mornings saved the brewery.

I'm also involved in brewing as a judge at homebrew competitions, which has allowed me to experience a wide variety of beers. Entries tend to be similar in style, making it a real treat when you judge that stellar example. Entering competitions is fun too. While most of my beers never make it into bottles, those that have tend to bring home the hardware (see below for one of my award winning recipes).

I'm a member of two homebrew clubs, which exposes me to a plethora of beers, knowledge and brewing systems. Though the common goal is always to make beer, every brewer does something a little different. Our brew clubs, The Silverado Home Brew Club and Urban Knaves of Grain get together for regular monthly meetings, social events and brewing parties. The Urban Knaves of Grain host the largest single day homebrew competition in Illinois, the Drunk Monk competition.

Every brew day is an exciting challenge. My biggest focus now is brewing high quality beers from extract and passing that excitement on. Not every beer is for everyone, but when I let people try my beers, the glass usually comes back empty. The best beer in the world is the one in hand. I've learned that as long as it leaves a smile on the face and an empty glass on the counter, it's a good beer.

Big Winning RECIPE:

Ed Seaman • 2003 AHA Nationals Gold Medal Winner
Category 23: Smoke-Flavored Beer

St. Charles Smoked Beer
(5 gallons/19 L, partial mash)
OG = 1.058 FG = 1.015
IBU = 10 SRM = 6 ABV = 5.7%

Ingredients

6.6 lbs. (3 kg) Coopers Wheat malt extract
1.0 lb. (0.45 kg) buckwheat honey (2 min.)
1.0 lb. (0.45 kg) alderwood home-smoked malt
½ lb. (0.23 kg) wheat malt
¼ lb. (0.11 kg) flaked wheat
4.4 AAU Hallertauer pellet hops (30 min.)
(1 oz./28g of 4.4% alpha acids)
1 vial White Labs California Ale yeast (WLP001)

Step by Step

Mash grains at 155 °F (68 °C) for 30 minutes. (You will need about a gallon (3.8 L) of water to mash these grains.) Strain, add water to normal boil level, add malt extract and hops. (The larger the volume of your boil, the lighter colored the beer will be.) Gently boil for 30 minutes. Add honey in the last 2 minutes of the boil. (Be sure it dissolves completely.) Cool wort to room temperature, pour into fermenter and top up to 5 gallons (19 L), if necessary. Pitch yeast and ferment at ale temperatures.

homebrew SYSTEMS that make you DROOL

Rich Bingham • St. Louis, Missouri

(Top): Rich in front of his HERMS brewing system. He likes to call it "Oscar."
(Middle): Here is Rich's (or Oscar's) mash tun with the mixer on top.
(Bottom): This stirrer was built with parts from an ice cream mixer and a boat motor.

Building brewing systems and gadgets can be as much fun as brewing itself. That is, of course, as long as you have a nice, fresh homebrew to drink while you are doing it. One of the main goals in designing my system was to have everything on the same level, to prevent having scalding water above my head. My system can easily be increased to a 1 barrel (31-gallon/118-L) system by changing the vessels and attaching some manifolds. I'm not sure that this will ever happen, but I sometimes go overboard.

My next consideration was accurate temperature control, which brought me to the HERMS concept. The Heat Exchange Recirculating Mashing System (HERMS) allows me to circulate the mash liquor through a heat exchanger in the liquor pot. This can boost temperatures or bypass and prevent temperature gradients in the mash tun. The bonus of this type of a system is that you get an unbelievably clear runoff to the boil kettle.

To take it a step farther, an electric stirring unit was built from parts of an old ice cream mixer and a stainless driveshaft from an outboard boat motor. The motor is turned on to mix the grain and water as I dough in and continues to stir, preventing temperature gradients in the mash bed. This makes doughing in a piece of cake and really helps in extracting the sugars from the grains.

Two pumps make the brewery pretty flexible. One pump can move liquid from any one vessel to another. While the first pump is doing its job, as during sparging, a second pump is dedicated to pumping heated water from the liquor pot to the mash tun manifold. By setting the flow of both pumps even, fly sparging is simple and painless. Both pumps are turned on and off via switches on the control panel and have LED status lights.

A whole house carbon water filter is mounted on the system's main inlet manifold. This takes out chlorine and any other off-flavor-imparting stuff that may come from the local water supply. There are two manifolds, a supply and return, that make the system work. Within these manifolds are 13 valves that will allow you to isolate any vessel that may be removed for cleaning or whatever. To finish up the brewing process, I have a counter flow chiller made entirely of copper. This consists of ⅜" refrigeration copper tubing within ¾" copper tubing that was wrapped around a propane tank as a mandrill. Using this chiller, I can bring boiling wort down to within two degrees of ambient water temperature any time of the year. In the hot summer months, a pre-chiller coil can be put into a bucket of ice to get the wort down to lager pitching temperatures. All in all, the system is very efficient.

To see more of my brewery visit my Website at www.home.earthlink.net/~ibrew4u. Here you can find lots of pictures and instructions on how to build some equipment at home.

we want you

Do you have a system or some unique brewing gadgets that will make our readers drool? Email a description and some photos to **edit@byo.com** and you too may have a claim to fame in your brewing circle!

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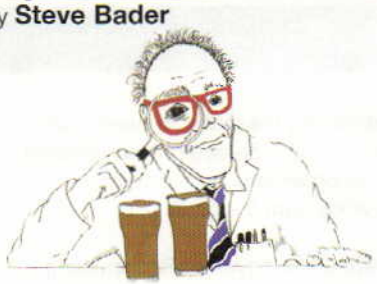
replicator

by **Steve Bader**



Dear Replicator,

Recently my wife and I spent several days in Asheville, North Carolina. While there we had the pleasure of sampling several brews from the Highland Brewing Company. Their Heather Ale is one of the best, most original beers I have tried and was wondering if you had any ideas on the recipe.

Chad and Rachel Matthews
Lexington, Kentucky

Heather ale is one of the world's oldest beer styles, with the use of heather in beer predating the common use of hops in beer as a flavoring. Highland chose to make Heather Ale as a medium alcohol beer, as more of a session beer, rather than the higher alcohol beers that many Scotch ales are. Brewmaster John Lyda described Highland Heather ale as a beer with a brown ale color, but a floral sweetness and aroma from the use of dried heather. It has a thin to medium body, and due to the relative low hop bitterness and medium alcohol level, has a shorter than normal shelf life. John says that he adds gypsum and calcium chloride (commonly known as "Burton water salts") to harden their water and give the beer more stability. For more information you can visit the Highland Brewery Website at: www.highlandbrewing.com or by calling 828-255-8240.

Highland Heather Ale

(5 gallons/19 L, extract with grains)
OG=1.048 FG=1.008
IBU = 22 SRM= 17 ABV = 5.2%

Ingredients

3.3 lbs. (1.5 kg) Muntons Light liquid malt extract
2.25 lbs. (1.0 kg) Muntons Light dried malt extract
1.0 lbs. (0.45 kg) British Maris Otter malt
4 oz. (113 g) roasted barley
2 oz. (56 g) heather tips (boil 30 minutes)
2 oz. (56 g) heather tips (dry hop)
1 teaspoon Irish moss (boil 60 minutes)
3.5 AAU Kent Goldings hops (bittering hop, boil 60 min.) (0.75 oz. (21 g) of 4.7% Alpha acid)
2.4 AAU German Hallertau Hersbrucker hops (bittering hop, boil 60 min.) (0.50 oz. (14 g) of 4.7% alpha acid)
White Labs WLP001 California Ale yeast or Wyeast 1056 American Ale yeast
0.75 cup of corn sugar for priming

Step by step

Steep the two crushed malts in 3 gallons (13.5 L) of water at 150 °F (66 °C) for 30 minutes. Remove grains from wort, add the malt syrup and dry malt extract and bring to a boil. Add the Goldings hops, Hersbrucker hops, Irish moss, and boil for 60 minutes. Add the first addition of Heather tips for the last 30 minutes of the boil. There are no finishing hops in this recipe. Now add wort to 2 gallons (9 L) cool water in a sanitary fermenter, and top off with cool water to 5.5 gallons (25 L). Cool the wort to 75° (24 °C), aerate the beer and pitch your yeast. Allow the beer to cool over the next few hours to 65 °F (18 °C) and hold at this temperature until the beer has finished fermenting. Add the last 2 ounces (56 g) of the heather tips just as you would if you were to be dry hopping, by adding them to the beer when the fermentation is done. Let the Heather tips dry hop in the beer for about five to seven days, then bottle.

All-grain option:

This is a single step infusion mash. Your grain bill will be 9.5 lbs (4.3 kg) British Maris Otter Pale 2-row malt and 4 oz. (113 g) British Roasted Barley. Mash crushed grains together at 150 °F (66 °C) for 60 minutes. Collect approximately 7 gallons wort (32 L) to boil for 90 minutes and have a 5.5-gallon yield (25 L), allowing for racking losses later. Lower the amount of the Kent Goldings hops in the boil to 0.50 ounce (14 g) to account for higher extraction ratio of a full boil. The remainder of the all-grain recipe is the same as the extract recipe.

homebrew calendar

December 4, 2004
Humpy's Big Fish Homebrew Competition
The Breakfast Cereal Challenge
Anchorage, Alaska

Have you ever dreamed of having your homebrew brewed by professionals and put on tap at an alehouse? The Great Northern Homebrew Club offers two events open to the public. The grand prize for Humpy's Big Fish Homebrew Competition is to have your beer brewed at the Midnight Sun Brewing Company and put on tap at Humpy's Great Alaskan Alehouse. Entry into the contest is free and all categories of beer, meads and ciders are open for entry. To enter, send three bottles via UPS or Federal Express to: Arctic Brewing Supply, 5915 Lake Otis Parkway #3, Anchorage, Alaska 99507, the site of the competition. Club member Steve Schmitt has conducted a fun side competition each year. This year the theme is brewing a beer with breakfast cereal. For more information call Jason Ditsworth at (907) 338-8828 or email gnbcweb@corecom.net.

December 11, 2004
14th annual Happy Holiday Homebrew Competition
St. Louis, Missouri

The cost of this event is $5.00 per entry and three bottles should be submitted for each. The judging will begin at 9 a.m. at The Parish Hall of Our Lady of the Presentation Catholic Church located at 8860 Tudor Ave., Overland, Missouri. Entries can be sent to the attention of Stephen Hale at HHC 2004 at the St. Louis Tap Room, 2100 Locust Street, St. Louis, Missouri 63103. For more information, visit www.stlbrews.org, email Dan Stauder at secretary@stlbrews.org or call (314) 241-BEER.

BREWER'S DICTIONARY

R is for . . .

rack: to move beer from one container to another, typically from a primary to secondary fermenter in order to separate beer from the solids that fall out of solution during the initial fermentation period.

racking cane: a plastic tube with an arced end that is attached to a hose and used to siphon brew. The arced end stays above the solids when lowered to the bottom of a fermenter and helps to leave sediment behind.

rauchbier: An amber colored brew from Germany that is noted for its smoked flavor that derives from roasting and drying malts over an open fire.

real ale: an ale that hails from England and is cask-conditioned in the cellar. Real ales are often served from casks in the pub with a beer engine.

rest: during the mash, brewers hold the mash at a predetermined temperature in order to draw out certain enzymes from the grain.

RIMS: an acronym for Recirculating Infusion Mash System, a type of brewing system that many homebrewers use.

roasted barley: an unmalted barley that is roasted in a kiln to give it a dark color and a bit of a bitter flavor.

runoff: a synonym for wort, or the liquid that you separate from the spent grain husks during lautering.

homebrew CLUB

Pacific Gravity

Culver City, California

(Left to right:) Pacific Gravity members Kevin Barry, Victor Macias and Josh Jensen say cheese at a monthly club meeting.

While the members of Pacific Gravity are legendary for their pranks and love of beer, when it comes down to homebrewing, they're more serious than they'd like you to think. And they've got the medals to prove it. About a dozen founding members under the guidance of Culver City Home Brewing Supply's owners established the club in 1995 in Culver City, California. Since then, the club has grown to over 200 dues-paying members ranging in age from 21 to over 70. It's a challenge to keep that many members involved, but we manage to keep them busy with a full calendar of club events. Our monthly club meetings feature up to six kegs of homebrew in addition to commercial examples of the month's designated beer style (barleywines and Belgian strong ales always make for an interesting meeting). We usually hold a raffle, throw some wasabi peas at our president while he announces club business and share our latest homebrewed creations. A long-running monthly tradition is First Friday, where we congregate at a local bar, restaurant, brewpub . . . wherever good beer can be had in town. Road trips are also popular club events: there's nothing like rolling down the L.A. freeways in a yellow school bus with friends and beer.

Twice a year, Pacific Gravity really pulls out the stops for our "official" summer and holiday parties. Our summer bash — the biggest and most anticipated event on our calendar — promises more than 20 kegs of homebrew and sodas, about 150 attendees and a crazy idea to feed the masses. Dig a pit, drop in a pig, roast for 24 hours and voila, another Pacific Gravity legend is born.

Our events require a lot of homebrew that has to come from somewhere. Fortunately, our club includes a stable of great brewers and we're always looking for ways to encourage them to brew better beer and more of it. One way we do this is by holding four or five club brews a year. These are community multi-brewing sessions, which of course have beer on tap and a barbecue working overtime. One of these events doubles as our annual chili cook-off.

Pacific Gravity members have fared well in local and national homebrew competitions, including 12 beers advancing to the finals of the 2003 AHA nationals. We've even got a few BJCP judges to keep us on our toes. Along the way we figured out how to run a homebrew competition too (2001 AHA NHC Finals, Pacific Brewers Cup and a club-only competition for Altbier and Kolsch held in November 2003). For club information, newsletters, photos and more, visit our Website at www.pacificgravity.com.

Forceful Carbonation

"Help Me, Mr. Wizard"

Doubling down on hops and consideration for clones

When carbonation takes a dive

I used my keg system for the first time recently and force carbonated my brew by chilling the beer, applying approximately 30 pounds of carbon dioxide pressure and shaking the keg. By doing this, I over-carbonated my American pale ale. Is there a way to remove the extra bubbles? Also what is the proper step-by-step procedure and temperature for force carbonating so I can avoid this the next time?

Ryan Pearce
Kenner, Louisiana

Removing excess carbon dioxide from this batch of beer, or de-carbonating it, at home is about as crude and unpredictable as the method used to get your poor beer in this state to begin with. Every time I read the procedure you used for carbonation I cringe and I applaud you for writing into us describing a problem with the old crank-n-shake method!

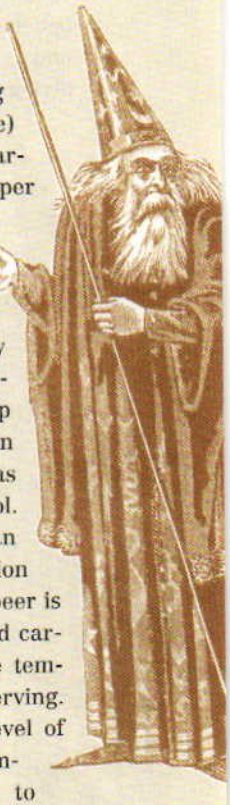
What you must do is to bleed off the head pressure in your keg, re-seat the bleed valve and allow the beer and keg headspace to re-equilibrate. This means that excess gas in the beer will flow out of the beer into the keg headspace and the keg pressure will increase to some pressure. This unknown pressure depends on how much carbon dioxide the beer contains and how full the keg is. If the keg has an infinite headspace, for example when a glass of beer is left on the countertop for a long time period, the beer goes flat and the atmospheric pressure of your house remains unchanged. When the keg has a finite headspace, the gas will cause the pressure to increase, unless the keg is essentially empty and you will again get flat beer.

Bottom line is that the emergency de-carbonation plan only works if you have already consumed most of the beer in your keg. The method does require patience and some old fashioned sensory evaluation . . . that means you get to enjoy a couple of beers while coaxing your beer back to an acceptable carbonation level. It will take about 8 hours for the beer to re-equilibrate after you dump the head pressure in the keg. You probably can get this done in 24 hours if you are really committed. Dump the pressure the first time at midnight and go to bed. This means your first scheduled sensory trial is at 8 a.m. If you have a regular job the day for your appointment with the ill keg should be Saturday! If your prognosis indicates too much fizz, repeat the procedure and have another sample at 4 p.m. Eventually, you will either find that the carbonation is acceptable or that you have repeated this procedure in excess and now have under-carbonated beer.

Under-carbonated beer is of course what you had before applying the crank-n-shake method. I use the term "crank" to describe the random application of gas pressure resulting from cranking the gas regulator to its maximum setting of 30 psi and unleashing this pressure on the poor keg of beer. If beer could become ill from too much dissolved gas like scuba divers do when staying down too deep for too long, these beers would certainly suffer from a high rate of the bends.

Divers use dive tables, these days programmed into fancy little dive computers, to avoid the bends. Dive tables relate depth and time to dive duration and this is all based on gas solubility in blood. Depth is another term for pressure and every 33 feet of liquid adds another atmosphere of pressure. The key to safe diving is to avoid staying too deep for too long. Same is true with carbonating your homebrew . . . and yes, I did just happen to return from a dive trip, thanks for asking!

Brewers also have handy little gas tables and these tables show how much gas is dissolved in beer when the beer is in equilibrium with a given gas pressure at a given temperature. For example, beer at 40 °F (4 °C) with an equilibrium headspace pressure of 12 psig (the 'g' indicates gauge pressure where 0 psig equals atmospheric pressure) contains about 2.5 volumes of carbon dioxide or about 5 grams per liter. This is a normal carbonation level for most draft beers, including your American pale ale.

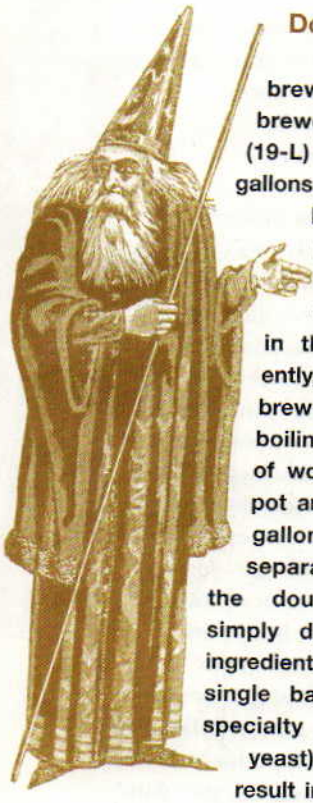


The easiest way to properly carbonate your beer is to exercise a little patience and to equip yourself with the proper tools. In the case of carbonation, a gas table is a pretty important tool. With table in hand, you can select your desired carbonation level at the temperature your beer is being stored. Ideally you should carbonate your beer at the same temperature you will use for serving. Once you know the desired level of carbonation and the beer temperature use the gas table to determine the required gas pressure. This pressure is what the regulator on your tank will be adjusted to. As divers say "plan the dive and dive the plan." This same principle applies to carbonating homebrew and requires patience . . . and yes, I did just get back from a diving trip, thanks for asking!

Once you have your gas plan, attach your keg to the carbon dioxide tank adjusted to the pressure dictated by your gas table and wait. A batch of homebrew is small and the headspace pressure will equilibrate with the beer in about 3 days. The only thing you can do to speed this method up is to periodically shake the keg. Some people want to bubble the gas through the dip tube in the keg, but this really does not speed things up much because the gas bubbles are too large and zip through the beer before much gas diffuses into solution. It also causes foaming. Take my advice and just hang tight!

You can periodically shake the keg to speed things up, but whatever you do, avoid the temptation of cranking

the regulator higher than what your gas table states. Just remember to "plan the dive and dive the plan" and while patiently waiting for your beer to carbonate daydream about sandy beaches, blue skies, cold beer, def jams and . . . yes, I did just get back from a diving trip.



Does 1 + 1 = 2?

I'm a partial mash brewer and formerly brewed single, 5-gallon (19-L) batches using 2.5 gallons (9.5 L) of water in the brew pot. After the boil was complete, we would then top off to 5 gallons (19 L) in the fermenter. Recently, we have begun to brew double batches by boiling 5 gallons (19 L) of wort in a single brew pot and topping off to 10 gallons (38 L) in two separate fermenters. In the double batches, we simply doubled all of the ingredients formerly used in a single batch (malt extract, specialty grains, hops and yeast). Will this method result in the same hop bitterness as the single batches since the volume of boiling wort is also doubled or are additional adjustments to the hops necessary?

David Balducci
Mechanicsville, Virginia

Brewing beer, whether at home or in a commercial brewery, often boils down to balancing the investment of time with money. Commercial brewers are certainly more concerned with financial matters than hobbyist brewers, but the fact remains that time is valuable. And your question addresses this issue head-on.

Brewing high gravity wort and diluting later in the process is how almost all beer is made for sale to the public. Most brewers who use this practice produce high gravity beer all the way through aging and dilute with water prior to filtration and packaging. This is the most efficient method of brewing when one considers the cost of fermentation and aging tank space as well as the labor cost added to the beer when transfers and tank cleaning are considered. The method you propose only takes advantage of labor savings in wort production and is a form of high gravity brewing (albeit an abbreviated version). I do something similar to your method on a regular basis in a brewpub setting to produce wort for reasons that extend beyond labor savings and have had great success with dilution of high gravity (usually 2–3 °Plato higher than the target gravity) wort prior to wort cooling.

The recipe for this method is not a simple proportional increase in ingredients. Yields of brewing ingredients, both malt and hops, decline as their concentrations increase. For example, brewing wort with an OG of 1.096 (24 °Plato) versus one with an OG of 1.048 (12 °Plato) will not give you the same efficiency in the brewhouse. This means that more malt is required to achieve the same final wort volume.

On the surface, this fact is inefficient but it does have its advantages. Time savings is one obvious benefit. You can produce high gravity wort and then dilute to a greater volume and by doing so produce more wort in less time from a brewhouse limited to a given volume (which is the norm). The other bonus is a reduction of last runnings collected from the mash bed. This fact is often overlooked as wanton disregard for efficiency but many brewers choose not to collect dilute wort flowing from the mash. Kirin Ichiban is one such beer and this beer is marketed as only being made from first wort (undiluted by sparge water) flowing from the mash bed.

Hop utilization in the kettle boil also suffers from this method as utilization declines with increasing wort gravity and with the concentration of hop bittering acids in the wort. This is a double whammy and will require you to increase the hop dose to compensate for the reduction in efficiency. Your experience is consistent with this standard tid-bit of brewing wisdom.

High gravity brewing, as you propose, certainly has its merits but, like many things in brewing, has no exact formulas. In order to fine-tune, this method requires tweaking on your part to assess the performance of your mash/lauter tun and further adjustments to account for the decrease in hop utilization.

Don't be discouraged by your task. Remember that yield from malt and hops decrease as concentration increases and that small steps towards your ultimate goal help to gauge the effect of high gravity brewing on yield and nailing your target. Most big brewers don't venture above 1.072 (18 °Plato) because yield becomes too low and fermentation gets funky as esters and higher alcohols get too high, even after dilution.

One way to get good yields from this method is using liquid additives to boost both sugars and hop bitterness. The most "modern" (and least traditional) breweries add sugar to wort either pre or post boil to adjust wort gravity and then add hop acids post fermentation to hit their bittering specifications. In fact, some brewers add most of their hop acids post fermentation in order to reduce hop losses in the boil and during fermentation. I am not attracted to these methods because I fancy myself as a traditional brewer (whatever that means!) but offer these techniques as fodder for the hungry homebrewing appetite. If you want to go crazy and dabble with these practices you can add malt extract or simple sugars to your malt wort prior to boiling and then dribble in some hop acids after the boil to move your bitterness closer to its target.

Throw me a clone

I recently obtained a Black Cherry Porter recipe from a local microbrewery. The only thing is, this microbrewery makes around 300 gallons (1,140 L) at a time. While this is every homebrewer's dream, we typically only make about 5 gallons (19 L) at a time. Is there a linear scale-down to 5 gallons (19 L) or are there other factors that need to be considered?

Dave Kairys
Sheboygan, Wisconsin

This question is similar to the previous question from David Balducci about high gravity brewing because it deals with efficiency and does not have a definitive answer. The interesting thing about this question is that the answer may surprise many homebrewers. When small brewers think about scaling a recipe down, the assumption is that there will be a reduced yield on a small system. This may or not be the case as many small brewers don't have much better malt yields than homebrewers. As a general rule, yield becomes higher and more important as brewery size increases. Most brewers will tell you their yield if you ask. Fruit flavors are easy to scale up or down as most are added later in the process.

The hard thing about scaling up and down is the hopping. That's where I will focus my answer and I am going to broaden my response to include all beers (and somewhat ignore the fruit component). Fluctuations in hop utilization as related to batch size is well-documented and text books have all sorts of great explanations of why big breweries have better hop utilization than small ones. The list of reasons includes lower surface to volume ratio in large kettles, more vigorous boils in large kettles, lower surface to volume ratio in the fermenter with big batches and so on. The key here is the surface to volume ratio and the idea is that hop acids and oils stick to surfaces. The more surface area per volume of wort or beer and the more loss you get with hops. This same thing occurs in fermentation when the foam from fermentation is yet another surface that scrubs hop goodies from beer.

Commercial brew kettles range from small 500-gallon (19 hL) kettles found at your local pub to huge 30,000-gallon (1,134 hL) monsters used at the largest breweries. The now closed Heilemann Brewery in LaCrosse, Wisconsin had a 46,000-gallon (1,741 hL) behemoth of a kettle! To put these volumes into perspective, the surface to volume ratio of a giant 30,000-gallon (1,134 hL) kettle is about 0.66 m^2/m^3. The units are not important here but this a very low number. A 500-gallon kettle (19 hL), on the other hand, has a surface to volume ratio of about 2.63 m^2/m^3 and the typical homebrew kettle has a surface to volume ratio of about 13 m^2/m^3.

The surprising point about this comparison is the dramatic difference between a homebrew kettle and even the smallest commercial kettle. The surface area where hop acids tend to stick grows rapidly as kettle volume is reduced.

Clearly the homebrewer must use more hops per gallon when scaling down a recipe due to decreased hop utilization at home. The other thing about hops is their oil content and these are also lost more in a small kettle for a similar reason. This is the interfacial area between the liquid and air. A similar pattern is seen with this

where the huge kettle has an interface area to volume ratio of 0.25 m^2/m^3 the small commercial kettle has 0.96 m^2/m^3 and the homebrew kettle has 3.9 m^2/m^3. This means that as batch size decreases hop oils are harder to keep in the wort where they are needed if the finished beer is going to have a nice hoppy aroma.

The take home message with hops is practical. If a commercial batch is scaled down more hops will be required for bitterness. That's easy; just add more hops. The additional amount will probably range between 25 and 33% above what is used in a commercial brewery for a given wort volume assuming your recipe is coming from a small brewery. The hop oil loss is not so easy to balance because when you add more hops to make up for the oil loss you are adding bittering acids and plant matter that can begin to add vegetal flavors to beer when heavy hopping rates are used.

I cannot use whole hops and use pellets. This gives a different sort of hop aroma and also adds more bitterness than cone hops do because the aroma hop remains in contact with hot wort in the whirlpool. So, doing a "clone" beer becomes difficult. Commercial brewers usually do not wish to clone other commercial beers but we often want to pluck out a certain flavor or aroma from a product and insert it into one of our own. In the case of hop aroma, the best method for me to brew an extra hoppy beer is by means of dry-hopping. This is simply the way it is with our equipment.

My advice to you is that when you want to scale down a commercial recipe, you first must carefully study the beer you want to brew. Smell it, taste and really focus on the hops in the beer. Are the aromas similar to any homebrews you have previously made or is the aroma something more intense? You may indeed find that the easiest way to duplicate the hop aroma is by using an entirely different hopping method. Cloning a commercial brew has much more to do with using all of your skills as a brewer to attempt to match the flavor of your homebrew with your chosen model. Simply copying the technique used by another brewer may get you close, but the devil is always in the details. Copying technique will probably fail when it comes to the subtleties of hop aroma. Good luck!

Do you have a question for Mister Wizard? Write to him c/o Brew Your Own, 5053 Main Street, Suite A, Manchester Center, VT 05255 or send your e-mail to wiz@byo.com. If you submit your question by e-mail, please include your full name and hometown. In every issue, the Wizard will select a few questions for publication. Unfortunately, he can't respond to questions personally. Sorry!

California Common

An American brew for the common man

by Horst D. Dornbusch

California Common is a New World beer style. In fact it is one of two classic styles that everybody agrees are genuinely American, the other being cream ale. California Common is an odd beer, essentially a lager that tastes more like an ale. Some people call it a hybrid beer; others are less genteel and call it a bastard. It is a quaffing brew for the common man and woman, a brew reminiscent of the rough and tumble days of the Alaska Gold Rush of the 1890s, when many of the mostly male inhabitants of San Francisco lined up on the docks waiting to be transported to the riches of the northern frontier.

Obviously, in those days before the Panama Canal, there was hardly enough "imported" beer available to satisfy the collective thirst of the disparate lot of prospectors, thrown together from all corners of the country, even the globe. Not surprisingly, enterprising publicans quickly filled the void by brewing their own beer on location, and because German immigrant brewers used to dominate American brewing, including California brewing, at the time, the brews these California pioneer brewers made were lagers . . . but lagers with a difference.

California Common, a can-do and make-do style

Before man acquired the technology to control the entire brewing process as well as the transportation network to make locales irrelevant, he could only make the beers nature allowed him to brew, and do so with local materials. In the cold winters of Munich, for instance, near the foothills of the Alps, lager emerged, because only bottom-fermenting yeasts can work in such a climate. The Rhineland, by contrast, never got cold enough for lager brewing nor warm enough for ale brewing by the British way. The result was the cool-fermented Altbier and its blond cousin, the Kölsch. In the British Isles, on the other hand, warm-fermenting brews thrived, which resulted in a cornucopia of ale styles from the blondest pale ale to the darkest stout.

In far-away California, however, it was much warmer and the brew equipment was primitive. According to the Anchor Brewing Company Website, the California brew scene was run mostly by German-born entrepreneurs in the 19th century. They had such names as *Behlmer, Böse, Freyer, Garms, Hagemann, Hansen, Lurmann, Schleemann, Schröder, Schwarz, Thode, Veen, Windeler* and *Wunder*. True to the tradition of their native land, they used lager yeast, probably hauled in from the Eastern seaboard. As for grain and hops, they probably used whatever happened to become available on the local market. From these ingredients, they made their beers in flat open fermenters. Even after the invention of refrigerated beer vats in Munich in the 1870s, such technologies were not yet available in the pioneer outposts at the Golden Bay.

Whichever lager yeast these early brewers might have used initially, it is likely that it mutated rapidly in the unusual, non-lager-like environment. Not surprisingly, the character of the San Francisco brews began to reflect the character of their times and circumstances. The result was a beer, which, though bottom-fermented, tasted more like an ale, probably with plenty of fruitiness and butterscotch flavor.

Initially this brew from the steamy shores of San Francisco was called "steam beer." It is not clear where the name came from, but according to one

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CALIFORNIA COMMON by the numbers

OG	1.044-1.056
FG	1.012-1.014
SRM	10-20
IBU	30-45
ABV	4.5-5.5%

RECIPE

California Common

(5 gallons/19 L, all-grain)
OG = 1.052 FG=1.012
IBU = 35 SRM = 16 ABV = 5.2%

Ingredients

8.5 lbs. (3.8 kg) American 2-row pale ale malt (approx. 2.5 °L)
1.3 lb. (0.58 kg) Munich malt (10-20 °L)
1.0 lb. (0.45 kg) crystal malt (60 °L)
9.5 AAU Cluster hops (bittering) (1.6 oz./45 g of 6% alpha acid)
1.5 oz. (28 g) Cluster hops (aroma)
1 tsp. Irish Moss
Wyeast 2112 (California Lager or White Labs WLP0810 (San Francisco Lager) yeast
1 cup dry malt extract (for priming)

Step by Step

Start at 130 °F (54 °C) for a 30-minute rest and increase the mash temperature, using a combination of hot-water infusion and direct heat, to 152 °F (67 °C) for a 60-minute saccharification rest, then to 168 °F (76 °C) for the mash-out. Recirculate your wort until it runs clear (about 15 minutes) and sparge with 170 °F (77 °C) water until you reach a kettle gravity of about 1.047 (11.8 °P) to account for evaporation losses during the boil. Boil for 75 minutes. Add the bittering hops after 15 minutes and the aroma hops and Irish Moss after 70 minutes. After shutdown, let the brew rest for about 15 minutes. Then siphon the wort off the trub and heat exchange it to your preferred pitching temperature (see "Ingredients and Process," in story), between 58 °F (14 °C) and 72 °F (22 °C). Ferment for 10 days and rack. Allow an additional week for

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recipes continued

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secondary fermentation. Rack again and prime for packaging. Let the brew condition and mellow in bottles or in a keg for another two to three weeks.

California Common

(5 gallons/19 L, extract with grains)
OG = 1.052 FG = 1.012
IBU = 35 SRM = 16 ABV = 5.2%

Ingredients

6.25 lbs. (2.8 kg) pale ale liquid malt extract
1.3 lb. (0.58 kg) Munich malt (10-20 °L)
0.8 lb. (0.28 kg) crystal malt (60 °L)
9.5 AAU Cluster hops (bittering) (1.6 oz./45 g of 6% alpha acid)
1.5 oz. (28 g) Cluster hops (aroma)
1 tsp. Irish Moss
1 package Wyeast 2112 (California Lager) or White Labs WLP810 (San Francisco) yeast
1 cup dry malt extract (for priming)

Step by Step

Coarsely mill the 2.1 lbs. of specialty grains and place them into a muslin bag. Immerse the bag in cold water and heat slowly, for about 30 minutes to 170–190 °F (77–88 °F). Discard the bag without squeezing it and mix the liquid with about 4 gallons (15 L) of brewing liquor. Heat the liquor and stir in the liquid malt extract. Bring the dissolved malt extract to a boil. Boil for 75 minutes. Add the bittering hops after 15 minutes and the aroma hops and Irish Moss after 70 minutes. After shutdown, let the brew rest for about 15 minutes. Then siphon the wort off the trub and heat exchange it to your preferred pitching temperature (see "Ingredients and Process," in story), between 58 °F (14 C°) and 72 °F (22 °C).

Ferment for 10 days and rack. Allow an additional week for secondary fermentation. Rack again and prime for packaging. Let the brew condition and mellow in bottles or in a keg for another two to three weeks.

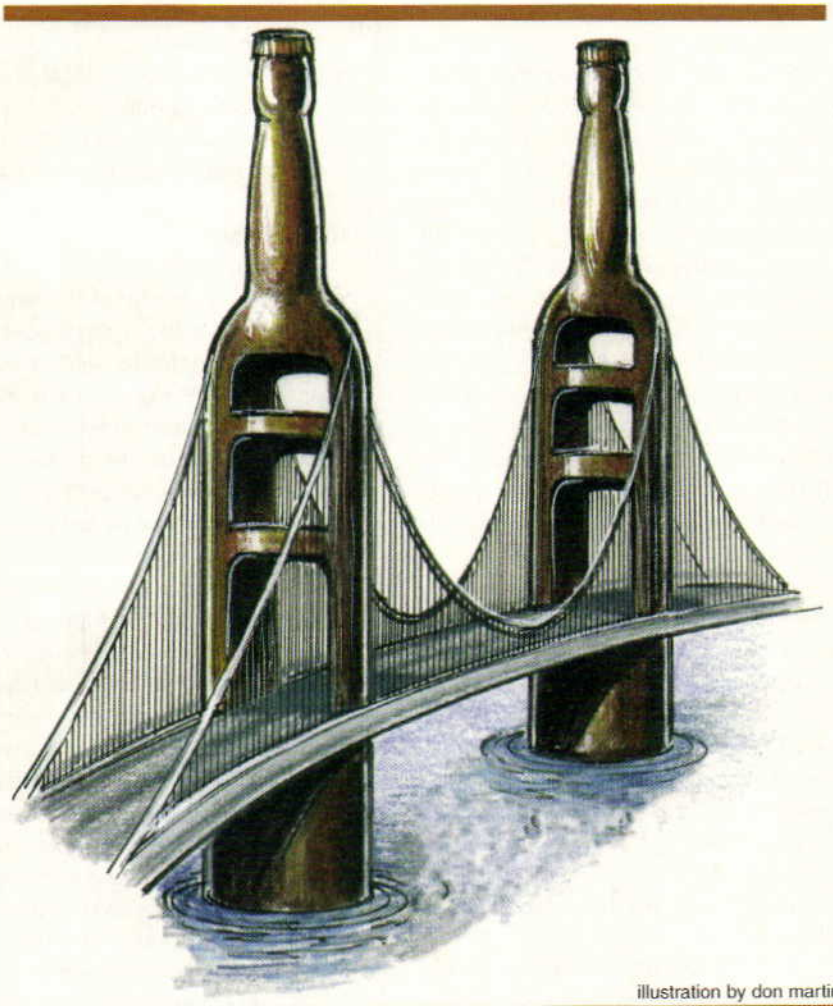

illustration by don martin

California Common

(5 gallons/19 L, extract only)
OG = 1.052 FG = 1.012
IBU = 35 SRM = 16 ABV = 5.2%

Ingredients

6.25 lbs. (2.8 kg) pale ale liquid malt extract
1.66 lb. (0.75 kg) dark ale liquid malt extract
9.5 AAU Cluster hops (bittering) (1.6 oz./45 g of 6% alpha acid)
1.5 oz. (28 g) Cluster hops (aroma)
1 tsp. Irish Moss
Wyeast 2112 (California Lager) or White Labs WLP 0810 (San Francisco) yeast
1 cup dry malt extract (for priming)

Step by Step

Mix the malt extracts with your hot brewing liquor in the kettle. Bring the wort to a boil, and boil for 75 minutes. Add the bittering hops after 15 minutes and the aroma hops and Irish Moss after 70 minutes. After shutdown, let the brew rest for about 15 minutes. Then siphon the wort off the trub and heat exchange it to your preferred pitching temperature ("Ingredients and Process," in story), between 58 °F (14 °C) and 72 °F (22 °C). Ferment for 10 days and rack. Allow an additional week for secondary fermentation. Rack again and prime for packaging. Let the brew condition in bottles or in a keg for another two to three weeks.

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fanciful theory, the cask-conditioned California brews of the 1890s gave off plumes of "steam" when their bung holes were opened prior to tapping. Another theory suggests that the name relates to the early steam engines installed in some California breweries. As these steam-equipped breweries proudly bragged about their modern machinery in their promotions, their brews came to be known as "steam beer."

Whichever is the true explanation, for legal reasons, the descendants of these beers are now universally called California Common, because "Steam" has since become a trademark owned by the Anchor Brewing Company of San Francisco. The steam beer style had nearly faded into oblivion by the 1960s. Fewer and fewer breweries bothered to make it, while generic mass lagers were capturing an ever-increasing market share. It was then that Fritz Maytag purchased one of the last steam breweries — namely Anchor. This brewery was founded in the 1850s by two German immigrants. In 1896, it had fallen into the hands of two German-born steam brewers, Otto Schinkel and Ernst Baruth. After several changes in ownership, Fritz Maytag acquired the brewery in 1965, just before it was to be closed down, and he turned it into one of the biggest success stories of the American craft brew revival.

A tale of an accidental California Common

It is not surprising that a beer style with the history of the California Common has a fairly broad range of specifications (see California Common by the numbers on page 17). Numerically, a California Common is hard to pin down and different experts, including the Association of Brewers Beer Style Guidelines, use marginally different ranges for the different variables. But there is no point in arguing, because we know the original merely in broad strokes. For instance, the color range of a California Common may be quite wide, from light to darkish-amber. Modern versions are generally pale-amber to copper. The alcohol content by volume can vary at least from a low of around 4.5% to a high of around 5.5%. The composition of the grain bill, too, is very unspecific.

A quick glance at the printed and posted literature confirms that a great number of brews have been labeled California Common, even though they could have been called something else by virtue of their ingredients. A case in point is the following tale of a pub brew that started out as German lager but ended up as a California Common:

A while back, a pub-brewer friend of mine called me up to ask me if I could pop over for a taste test. He had made a Munich Helles with all the right ingredients and he felt the beer had great promise. Half-way through the primary fermentation, however,

something had happened over night. Perhaps there was a power failure. Nobody knows, but when he showed up in the cellar the following morning, his Helles lager was at the comfortable ale temperature of 68 °F (20 °C) and the beer was almost completely attenuated. "I thought I should get a second opinion," he said despondently, "before I pour it down the drain."

Indeed, the beer tasted like an overly fruity, diacetyl-laden, estery ale. It was raw and unpleasant. Yet, I thought it would be a shame to toss out 10 U.S. barrels (almost 12 hectoliters) of beer if they could be saved. I suggested that he just go ahead and consider the accident a premature diacetyl rest. I recommended that he pull down the tank temperature again, cap the tank for conditioning, and let the brew mature for a few weeks. This gave him the idea to perhaps rename the brew California Common.

The characteristics of the brew that eventually emerged, after some aging, from the mysterious mishap indeed matched the California flavor profile. A California Common was not what he had planned to make, but it's what he ended up with — and three weeks later, the brew was on the pub's beer menu under that very name. It was very popular with the customers and was gone in no time. My friend had accidentally replicated on a small scale what probably happened in San Francisco in the 1890s on a large scale.

The point of this tale is not that a California Common is a mere mistake made palatable by aging. Rather, it shows that the characteristics of different beer cultures, when fused together, can produce a brew that may appear unlikely at first glance but yield surprisingly pleasant taste experiences in the end. In a sense, the California Common as the first truly American beer style is a fusion brew, with elements borrowed from several brewing traditions. If America is a melting pot, perhaps the California Common can be regarded as a melting glass.

Ingredients and process

In spite of the broad style definition of the California Common, there are a

few guidelines for ingredients and process that the brewer must adhere to in order to make the resulting brew authentic. For instance, formulate the brew so that the mouthfeel is medium, neither viscous nor thin. This means no unmalted grain in the mash tun and no poorly attenuating yeast in the fermenter.

Considering where the grain would most likely have come from in San Francisco at the end of the 19th century, a California Common is perhaps most authentically brewed with grains that are indigenously American. A good portion might have even been 6-row malt. Modern homebrewers, of course, do not have such supply limitations. For the cleanest taste, use a top quality pale ale malt as a base grist. Even a Pils malt is suitable, as my friend's happenstance Helles/Common proved. Adding some Munich malt gives the brew some color and body. For a very pale California Common, you can use caramel Pils malt instead of Munich malt. For a deep-amber brew, add some crystal malt at a color rating of no more than 60 °Lovibond/SRM. Avoid darker malts because you are only after color, not roastiness, which is not part of the California Common's flavor profile.

For the straight extract brewer, California Common is rather user friendly. Simply mix a standard, unhopped pale ale malt with a standard, unhopped dark ale malt. You can vary the proportions depending on the desired color and flavor profile of your California Common. In our recipe the dark ale liquid malt extract (LME) accounts for about 20% of the malt.

While the upfront perception of a California Common relies more on maltiness than hoppiness, the finish should have a pronounced American-style hop-aromatic component. In theory, therefore, we must choose a bittering hop that is not overpowering and an aroma hop that has legs. In practice, American, British and Continental European hop varieties all seem to be found in a California Common. However, because we are looking at California Common more as a classic beer style than an experimental inspiration, I have chosen Cluster for both bittering and aroma in our recipe. It is a hop variety with an alpha-acid level of about 6%.

Cluster is the most traditional choice, because it was one of the most ubiquitous hop varieties grown from coast to coast in the United States in the 19th century. The genetic origin of Cluster is not known but it is probably a cross between a cultivated English and a wild American variety. If you prefer a more contemporary American flavor, you can utilize such spicy Northwest types as Galena for bittering and Willamette for aroma. For a more edgy, assertive California Common, of course, you can always use the floral, aromatic Cascade.

Anchor actually uses their own strain of yeast for their Steam. This yeast strain is distinctive and good

tasters can distinguish it for its unique aroma. Nonetheless, there have been yeasts developed that closely resemble Anchor's and these are widely available to homebrewers.

Given the historical roots of California Common, its yeast should be a lager variety that has adapted to the relatively high ambient fermentation temperatures that prevailed in San Francisco in the 19th century. Perhaps the most common strains are Wyeast 2112 California Lager and White Labs WLP 0810 San Francisco. Both strains ferment wort to the California style within an optimal temperature range of roughly 58–65 °F (14–18 °C). It is a fair guess that the diacetyl levels in today's California Common brews are lower than they must have been most of the time in the 1890s. However, if you do wish to accentuate your Common's fruitiness, by all means, ferment your beer at 72 °F (22 °C).

Also, a California Common should be well carbonated. Use a generous amount of priming agent, perhaps as much as 1½ cups of light dry malt extract for 5 gallons (19 L). If the brew is to be served out of a Cornelius keg, dispense it cool, at a pressure of 15–20 psi (1–1.4 atmospheres).

All of this is potentially good news for homebrewers. The temperature inside most homes (where many people tend to brew) closely resemble the climate of California throughout the year (from winter to summer). This being the case, we as homebrewers have the comfort of making California Common at (or very close to) room temperature while staying authentic to the style. No need to press-gang the family fridge into brewing service. The pantry or a dark basement corner will suffice!

Horst Dornbusch has been brewing ales and lagers since 1972, both as a homebrewer and, in the 1990s, as the owner of a brewing company. In 2000 he was awarded a Bronze Medal at the Great American Beer Festival in Denver, Colorado for his Dornbusch German Ale, an Altbier. When not busy brewing, he is a beer writer and contributes "Style Profile" to every issue of Brew Your Own.

This holiday season give the gift of beer! Check out these businesses for some great gift ideas for friends & family or your own holiday wishlist.

BREWING BALTIC porter

the evolution of strong porter

BALTIC PORTER is a lesser-known style of beer, even within the boom of microbrewed beer. Imported Baltic porters are only sporadically available and even microbrewed strong porters are rare. One would think that this style should be ever-present in the homebrewing world since it has a big maltiness with a lot of complexity, but Baltic porters rarely seem to rear their head at homebrewing competitions, homebrew club meetings or Internet forums. Hoping to bring more attention to this great style, the Beer Judge Certification Program (BJCP) has added Baltic porter to the 2004 style guidelines in same category as the perenially popular brown and robust porter styles.

By Michael Heniff

WHAT IS A baltic porter?

Baltic porters originated as a strong version of English porters, ales brewed higher in alcohol to survive export shipping conditions and to appease the tastes for strong beer in Eastern Europe. But, after being brewed for years in Eastern Europe, where lager brewing has been the standard, most Baltic porters are now fermented as lagers.

Although Baltic porter has occasionally been referred to as an "imperial" porter, it is probably more aptly described as an "imperial" Schwarzbier due to its clean lager character and smooth maltiness.

Baltic porters generally have original specific gravities from 1.060 to 1.090. They are generally bittered to 20–50 IBU, somewhat modest for a high original gravity. They are usually lagers, but are also found as ales. (All of the ales are quite lager-like, being very clean with a low level of fruity esters.) The maltiness is the highlight of this style showcased with flavors of chocolate, rich caramel, molasses, licorice, and coffee — but never burnt or roasty flavors. The finish is very malty due to the moderate bitterness and is quite smooth and clean due to the lager or very clean ale fermentation. The hop character is quite low with little or no hop flavor or aroma present.

The History of BALTIC PORTER

In the 18th and early 19th century, strong porters

(continued on page 29)

baltic PORTER recipes

Homebrewers at the Baltic porter tasting pictured in photo (left to right): Doak Procter, Scott Weitzenhoffer, Colby Sheridan, Mike Heniff (wearing fez), Ed Moore, Bev Blackwood (seated), Rob Kolacny, Sean Lamb, Steve Moore, Don Sajda (KGB) and Jimmy Paige.

Batch #81 Baltic Porter

by Mike Heniff

(5 gallons/19 L, extract with grains)
OG = 1.085 FG = 1.018 IBU = 45

Ingredients

8.33 lbs. (3.8 kg) light dry malt extract
0.87 lbs. (0.40 kg) German medium CaraMunich (45 °L)
0.43 lbs. (0.20 kg) German dark CaraMunich (60 °L)
0.25 lbs. (0.11 kg) chocolate malt
0.67 lbs. (0.3 kg) Carafa II Special malt
0.25 lbs. (0.11 kg) CaraPils malt
14 AAU German Perle hops (60 min) (1.75 oz./50 g of 8.0% alpha acids)
1.4 AAU of Hallertauer Hersbrücker hops (10 min) (0.43 oz./12 g of 3.3% alpha acids)
0.7 AAU of Hallertauer Hersbrücker hops (3 min) (0.22 oz./6 kg of 3.3% alpha acids)
White Labs WLP029 (German Ale/Kölsch) yeast

Step by Step

Steep grains at 155 °F (68 °C) in 5 gallons (19 L) of water for 30 minutes. Remove and rinse grains with 1 gallon (3.8 L) of 165 °F (74 °C) water. Bring to boil, remove heat, and add extract. Bring to a boil for 75 minutes, add hops per schedule, chill, and ferment at 62 °F (17 °C).

Judges' comments: "Nice balance of malt flavors, complex maltiness, dry, could use more body, some esters — need to lower fermentation temperature."

Maltic Porter

by Rob Kolacny

(5 gallons/19 L, all-grain)
OG = 1.083 FG = 1.012
IBU = 51

Ingredients

3.75 lb. (1.7 kg) Moravian Pilsner malt (well-modified)
3.75 lb. (1.7 kg) light Munich malt
2.0 lb. (0.91 kg) dark Munich malt
0.50 lb. (0.23 kg) CaraPils malt
0.50 lb. (0.23 kg) flaked barley
0.50 lb. (0.23 kg) flaked rye
0.40 lb. (0.18 kg) aromatic malt
0.40 lb. (0.18 kg) CaraMunich malt (45 °L)
0.40 lb. (0.18 kg) molasses
1.1 lb. (0.50 kg) dark crystal malt (75 °L)
0.25 lb. (0.11 kg) Carafa II Special malt
1.1 lb. (0.50 kg) chocolate malt
0.13 lb. (58 g) black patent malt
2.1 AAU Czech Saaz whole hops (first wort hops) (0.6 oz./17 g of 3.5% alpha acids)
9.8 AAU Horizon hops (60 min) (0.75 oz./21 g of 13% alpha acids)
3.0 AAU Hallertauer Hersbrücker hops (30 min) (0.63 oz./18 g of 4.8% alpha acids)
5.2 AAU German Perle hops (15 min) (0.63 oz./18 g of 8.3% alpha acids)
6.7 AAU Czech Saaz hops (0 min) (1.9 oz./54 g of 3.5% alpha acids)
White Labs WLP800 (Pilsner Lager) yeast

Step by Step

One day before brewing, steep 0.9 lb. (0.41 kg) chocolate malt, 0.13 lb. (59 g) black patent malt, and 0.8 lb. (0.36 kg) medium crystal malt in 2 gallons (7.6 L) of room temperature water for 24 hours. Drain the liquid and add to the last 15 minutes of the boil.

Dough in all of the remaining grains except for the chocolate and Carafa malts in 4.5 gallons (17 L) of water at 110 °F (43 °C). Raise temperature with direct heat to 122 °F (50 °C) and rest for 10 minutes. Decoct 1.5 gallons (5.7 L) of mash and raise to 145° F (63 °C) for 10 minutes, 165 °F (74 °C) for 10 minutes, and bring to boil. Add decoction back to main mash and rest at 157 °F (69 °C) for 60 minutes. After 60 minutes, decoct 1 gallon (3.8 L) of mash and bring directly to boil. Add back to mash and rest at 170 °F (77 °C) for 20 minutes. When adding second decoction back to mash, stir in remaining dark grains. Batch sparge with 170 °F (77 °C) water. Run-off mash liquid and boil. Add molasses to wort during the last 15 minutes of boil with cold steeped dark grain liquid. Ferment at 50 °F (10 °C) for 2 weeks.

Judges' comments: "The balance of maltiness and chocolate/coffee flavors is excellent, hoppier than characteristic of Baltic porter, could use more caramel."

Any Porter in a Storm

by Bev Blackwood

(5 gallon/19 L, all-grain)
OG = 1.080 FG = 1.017
IBU = 29

Ingredients

12 lb. (5.4 kg) German Pilsner malt
0.4 lb. (0.2 kg) CaraVienne malt (20 °L)
0.4 lb. (0.2 kg) German dark CaraMunich (60 °L)
0.2 lb. (0.1 kg) Special B malt (145 °L)
0.2 lb. (0.1 kg) British chocolate malt
0.1 lb. (45 g) black patent malt
0.8 lb. (0.36 kg) Mexican Piloncillo cane sugar
8.3 AAU Czech Saaz hops (90 min) (2.5 oz./71 g of 3.3% alpha acids)
1.7 AAU Czech Saaz hops (30 min) (0.5 oz./14 g of 3.3% alpha acids)
White Labs WLP830 (German Lager) yeast

Step by Step

Mash at 158 °F (70 °C) for 75 minutes. Ferment at 52 °F (11 °C) for 2 weeks. Lager in secondary for 3 to 4 weeks.

Judges' comments: "Complex toffee/caramel good, needs more coffee and chocolate malts, cleanly fermented."

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were made by British brewers for export to the Baltic region of Eastern Europe, Scandinavia and Russia (along with strong stouts that are now referred to as Russian imperial stouts). Between 1806 and 1815, there were a number of political conflicts between France, Britain and Russia causing trade to the Baltic region by Britain to be greatly curtailed and at points trade was even prohibited. After the War of 1812, Britain's main trade focus had shifted towards business with India and Latin America. Additionally, in the 19th century, the taste for porter in Britain was declining in favor of paler colored ales.

During the early 19th century in the Baltic region, nationalism grew out of resentment for the French and their rule in foreign countries, creating sentiment for locally produced goods. This nationalistic view became as strong a force against imported goods as the high trade tariffs in the region. Additionally, as the Industrial Revolution (the development of modern industry and science) had started in Britain in the 18th century, an industrial revolution of its own was spreading in Eastern Europe. These factors led to the formation of many breweries in the Baltic region, many brewing Baltic porters, thus reducing and eventually eliminating the export of strong porter from Britain.

In the last century, communist rule had kept many of these great porters from reaching the U.S. beer market. Since the fall of communism, more and more Baltic porters have been exported. Even so, they are still only available sporadically throughout the U.S.

In Scandinavian countries, breweries face extremely high beer taxation along with strong political efforts to curb alcohol consumption. This acts to limit the presence of these beers in the import beer markets.

Imported Baltic porters include Zywiec (Poland), Sinebrychoff (Finland), Carnegie (Sweden), Saku (Estonia), and Baltika (Russia). In the U.S., strong porters from Heavyweight Brewing (New Jersey), Southampton Publik House (New York), and Old

Dominion (Virginia) come closest to emulating the style.

Brewing a BALTIC PORTER

When formulating the malt bill for a Baltic porter, the choice of base malt is not so important due to the strong character contributed by the specialty grains. Although European Pilsner malt is a more traditional selection, any Pilsner or pale malt would be a good foundation. For complexity and a depth of maltiness, Vienna and Munich malts can be added in virtually any proportion or even used entirely as the base grain.

For the dark malt character, a combination of chocolate malt with dark crystal or caramel malts give a chocolate and coffee aroma and flavor with rich caramel and raisin/plum-like highlights. Carafa, a German dark malt made by Weyermann, is a good selection because it is smoother than many American and British chocolate malts. Their Carafa "Special" is an even better choice because it is de-husked for a smoother flavor and reduced astringency. The use of roasted barley and black patent malt should be avoided; roasted barley will give the porter a roasted, stout-like character that is not found in commercial Baltic porters while the black patent malt will contribute an acrid harshness that is not typical of the style.

For a mash schedule for a Baltic porter, the method can be either simple or complex. For a simpler mash procedure, use only a single temperature rest between 154 and 158 °F (68–70 °C). Since clarity is rarely a concern for dark beers and because most malts are well-modified by the maltster (and since many homebrewers can only perform one temperature rest with their equipment), this rest will suit a Baltic porter just fine. The higher saccharification temperature is chosen to result in a sweeter finishing beer.

To be traditional but more complex, step mashing is the mash schedule that Baltic porter brewers use. An acid rest to adjust the mash pH is not necessary as the malt bill contains an abundance of dark grains with acids formed during the kilning process. For under-modified malts, a short protein rest of 20 minutes at 122 °F (50 °C) should be utilized. For well-modified malts, rest at 132 °F (56 °C) to retain head and body contributing smaller peptides. Follow this mash step with a saccharification rest as described above.

The crystal and chocolate malts are especially good choices for extract brewers that steep grains to add color and character for their extract brews. For an extract recipe, choose a light or amber extract and steep the crystal and chocolate malts in a steeping bag in hot water. Be sure not to steep the grains in water hotter than 170 °F (77 °C) as it may result in an astringent beer due to the extraction of tannins from the grain husks.

When selecting hops for this style, English hops such as Goldings or Fuggles were likely the varieties used in the 1800s. Today, noble hops from continental Europe are the varieties used in Baltic porters. Bittering hops such as Perle or Northern Brewer are good selections due to their higher alpha acid content, mild bitterness and mild flavor. Flavoring and aroma hops such as Saaz, Hallertauer or Lublin are good selections for late hop additions but still should be used at very low levels. Most U.S. hop varieties from the Pacific Northwest are inappropriate for a true Baltic porter.

As for yeast selection for a Baltic porter, either ale or lager yeasts can be used. For ale yeasts, clean cold-fermenting European yeasts are most appropriate, such as White Labs strains WLP011 (European Ale) or WLP029 (German Ale/Kölsch) and Wyeast strains 1338 (European Ale) or 2565 (Kölsch). Be sure to ferment these ales on the lower end of the yeast strain's recommended temperature range to limit fruity esters and provide more of a clean, lager-like character. Extended cold storage after fermentation will help provide a lager-like character as well.

For lager yeasts, any strain that accentuates maltiness is a good choice. White Labs strains WLP830 (German Lager) or WLP820 (Oktoberfest Lager) and Wyeast strains 2206 (Bavarian Lager) or 2308 (Munich Lager) are all good choices. Be sure to make a hefty starter and give the cool wort plenty of aeration since this is a big beer fermented at cool temperatures.

The Foam Rangers Try Their Hand at BALTIC PORTER

The Foam Rangers Homebrew Club in Houston, Texas decided that they would see how their homebrewed versions of the style would turn out and wanted to compare them to the imports from overseas. (One brewer was from the Kuykendahl Gran Brewers (KGB), also from Houston.) Each homebrewer was given the BJCP style guidelines and the freedom to choose any ingredients available. No restrictions were given for extract versus all-grain recipes or ale versus lager fermentations.

In all, nine homebrewed examples were made by eight brewers. Six were all-grain recipes while one recipe was partial mash with extract and two recipes were extract with steeping grains. Of the nine beers, only two were fermented with ale yeasts. Of the all-grain batches, Pilsner malt was most often used as the base malt with Munich malt added to most recipes. For the specialty malts, a variety of crystal and caramel malts were added. For the dark malts, the most common combination was chocolate and Carafa. Three brewers opted to add non-traditional ingredients such as molasses, treacle, and even Piloncillo sugar (a dark brown cane sugar from Latin America). Three of these recipes are given on page 28.

Each beer was judged by one Certified and two National BJCP judges: Jimmy Paige, Steve Moore and Sean Lamb. Each judge commented on all aspects of the beer including aroma, appearance, flavor and mouthfeel. Characteristics that made each beer fit or not fit the style were included as well as what suggestions could be made to improve the beer. Jimmy Paige's comments best summed up the homebrews: "All homebrewed beers

were very good with some outstanding that ran the full spectrum of dark malts with alcohol, paralleling the broad range of the commercial examples."

After the judging was complete, the judges and brewers gathered to try each of the homebrewed Baltic porters along with the nine commercial Baltic porters. The homebrewed beers, with the exceptions of a few minor flaws, compared favorably against the commercial Baltic porters. While a few minor flaws held some of the homebrewed beers back, oxidation was the biggest flaw against the commercial Baltic porters.

Many of the homebrewers were surprised by how much the commercial examples varied. For example, the Carnegie Stark Porter (with an OG of 1.056 and an alcohol content of 5.5%) was quite a bit like a robust porter and was lacking in character when compared to some of the stronger Baltic porters from Sinebrychoff (OG 1.068, 7.7% ABV) and Zywiec (9.5% ABV). Also, two examples had a maltiness focused mainly on darker caramel malts with very little chocolate character (Saku and Utenos). A good homebrewed robust porter was tasted as well but its character was quite diminished compared to the stronger homebrewed and commercial Baltic porters. Colby Sheridan remarked that the "thing that really struck me is how bland regular porters were after drinking the Baltic porters."

Mike Heniff is the Grand Wazoo of the Foam Rangers homebrew club. Special thanks go out to all of the homebrewers and judges that helped contribute to this article — Doak Procter, Scott Weitzenhoffer, Colby Sheridan, Ed Moore, Bev Blackwood, Rob Kolacny, Sean Lamb, Steve Moore, Don Sajda and Jimmy Paige. (That's them in the photo on page 28.) Thanks also to Scott Birdwell and his staff at DeFalco's Homebrew Supply for steering many of the homebrewers in the right direction, and to James Heniff for providing an insight to the history of the Baltic region in the 18th and 19th centuries.

by Glenn BurnSilver

Indigenous cultures living high in the Andes and Himalayas have been concocting fermented alcoholic beverages for thousands of years. The Incas brewed above 12,000 feet while brewing activities in Tibet occur well above that. A group of adventurous California brewers produced homebrew on the summit of the highest point in the continental US, Mt. Whitney (at 14,497 feet), using only a camp stove for heat. So why is it that high elevation brewing poses problems for some homebrewers with the advantage of more sophisticated equipment than clay urns and wood fires?

Perhaps the answer lies in a desire to achieve a perfect product, rather than simply enjoying a good beer. For years I have brewed at high elevations, topping out at 9,200 feet in my mountain home, without making a single adjustment to my brewing process. And, while brewing at high elevations can cause some minor problems — the obvious factors being lower boiling temperatures, under utilization of hops and a lack of oxygen — the need to "correct" a batch is a matter of debate.

HOP UTILIZATION: It's all in the boil

Hop under-utilization is the main concern surrounding high elevation brewing. Lower boiling temperatures at elevation can decrease hop alpha acid utilization and beer bitterness can be thrown off. Mark Garetz, author of "Using Hops, the Complete Guide to Hops for the Craft Brewer," has developed a correction factor equation for hops based on elevation, yet he doesn't put a lot of stake in needing adjustments. "My real world advice would be not to worry about it too much. This is still a pretty small difference," Garetz says. "Usually (the brewer) won't be able to tell the bitterness difference."

John Arthur, a high-elevation homebrewer at his 8,000-foot elevation home, and owner of the What's Brewin' brewshop in Boulder, Colorado agrees: "(Bittering differences) can be overcome by increasing the hops, but it's hardly even worth the effort. Even at the top of Mt. Whitney, it is such a minor adjustment that it is not even worth mentioning."

But for those willing to take on even the most minute tweaking, Garetz's adjustment factor is simple:

TF (Temperature Factor) = ((Elevation in feet/550)*0.02)+1

This formula can be used as the multiplier for the amount of bittering hops. In Denver (5,280 feet) the adjustment would be 1.19. For a recipe that normally called for one ounce of hops, a mile-high brewer would instead add 1.19 ounces.

Anthony Carestia, Brewmaster at Frisco, Colorado's Backcountry Brewery, believes the need for hop adjustments can be overcome simply by maintaining a vigorous wort boil. It is his belief that under-utilization occurs because homebrewers might attempt to boil a wort larger than their stove can accommodate. This becomes more noteworthy at higher elevations where boiling points are lower. At sea level, water boils at 212 °F (100 °C), but at 9,097 feet (Backcountry Brewery's elevation) water boils at 195 °F (91 °C). But, just because the water boils at a lower temperature, this doesn't mean satisfactory hop extraction won't take place.

"Our hop utilization is actually really good," Carestia explains. "We have plenty of BTUs for (a steady, rapid) boil and as a result don't have any hop utilization issues. It is true you boil more rapidly (at elevation), but that is not to say you can't maintain higher temperatures. I used to brew at lower elevations and I actually have a better hop utilization here."

Some breweries use pressurized boiling to increase wort temperature. For homebrewers, simply purchasing a 35,000 BTU cooker that runs on propane is an easier way to guarantee a good boil.

"You should always strive to have a strong boil," Carestia states. "If that means reducing the batch size because limited (heating capabilities are) available, that is what you should do."

This means at high elevation, without a big cooker, the only choice might be producing a high-concentration wort in a smaller-size brew kettle. The only downside is that a high concentration wort further reduces hop utilization, already an issue with high elevation brewing. High elevation, high concentration brewers concerned that this extra loss in utilization might be too much overall should consider balancing any loss with larger hop additions.

Cullen Dwyer, head brewer at Blue Corn Cafe and Brewery in Santa Fe, agrees. "A cooler boil will (slightly) lower your kettle alpha acid utilization, so you (could) add a few more hops to achieve the same bitterness you get at lower altitudes," he explains, noting other hop factors come into play that can negate any adjustments. "There are lots of factors that can throw off your predicted bitterness, including age and freshness, length and vigor of boil, and density of the kettle wort. As long as you boil your beer vigorously, your alpha acid utilization should be just fine. Don't worry about the altitude too much."

The Mt. Whitney brewers' goal was a high-altitude brewing world record.

HIGH ELEVATION BREWING

Is there really a difference?

photos by ian mackenzie

HIGH ALTITUDE recipe

High Altitude Pale Ale

Brewed at Blue Corn Café & Brewery
Santa Fe, New Mexico, 7,000 ft.
5 gallons/19 L, extract with grains
OG = 1.056 FG = 1.014
IBU = 38 SRM = 15 ABV = 5.6%

At an O.G. of 1.056 and 38 IBUs, this dark amber pale ale could almost be called an I.P.A. (but not quite). The endemically American flavor and aroma of Centennial hops takes center stage on the palate. A variety of high-quality crystal malts form a complex, caramel backdrop that balances the brew. We ferment this with Wyeast Scottish ale yeast strain 1728. This strain helps bring out complex malty notes, but beware: it produces diacetyl! To avoid butterscotch flavors, pitch healthy yeast, ferment cool, and as fermentation winds down, move your fermenter to a warm spot for a few days for rapid maturation and diacetyl reduction.

If you low-landers should enjoy this beer in Santa Fe, New Mexico, at 7,000 feet, go easy: it's got 5.6% alcohol by volume. Until your red blood cell count has adjusted to the thin air, your alcohol tolerance won't be what you are used to!

Ingredients

3.3 lbs. (1.5 kg) unhopped amber liquid malt extract
3.8 lbs. (1.7 kg) light dried malt extract
8 oz. (0.23 kg) British crystal malt (40 °L)
8 oz. (0.23 kg) British crystal malt (80 °L)
6.4 AAU Centennial hops (75 min) (0.71 oz./20 g of 9% alpha acids)
4.5 AAU Centennial hops (30 min) (0.5 oz./14 g of 9% alpha acids)
0.4 oz. (11 g) Centennial hops (5 min)
0.4 oz. (11 g) Centennial hops (0 min)
Wyeast 1728 (Scottish Ale) yeast (from 1–2 quart/~1–2 L starter)
0.75 cups corn sugar (for priming)

Step by Step

Steep crushed crystal malts at 150 °F (66 °C) for 30–45 minutes. Add malt extract and bring wort to a boil. Boil for 90 minutes, adding hop charges at 75 minutes, 30 minutes, 5 minutes and knockout (when you turn the heat off). Cool, aerate vigorously and pitch yeast. Ferment and bottle with corn sugar.

Hop utilization was calculated to be about one-third that at sea level and even with a boiling temperature of 186 °F (86 °C), a small, two-gallon batch was brewed. This proved to be just the right size as "the boil was pretty vigorous given that we were at 14,500 feet and using one WhisperLite (stove) under a 3.5 gallon kettle," wrote one of the brewers. And, "the resulting beer was deemed quite good."

Lack of oxygen

The further from sea level, the thinner the air we breathe because of the lower oxygen content. Although the proportion of oxygen in the atmosphere always remains constant at 21%, as we go higher the "driving pressure" decreases. The driving pressure depends directly on the barometric pressure, and forces oxygen from the atmosphere into the capillaries of the lungs. Reduced driving pressure results in decreased saturation of oxygen in the blood. Of course, yeast do not breath, they do need oxygen.

The same pressures that affect our breathing at elevation will determine the amount of soluble oxygen available for the yeast. With this in mind, high elevation brewing can potentially increase difficulties for yeast, as oxygen solubility in the wort decreases with elevation gain.

"At sea level, brewers with lax aeration procedures can often skate by with good results, but don't count on it (at elevation)," Dwyer interjects. "Yeast needs oxygen to build cell walls and reproduce before it can properly ferment your beer."

"You would need to oxygenate (the wort) more at higher altitudes. (Oxygenating) more would make a lot of sense," Chris White of White Labs agrees. Choosing suitable yeast, one with lower oxygen demands, may also help. According to White, White Labs California Ale and lager strains would probably perform best at higher elevations while the English strains — English, British, Irish Ale yeasts — tend to have a higher oxygen demand and might not perform as well.

Several methods of aerating the wort at high elevation include bubbling with an oxygen tank, adding an oxygenating stone or just shaking the carboy like hell. And while Carestia believes these methods are also useful, his preference is that a high pitching rate can overcome any altitude related oxygen deficiencies.

Increase the pitching rate

"There is a third less oxygen at this altitude, but it seems to be sufficient," says Carestia. "I wouldn't go out there and get a oxygenating stone or an oxygen tank. In my experience it is not necessary. You can get longer lags and yeast struggling to get through (fermentation), but I don't think aeration is necessarily the issue."

Athletes who train at elevation have more red blood cells than those who train at sea level. But yeast are unable to adapt to low oxygen environments the way the human body does. One way around this is to pitch more yeast. Carestia says, "I think the number one mistake of homebrewers is under pitching the proper amount of yeast." There are several methods for building enough yeast to assure a strong pitching rate, including making a yeast starter and harvesting yeast from prior batches. Even at lower elevations, these techniques can be useful in decreasing lag times and ensuring an active fermentation.

So, brewers (generally) agree there are minor adjustments that can be made and small brewing process changes that will help any batch. Perhaps Arthur sums up the issues of high altitude brewing most succinctly. "High altitude brewing can easily be done," he says, having produced hundreds of high elevation brews utilizing the same methods he would at lower elevations. "Really, there is not much different you need to be addressing. The only real difference is going to be with the hops, and it's not much." Rather, an attention to details – a good boil and a vibrant yeast culture – should be enough to ensure producing a quality homebrew at any elevation.

Glenn BurnSilver lives, and brews, in Colorado — above 9,000 feet.

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IT'S NO SECRET that homebrewers drink a lot of beer, and not all of it is homebrew. Given that homebrewers also enjoy many craft beers and imports, it's not surprising that a popular topic among us is clone brew recipes — homebrew recipes for commercial beers. Clones for literally hundreds of commercial beers are available. On the other hand, there are tens of thousands of commercial beers available. (BeerAdvocate.com has ratings of over 19,600 beers on their site.) And, whereas you can't swing a duck these days without hitting a clone of Sierra Nevada Pale Ale, there are many craft brews and brewpub beers for which no clone recipes are available. So what do you do if nobody has drawn up a clone of your favorite beer? Do it yourself of course! Here's how . . .

By **Chris Colby**

make your **FAVORITE COMMERCIAL BEER** at home

What you'll need

To formulate a clone recipe, you'll want to use some sort of beer recipe calculator. This can be a stand alone program (such as ProMash, BeerSmith or Strangebrew), an online calculator (such as beertools.com or the Recipator at brewery.org) or a spreadsheet like the one at byo.com. If you can calculate original gravity (OG) and color (in SRM) from the amount of malts in the recipe, final gravity (FG) from the attenuation of the yeast, bittering (in IBUs) from the hops added and alcohol (in ABV) from the drop in specific gravity, you'll be on your way.

The second, and most important, thing you'll need to formulate a clone recipe is information — and lots of it. To draw up a decent clone recipe, you'll need the above beer specifications plus information on both the ingredients in the beer and the procedures used to make it. For ingredients, you'll need to know the types and percentage of malts used, the types of hops used and when they are added, the kind of yeast and information on any other ingredients (kettle adjuncts, spices, fruits, etc). On the procedural side, you should find out the details of the mash program, boil times, fermentation temperatures and any unusual processes used.

Where to get the information needed

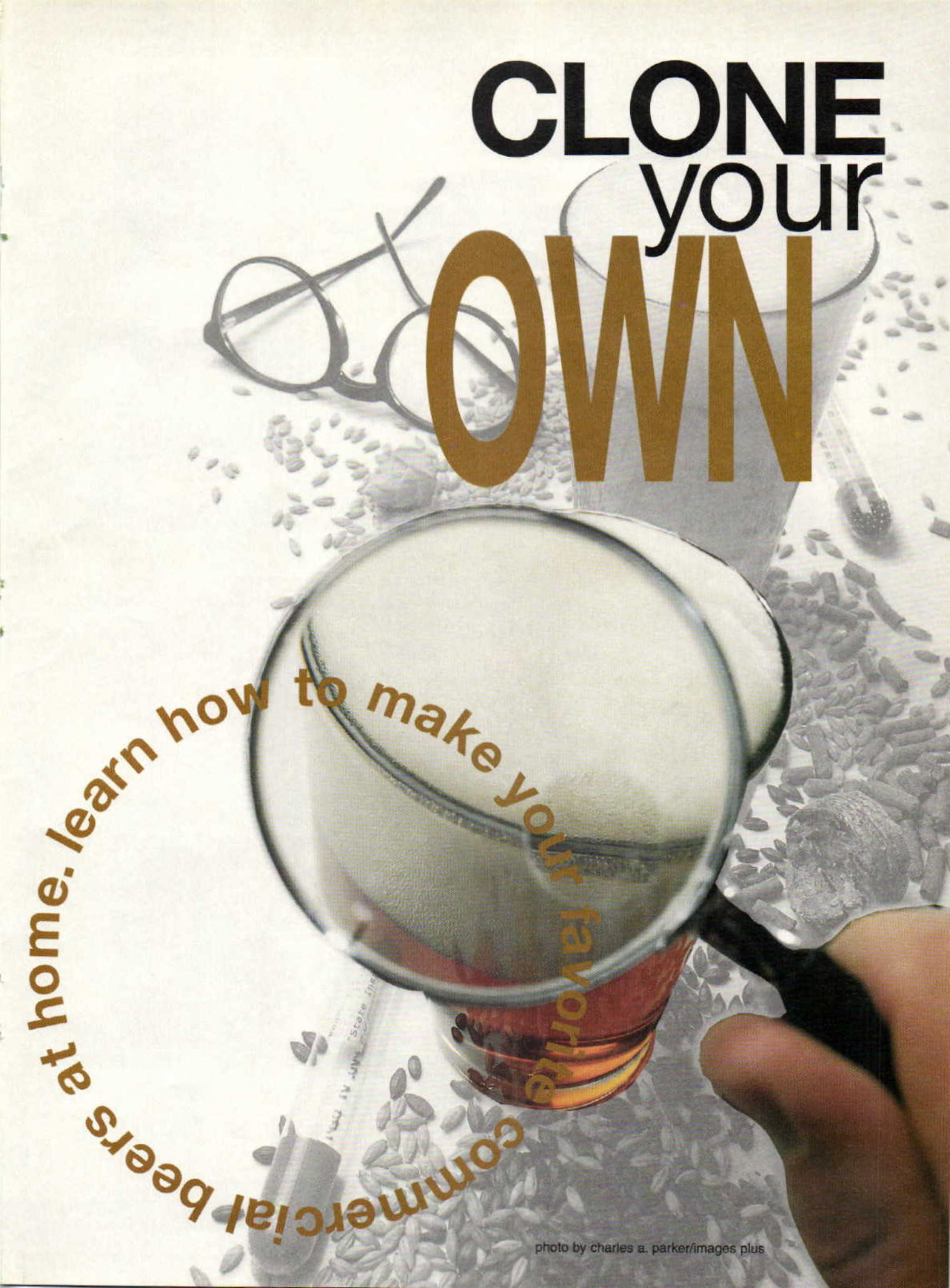
Information on a commercial beer can come from a variety of sources. First and foremost, you may be able to get much or all of the information straight from the brewer. If your local brewpub has a porter you just love, stop by during the day sometime — when the brewer is most likely there — and ask if you can talk to him. Some brewers are reluctant to give out any information about their beers, and others are bound by confidentiality agreements, but many others are happy to "talk shop." Information about a beer may also appear on a brewery's website or on their packaging.

If you can't get any information from the brewer or brewery, you may be able to find at least some information (such as alcohol content, in ABV) at other websites on the Internet. Recipes for similar beers can help you develop a clone recipe. Once you've gathered — or guessed at — all the information you need, you're ready to draw up the first draft of your clone recipe.

In the cloning lab

Once you have all the information assembled, one way to construct a clone is to use a trial and error method of entering ingredient amounts into your brewing calculator until you get the calculated beer statistics right. As an example of how to do this, I'll show you how I cloned a real world beer — Summit Winter Ale — using information found on their website along with my recollections of tasting this beer.

CLONE your OWN



at home, learn how to make your favorite commercial beers at home.

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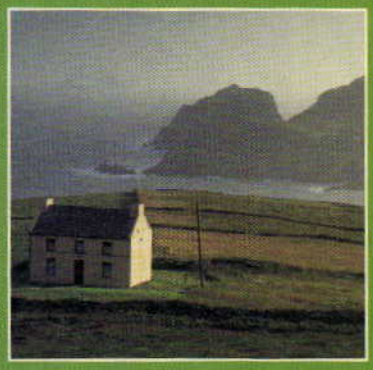
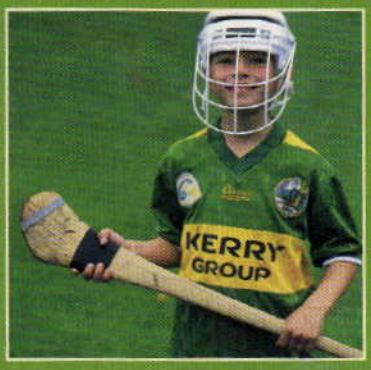
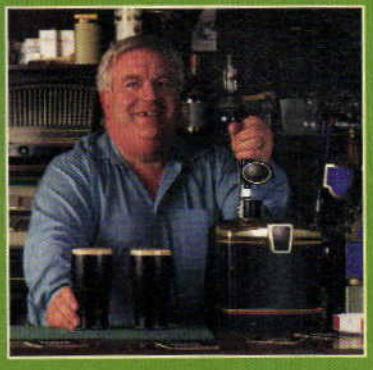






MOUNTMELLICK BEERKITS

THE GENUINE ARTICLE

Strength Start construction of your clone by getting a rough idea of how much malt you'll need to reach the beer's original gravity. To do this, enter various amounts of base malt until you get a number equal to your original gravity estimate. I found out that I would need 12 lbs. (5.4 kg) of 2-row pale malt to hit the website specified OG of 1.058. Extract brewers will use light malt extract as their base malt, but the rest of the process is the same for both extract and all-grain brewers.

What if, however, your only indication of the size of the beer was the alcohol content? Using only the ABV, you can still estimate the starting gravity of a beer. If you know the beer's yeast strain (or can make a reasonable guess), you can use its average attenuation to estimate the original gravity. In your recipe calculator, select the proper yeast type or type in a reasonable number for attenuation. Then fill in amounts of base malt until you reach the correct ABV.

Next, if you know the percentages of the other malts, just multiply the total amount of grain by these percentages and fill them in. For example, if we knew — which we don't — that Summit used 10% caramel malt, we'd know to add about 1.1 lbs. (0.49 kg) of caramel. If you don't have any information on the proportion of the various malts, the color depth of the beer can help you make a reasonable guess.

Color and malt flavor If you don't know the percentage of other malts, start adding the other malts in reasonable amounts into your brewing calculator. (You can use information on how similar beers are brewed as a basis for what a reasonable amount is.) In the case of a beer with one base malt and one specialty malt (both of known color rating), there is only one combination that will yield the right color and gravity for the beer. If there are three or more malts, there are an infinite number of solutions to the puzzle.

Using trial and error, I found that 1.25 lbs. (0.57 kg) of crystal malt (75 °L) and 1.0 oz (28 g) of black patent malt get me to the right color for Summit Winter Ale. How did I decide to use crystal 75? Well, from experience, I knew the amount of black patent malt that would give a nice amount of color, but only a tinge of flavor (as I remember Summit Winter having). From there, I found — by trial and error — that when I used crystal 75, I got a reasonable amount of crystal in the recipe for a beer of this type.

Note that, as you add other malts into your calculations, you will need to decrease the amount of base malt to keep the beer at the correct OG. This can, in turn, change the color of your beer. With multiple malts, this can lead to a lot of fiddling. However, after you've done this a few times, you'll get better at it.

Once your original gravity and color match your initial estimates, take a look at the final gravity (FG) and alcohol content (in ABV). If you're lucky, they might be right on. If not, adjust the amount of attenuation so the FG or ABV is right. In our case, I needed to lower the FG to 1.012 to get the ABV specified on the website.

Sometimes you may enter all of your information into your brewing calculator and the results won't match up with the brewery's information. For example, you may enter the percents and color ratings of the malts they use and end up with a calculated color other than the SRM they claim. Likewise, the alcohol content they claim may not jibe with the drop in specific gravity. From the standpoint of cloning, you need to decide how to deal with this discrepancy. The best way, in my opinion, is to forget about the numbers for a second and formulate a reasonable recipe that will work on your own homebrewery.

Bitterness and hop character Once you have the malt information set, you can begin to calculate the hopping schedule. As wort density affects hop utilization, you need to get at least the original gravity of your beer set before you calculate hop additions.

Type different amounts of hops into the brewing calculator until you hit the target IBU. If you're lucky, the brewer will have specified the amount of IBUs for each addition of hops. If you don't have any information about the timing of the additions, use information from

similar beers as a guide. For the Summit Winter clone, I found I needed 4.5 AAU of bittering hops (boiled for 60 minutes) combined with 3.75 AAU of flavor hops (boiled for 15 minutes) to reach the 20 IBU specified. I guessed that the Willamette hops would be the bittering hops and the more flavorful Fuggles and Tettnanger together would be the flavor hops.

Once the malt and hops have been decided, all that's left is the yeast, water and perhaps the miscellaneous ingredients — the details of which you either have in your possession or not. Add those details to your recipe and you now have the first draft of your clone recipe.

Assessing the clone

Once you've got your clone recipe drawn up, you'll probably wonder how it tastes. The obvious solution is to brew it and find out. However, if you've had to make several assumptions along the way, you may be hesitant to do so, afraid that you will be wasting your time. As you draw up a clone, it's natural to think about all the uncertainties. Once you're done, however, it's good to step back and also think of all you know you got right. Then, examine the consequences for your being wrong. Let's use our presumptive Summit Winter Ale clone as an example.

We know the OG, ABV and color of our clone match from the website information. We also know the malt and hop types are correct. However, I did guess at the color of the crystal malt — and the amount of crystal malt I used was based on that guess. What if I was wrong about that? Different colors of crystal malt are roasted differently and have different flavors, but the different flavors lie along a continuum. Given the color of the beer, the lightest versions of crystal malt can be ruled out. Likewise, the darkest are not that likely as only a small addition would be required. So, if I guessed wrong, the crystal malt flavor might be different than the actual beer, but not so entirely different that the beer tastes completely off.

Likewise, I guessed at the relative contributions and timing of hops. However, this beer doesn't have a ton of hop bitterness or flavor. It's balanced more towards the malty side, as many winter beers are. So, unless I'm ludicrously way off on the hops, this shouldn't produce a huge difference in the flavor of the beer. I think the biggest chance for a difference from the target beer is in my choice of yeast.

Another way of assessing your clone before brewing is to formulate a few different clones making different guesses. For example, what if Summit really uses crystal 90 instead of crystal 75? In that case, I'd need only about 1.0 lb. (0.45 kg) of crystal (and slightly less pale malt than before) to hit the same color and gravity. Sometimes drawing out the differences explicitly will help you make your choices.

Finally, maybe the brewer would give you some more feedback once you've compiled your clone.

In a worst case scenario — one in which you've had to guess at many factors — you should still end up with a beer that is of the correct style, but it may taste distinctly different from your clone target. If your information was very complete — as it was with most of the clones in the winter beer story on page 42 — the success of your clone will rest mostly on your brewing skill and how close the recipe's assumptions match the parameters of your system. (For an outline of the assumptions *BYO* uses, see page 6.) I sent my clone recipe, found on page 49, to Summit Brewing to get some feedback. Brewer Horace Cunningham responded by saying "Your assumptions (regarding) the caramalt color, yeast, and fermentation temp(erature), should give you a very satisfying Winter Ale." Cool.

Just Brew It

Of course, you can only really judge the success of your clone by brewing it. If you do brew the clone, taste your clonebrew alone first and judge it versus your memories of target beer. Next, conduct a side-by-side tasting with the commercial beer. If the clone is significantly flawed, you will notice that the beer doesn't taste right even before the head-to-head comparison. If the clone is fairly good, you'll likely be pleased with the initial tasting. However, in the side-by-side tasting, you will pick up some differences. In the best-case scenario, your clonebrew will taste very similar to the target beer, even in the direct comparison.

Using your tasting comparison, you should be able to tweak the recipe to match the details of your system and move it from a "generic" clone to "system specific" clone for your brewery.

Send in the clones

Do you have a clone recipe you compiled yourself? Send it (along with some details of how you came up with it) to edit@byo.com. We may publish it in our Homebrew Nation department or, if we gather enough recipes, in a clone collection story later next year.

the

The leaves are off the trees and colder temperatures prevail. A change is in the air and thus it is our natural inclination to begin thinking ahead to the holidays and planning something special. As homebrewers, our minds work in a completely different manner from our non-brewing spouses, friends or co-workers. Thoughts of office parties and tropical vacations give way (if they even appeared in the first place) to more practical ideas — those concerning beer. Yes, it is time to stretch the imagination and brew some recipes appropriate to the season — special holiday ales and "winter warmers" that will keep the blood flowing and taste buds tingling throughout the dark days of winter.

"The winter can be a long, dreary period," says Al Marzi, head brewer at Harpoon Brewery in Boston, Massachusetts, where Harpoon Winter Warmer was created. "It's nice to have something to look forward to."

"It is also a good excuse to do something unique and different and interesting," adds Matt Long, head brewer at Big Sky Brewing in Missoula, Montana. "You might not have that excuse any other time of the year. It's a celebratory time and the weather's colder, so you want something a little stronger . . . (it's) the time to kick it up a notch and do something a little different."

Generally speaking, holiday brews are strong beers with a higher alcohol content. All the better to keep you warm. The most commonly produced brews are robust English-style ales that are saddled with higher malt contents — particularly of roasted malts for darker colors, increased body and a heartier feel. "Spicier" hops, such as English varieties like Challenger and Liberty, are commonly used for added zing, but it is not uncommon to find some holiday brews utilizing actual spices, like allspice, ginger, cinnamon, nutmeg or cloves. Some, like Vermont's Magic Hat Brewery, even use fruit in their holiday creations. Yet, no matter what the ingredients used in producing special brews for the winter season, the tradition of festive brews date back more than a thousand years.

Winter beers were usually brewed to celebrate the official end of the harvest season and the winter solstice — the shortest, darkest day of the year. These rituals date as far back as Greek and Roman times and spread across the globe along with their empires. The style of brew varied with locations, available ingredients and pre-Christian rituals already in place. In many regions these "pagan" rituals were celebrated with Wassail, golden ale sweetened with honey or fruit and usually warming spices like spruce, cinnamon or cloves. The root of the word Wassail comes from a common Old English toast, "Waes Hael," which translates as "be thou well." After Christianity began to leave its mark around the world, even monks sequestered monasteries got into the act, creating hearty, heavenly brews for the Christmas season.

Wassail is still made in some European communities, but now takes a backseat to the popularity of strong ale offerings, naturally with as many variations on the theme as there are brewers. In the

by Glenn BurnSilver

PHOTO BY CHARLES A. PARKER/IMAGES PLUS

SANTA clones

WINTER BEER recipes

United States, the mid-20th century utilization of mass-produced beer practically eradicated the concept of seasonal brews. But Fritz Maytag at Anchor Brewing in San Francisco revived that ol' holiday spirit in 1975 with Anchor's first holiday ale. Now, craft breweries everywhere have followed suit and started their own brewing traditions for winter warmers and holiday brews.

"In Germany, you have the doppelbocks and in England the strong ales. In Belgium there are all kinds of different holiday beers," adds Long. "As craft brewers (in America), I think it is now part of (our) tradition because we've been working with all these different styles for years no matter where they originated. We take the style and change it to be more North American."

"A lot of breweries in America have adopted styles that work in North America," agrees Horace Cunningham, brewmaster at Summit Brewing Co. in St. Paul, Minn., where the Winter Ale combines both English and American hops. "It still means a beer that is full-bodied, a darker beer, a warm beer, a flavorful beer."

So, to help you and yours celebrate the season, we've assembled 12 winter beer clones from craft breweries across the US.

Whether the idea is brewing a beer that will keep you warm at night, or simply brewing up some holiday cheer, seasonal beers are now firmly rooted in our culture. Perhaps Dave Fougeron of Saint Arnold Brewing sums it up best. "People (brew seasonal ales) now because it's become tradition to do so, but it is also a season of excess — plentiful food and feasting," Fougeron, Saint Arnold's head brewer says. "People want to make a beer that goes along with that spirit." Indeed!

Avery Old Jubilation Ale clone

(5 gallons/19 L, all-grain)
OG = 1.074 FG = 1.015
IBU = 31 SRM = 25 ABV = 7.6%

"[Old Jubilation has] mocha and toffee flavors, with a hint of hazel nuts. In this day and age, it isn't that big of a beer, but it really holds up nicely." — Adam Avery, Avery Brewing head brewer

Ingredients

13.33 lbs. (6.0 kg) 2-row pale malt
13 oz. (0.37 kg) Briess Special Roast (50 °L)
13 oz. (0.37 kg) Briess Victory malt
1.6 oz. (45 g) Briess 2-row chocolate malt
0.8 oz. (23 g) Briess 2-row black malt
3.2 oz. (91 g) Turbinado sugar
1 tsp. Irish moss (15 mins)
5.3 AAU Bullion hops (60 min) (0.66 oz./19 g of 8% alpha acid)
8 AAU Bullion hops (30 min) (1.0 oz./28 g of 8% alpha acids)
1.0 oz. Bullion hops (0 min)
Wyeast 1028 (London Ale) or White Labs WLP013 (London Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 152 °F (67 °C). Boil the wort for 90 minutes, adding sugar at the beginning of the boil and hops and Irish moss as directed in recipe. Ferment at 70 °F (21 °C).

Avery Old Jubilation Ale clone

(5 gallons/19 L, extract w/ grains)
OG = 1.074 FG = 1.015
IBU = 31 SRM = 25 ABV = 7.6%

Ingredients

2 lbs. 14 oz. (1.3 kg) Briess Light dried malt extract
5 lbs. 2 oz. (2.3 kg) Briess Light liquid malt extract
1.0 lb. (0.45 kg) 2-row pale malt
13 oz. (0.37 kg) Briess Special Roast (50 °L)
13 oz. (0.37 kg) Briess Victory malt
1.6 oz. (45 g) Briess 2-row chocolate malt
0.8 oz. (23 g) Briess 2-row black malt
3.2 oz. (91 g) Turbinado sugar
1 tsp. Irish moss (15 mins)
5.3 AAU Bullion hops (60 min) (0.66 oz./19 g of 8% alpha acid)
8 AAU Bullion hops (30 min) (1.0 oz./28 g of 8% alpha acids)
1.0 oz. Bullion hops (0 min)
Wyeast 1028 (London Ale) or White Labs WLP013 (London Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Begin by heating 2 gallons (7.6 L) of water in your brew pot. While that heats, steep the specialty grains at around 152 °F (67 °C). Do this by heating 1 gallon (3.8 L) of water to 163 °F (73 °C) in a large kitchen pot. Add the crushed grains to a large steeping bag and submerge the bag for 30–45 minutes. At the end of the steep, remove the bag from the steeping pot and let drip dry for a minute or so. Add the "grain tea" to your brewpot and dissolve the dried malt extract and sugar. Bring this wort to a boil, add the first charge of Bullion hops and boil for 60 minutes. Add other ingredients at times indicated in the recipe. With 15 minutes left in the boil, stir in liquid malt extract. (Stir thoroughly to ensure extract dissolves and doesn't sink to the bottom of the kettle and scorch.) After boil, cool wort to 70 °F (21 °C), siphon to fermenter, add water to make 5 gallons (19 L), aerate and pitch yeast. Ferment at 70 °F (21 °C). Bottle with corn sugar.

Thanks to Adam Avery for his Old Jubilation Ale clone recipe.

Harpoon Winter Warmer clone

(5 gallons/19 L. all-grain)
OG = 1.056 FG = 1.014
IBU = 23 SRM = 23 ABV = 5.4%

Ingredients

9.33 lbs. (4.2 kg) 2-row pale malt
2.0 lbs. (0.91 kg) crystal malt (90 °L)
0.50 lb. (0.23 kg) CaraPils malt (15 °L)
1 tsp. Irish moss (15 mins)
6.25 AAU Clusters hops (60 mins) (1.25 oz./35 g of 5% alpha acids)
1/4 tsp. cinnamon
1/8 tsp. nutmeg
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 154 °F (68 °C). Boil wort for 90 minutes adding hops and Irish moss at the time indicated. Ferment at 70 °F (21 °C). Add cinnamon and nutmeg in secondary.

Harpoon Winter Warmer clone

(5 gallons/19 L, extract with grains)
OG = 1.056 FG = 1.014
IBU = 23 SRM = 23 ABV = 5.4%

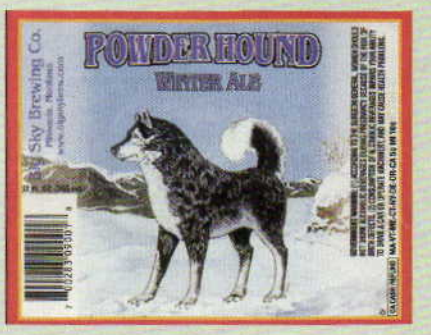
Ingredients

1.66 lbs. (0.75 kg) Coopers Light dried malt extract
4.25 lbs. (1.9 kg) John Bull Light liquid malt extract
0.50 lbs. (0.23 kg) 2-row pale malt
2.0 lbs. (0.91 kg) crystal malt (90 °L)
0.50 lbs. (0.23 kg) CaraPils malt (15 °L)
1 tsp. Irish moss (15 mins)
6.25 AAU Clusters hops (60 mins) (1.25 oz./35 g of 5% alpha acids)
1/4 tsp. cinnamon
1/8 tsp. nutmeg
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Begin by heating 2 gallons (7.6 L) of water in your brewpot. Steep specialty grains for 30–45 minutes at 154 °F (68 °C) in a separate pot. (Use just over 1 gallon (~4 L) of water at 165 °F (74 °C) in a large kitchen pot for steeping water.) After steeping, remove bag and let drip dry for a minute. Then add "grain tea" and dried malt extract to brewpot. Bring to a boil, add hops and boil for 60 minutes. With 15 minutes left in the boil, add Irish moss and liquid malt extract, stirring well to ensure it dissolves completely. After boil, cool wort and siphon to fermenter. Add water to make 5 gallons (19 L), aerate and pitch yeast. Ferment at 70 °C (21 °C). After primary is finished, rack to secondary and add spices.

Thanks to Al Marzi of the Harpoon Brewery for the information used to construct this clone of Harpoon Winter Warmer.



Big Sky Powder Hound clone

(5 gallons/19 L, all-grain)
OG = 1.060 FG = 1.013
IBU = 40 SRM = 22 ABV = 6.1%

"Powder Hound is traditional in style, but as far as a winter beer, it is still something that could be considered a session beer. In keeping it around six percent ABV, it remains much more drinkable." — Matt Long, head brewer at Big Sky Brewing

Ingredients

10.0 lbs. (4.5 kg) 2-row pale malt
2.0 lbs. (0.91 kg) crystal malt (75 °L)
0.63 lbs. (0.29 kg) flaked barley
0.5 oz. (14 g) chocolate malt
1 tsp. Irish moss (15 mins)
7.75 AAU Challenger hops (60 min) (1.1 oz./31 g of 7% alpha acids)
7 AAU Challenger hops (20 min) (1.0 oz./28 g of 7% alpha acids)
3 AAU East Kent Goldings hops (10 min) (0.6 oz./17 g of 5% alpha acids)
1.2 oz. East Kent Goldings hops (0 min)
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 154 °F (68 °F). Boil wort for 70 minutes, adding hops as indicated in recipe. Ferment at 69.5 °F (20.5 °C).

Big Sky Powder Hound clone

(5 gallons/19 L, extract with grains)
OG = 1.060 FG = 1.013
IBU = 40 SRM = 22 ABV = 6.1%

Ingredients

2.5 lbs. (1.1 kg) Muntons Light dried malt extract
4.25 lbs. (1.9 kg) Northwestern Gold

liquid malt extract
2.0 lbs. (0.91 kg) crystal malt (75 °L)
0.5 oz. (14 g) chocolate malt
1 tsp. Irish moss (15 mins)
7.75 AAU Challenger hops (60 min) (1.1 oz./31 g of 7% alpha acids)
7 AAU Challenger hops (20 min) (1.0 oz./28 g of 7% alpha acids)
3 AAU East Kent Goldings hops (10 min) (0.6 oz./17 g of 5% alpha acids)
1.2 oz. East Kent Goldings hops (0 min)
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Begin by heating 2.25 gallons (8.5 L) of water in your brewpot. Steep the specialty grains at 154 °F (68 °F) in 0.75 gallons (2.8 L) of water in a separate pot. After steeping for 30–45 minutes, remove bag and let drip dry. Add "grain tea" and dried malt extract to brewpot and bring to a boil. Add hops and Irish moss as indicated. With 15 minutes left in the boil, stir in liquid malt extract. (Stir thoroughly to avoid scorching.) After boil, cool wort and siphon to fermenter. Add water to make 5 gallons (19 L), aerate and pitch yeast. Ferment at 69.5 °F (20.5 °C).

Thanks to Matt Long of Big Sky Brewery for information and feedback regarding this clone recipe.

Magic Hat Feast of Fools clone

(5 gallons/19 L. all-grain)
OG = 1.060 FG = 1.020
IBU = 29 SRM = 56 ABV = 5.2%

"This beer is more along the style of a sweet stout. There's no milk sugar, but we use one pound of fresh raspberries per gallon!" — Magic Hat head brewer Matt Cohen

Ingredients

9.25 lbs. (4.2 kg) Crisp 2-row pale malt
0.5 lbs. (0.23 kg) CaraPils malt (15 °L)
1.66 lbs. (0.75 kg) crystal malt (70 °L)
0.26 lbs. (0.12 kg) chocolate malt
1.0 lb. (0.45 kg) roasted barley
1.0 fl. oz. (3.5 mL) blackstrap molasses
5.0 lbs. (2.3 kg) fresh raspberries (secondary)
1 tsp. Irish moss (15 mins)
8 AAU Warrior hops (60 mins) (0.5 oz./14 g of 16% alpha acids)
Wyeast 1187 (Ringwood Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 156 °F (69 °C). Boil wort for 90 minutes adding all hops after 30 minutes. Add Irish moss and molasses with 15 minutes left in boil. Ferment at 70 °F (21 °C) for 7 days. Add raspberries in secondary.

Magic Hat Feast of Fools clone

(5 gallons/19 L, extract with grains)
OG = 1.060 FG = 1.020
IBU = 29 SRM = 56 ABV = 5.2%

Ingredients

1 lb. 14 oz. (0.85 kg) Muntons Light dried malt extract
4.0 lbs. (1.8 kg) Coopers Light liquid malt extract
0.5 lbs. (0.23 kg) 2-row pale malt
0.5 lbs. (0.23 kg) CaraPils malt (15 °L)
1.66 lbs. (0.75 kg) crystal malt (70 °L)
0.26 lbs. (0.12 kg) chocolate malt
1.0 lb. (0.45 kg) roasted barley
1.0 fl. oz. (3.5 mL) blackstrap molasses (15 min)
5 lbs. (2.3 kg) fresh raspberries (secondary)
1 tsp. Irish moss (15 mins)
8 AAU Warrior hops (60 mins) (0.5 oz./14 g of 16% alpha acids)
Wyeast 1187 (Ringwood Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Place crushed specialty grains in large grain bag and steep at 156 °F (69 °C) in 1.5 gallons (5.7 L) of water in your brewpot. Steep for 30–45 minutes. After steep, remove grain bag and let drip dry. Add dried malt extract and 1.5 gallons (5.7 L) of water to brewpot and bring to a boil. (To save time, you can heat the additional water during the steep in a separate pot.) Add hops at beginning of boil. Stir in molasses, Irish moss and liquid malt extract with 15 minutes left in the boil. After boil, cool wort and siphon to fermenter. Add water to make 5 gallons (19 L), aerate and pitch yeast. Ferment at 70 °F (21 °C) then rack to secondary and add raspberries.

Thanks to Matt Cohen for providing all the details necessary to formulate this Feast of Fools clone.

Cottonwood Frostbite clone

(5 gallons/19 L, all-grain)
OG = 1.050 FG = 1.014
IBU = 64 SRM = 27 ABV = 4.6%

"It is a hoppier beer, (but) is very drinkable and heavier for the season." — head brewer Nikki Koontz

Ingredients

6.6 lbs. (3.0 kg) 2-row pale malt
1.1 lbs. (0.50 kg) Munich malt (10 °L)
1.0 lbs. (0.45 kg) crystal malt (35 °L)
2.1 lbs. (0.95 kg) crystal malt (75 °L)
1 tsp. Irish moss (15 mins)
4.95 AAU Centennial hops (90 min) (0.55 oz./16 g of 9% alpha acids)
12.65 AAU Centennial hops (45 min) (1.4 oz./40 g of 9% alpha acids)
1.0 oz. Columbus hops (0 min)
0.75 oz. Centennial hops (dry hop)
Wyeast 1084 (Irish Ale) or White Labs WLP004 (Irish Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 156 °F (69 °C). Boil wort for 90 minutes adding hops as indicated in the ingredient list. Ferment at 70 °F (21 °C).

Cottonwood Frostbite clone

(5 gallons/19 L, extract with grains)

OG = 1.050 FG = 1.014
IBU = 64 SRM = 27 ABV = 4.6%

Ingredients

0.5 lbs. (0.23 kg) Briess Light dried malt extract
3.5 lbs. (1.6 kg) Alexander's Pale liquid malt extract
0.75 lbs. (0.34 kg) 2-row pale malt
1.1 lbs. (0.50 kg) Munich malt (10 °L)
1.0 lbs. (0.45 kg) crystal malt (35 °L)
2.1 lbs. (0.95 kg) crystal malt (75 °L)
1 tsp. Irish moss (15 mins)
6 AAU Centennial hops (60 min) (0.66 oz./19 g of 9% alpha acids)
12.65 AAU Centennial hops (45 min) (1.4 oz./40 g of 9% alpha acids)
1.0 oz. Columbus hops (0 min)
0.75 oz. Centennial hops (dry hop)
Wyeast 1084 (Irish Ale) or White Labs WLP004 (Irish Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

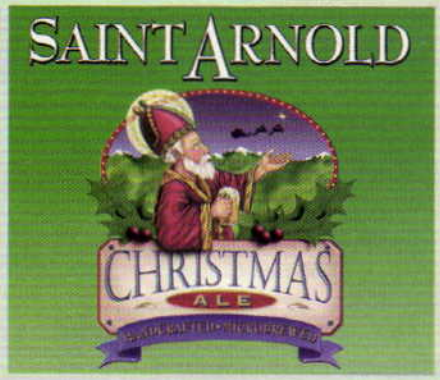
In your brewpot, heat 1.85 gallons (7.0 L) to 167 °F (75 °C). Place crushed grains in a large steeping bag and submerge in water. Steep at 156 °F (69 °C) for 30–45 minutes. After steep, remove grain bag and let drip dry. Add dried malt extract and 1.15 gallons (4.4 L) of water to brewpot and bring to a boil. (You can be heating this mixture while the grains steep, if you have an extra pot.) Boil for 60 minutes, adding hops at 60 and 45 minutes left in the boil. With 15 minutes left in the boil, stir in the Irish moss and liquid malt extract. (Stir well to dissolve extract completely and avoid scorching.) After boil, cool wort and siphon to fermenter. Add water to make 5 gallons (19 L) of wort, aerate and pitch yeast. Ferment at 70 °F (21 °C).

Thanks to Nikki Koontz, head brewer at Carolina Beer and Beverage Co. for the information used to make this clone recipe.

Saint Arnold Christmas Ale

(5 gallons/19 L, all-grain)
OG = 1.066 FG = 1.013
IBU = 22 SRM = 22 ABV = 6.8%

"There are no spices in (the Christmas Ale) at all, but I would have sworn there was before I started working here." — Saint Arnold Brewing brewmaster, Dave Fougeron



Ingredients

11 lbs. (5.0 kg) 2-row pale malt
13 oz. (0.37 kg) Munich malt
7 oz. (0.20 kg) CaraMunich malt (40 °L)
7 oz. (0.20 kg) Special B malt
1 lb. 3 oz. (0.54 kg) CaraVienne malt (20 °L)
1 tsp. Irish moss (15 mins)
10.8 AAU Perle hops (30 min) (1.5 oz./43 g of 7.2% alpha acids)
3 oz. (85 g) Liberty hops (0 min)
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Single step infusion mash at 150 °F (66 °C). Boil wort for 90 minutes, adding hops as indicated at 30 minutes. Ferment at 72° F (22 °C) "to get those nice, fruity esters."

Saint Arnold Christmas Ale

(5 gallons/19 L, extract with grains)
OG = 1.066 FG = 1.013
IBU = 22 SRM = 23 ABV = 6.8%

1.75 lbs. (0.79 kg) Muntons Light dried malt extract
5.0 lbs. (2.3 kg) Weyermann Bavarian Pilsner liquid malt extract
1.0 lb. (0,45 kg) 2-row pale malt
13 oz. (0.37 kg) Munich malt
7 oz. (0.20 kg) CaraMunich malt (40 °L)
7 oz. (0.20 kg) Special B malt
1 lbs. 3 oz. (0.54 kg) CaraVienne malt (20 °L)
1 tsp. Irish moss (15 mins)
10.8 AAU Perle hops (30 min) (1.5 oz./43 g of 7.2% alpha acids)
3 oz. (85 g) Liberty hops (0 min)
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

In your brewpot, heat 1.45 gallons (5.5 L) of water to 161 °F (72 °C). Place crushed grains in large steeping bag and submerge in water. Steep for 30–45 minutes at 150 °F (66 °C). After steep, remove bag and let drip dry. Add 1.55 gallons (5.9 L) of water and dried malt extract to brewpot and heat to a boil. (Note: To save time, you can bring the the water and extract up to temperature in a separate pot while steeping.) Add Perle hops with 30 minutes remaining in the boil. With 15 minutes remaining, stir in liquid malt extract. (Stir until extract dissolves completely to avoid scorching.) After boil, cool wort and add to fermenter. Top up to 5 gallons (19 L) with water, aerate and pitch yeast. Ferment at 72° F (22 °C).

Thanks to Dave Fougeron of Saint Arnold Brewing for providing the information used in formulating this Christmas Ale clone.

Breckenridge Christmas Ale clone

(5 gallons/19 L, all-grain)
OG = 1.078 FG = 1.020
IBU = 22 SRM = 21 ABV = 7.4%

"[Breckenridge Christmas Ale] is up there in alcohol too, so you get some nice warming characteristics from it as well." — Breckenridge Brewery head brewer Todd Usry

Ingredients

14.66 lbs. (6.6 kg) 2-row pale malt
1.5 lbs. (0.68 kg) crystal malt (60 °L)
1.0 oz. (28 g) chocolate malt
0.5 oz. (14 g) black patent malt
1 tsp. Irish moss (15 mins)
6.1 AAU Chinook hops (60 min)
(0.51 oz./14 g of 12% alpha acids)
3.8 AAU Mt. Hood hops (15 min)
(0.76 oz./22 g of 5% alpha acids)
Wyeast 1272 (American Ale II) or
White Labs (California V) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 152 °F (67 °C) for 45 minutes. Boil wort for 90 minutes. Ferment at 70 °F (21 °C).

Breckenridge Christmas Ale clone

(5 gallons/19 L, extract with grains)
OG = 1.078 FG = 1.020
IBU = 22 SRM = 21 ABV = 7.4%

Ingredients

4.0 lbs. (1.8 kg) Breiss Light
dried malt extract
5.25 lbs. (2.4 kg) Alexander's Pale
liquid malt extract
1.5 lbs. (0.68 kg) crystal malt (60 °L)
1.0 oz. (28 g) chocolate malt
0.5 oz. (14 g) black patent malt
1 tsp. Irish moss (15 mins)
6.1 AAU Chinook hops (60 min)
(0.51 oz./14 g of 12% alpha acids)
3.8 AAU Mt. Hood hops (15 min)
(0.76 oz./22 g of 5% alpha acids)
Wyeast 1272 (American Ale II) or
White Labs (California V) yeast
0.75 cups corn sugar (for priming)

Step by Step

Begin by heating 2.5 gallons (9.4 L) of water in your brewpot. In a separate pot, heat 0.50 gallons (1.9 L) of water to 161 °F (71 °C). Place crushed grains in a stepping bag and submerge in water, steeping at 150 °F (66 °C) for 30–45 minutes. After steep, remove grain bag and let drip dry. Add "grain tea" and dried malt extract to your brewing pot and bring to a boil. Boil for 60 minutes, adding hops at the times specified. With 15 minutes left in the boil, stir in Irish moss and liquid malt extract. (Stir constantly until extract is completely dissolved.) After boil, cool wort and siphon to fermenter. Add water to make 5 gallons (19 L), aerate and pitch yeast. Ferment at 70 °F (21 °C).

Thanks to Todd Usry, Breckenridge Brewery head brewer for his contributions to this Christmas Ale clone recipe.

Full Sail Wassail clone

(5 gallons/19 L, all-grain)
OG = 1.070 FG = 1.014
IBU = 55 SRM = 29 ABV = 7.3%

Ingredients

13.75 lbs. (6.2 kg) 2-row pale malt
9 oz. (0.27 kg) crystal malt (60 °L)
2 oz. (56 g) crystal malt (120 °L)
2 oz. (56 g) chocolate malt
1 oz. (28 g) roasted barley
1 oz. (28 g) black patent malt
1 tsp. Irish moss (15 mins)
2.5 AAU Northern Brewer
hops (75 min)
(0.36 oz./10 g of 7% alpha acids)
2.5 AAU Styrian Goldings
hops (75 min)
(0.5 oz./14 g of 5% alpha acids)
3.75 AAU Hallertau Hersbrücker
hops (15 min)
(1.1 oz./30 g of 3.5% alpha acids)
3.75 AAU Styrian Goldings
hops (15 min)
(0.75 oz./21 g of 5% alpha acids)
7.5 AAU Hallertau Hersbrücker
hops (0 min)
(2.1 oz./61 g of 3.5% alpha acids)
7.5 AAU Styrian Goldings
hops (0 min)
(1.5 oz./43 g of 5% alpha acids)
Wyeast 1968 (London ESB) or White
Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 150 °F (66 °C) for 30 minutes in soft water with $CaSO_4$ and $CaCl_2$ added. Boil wort for 90 minutes, adding hops and Irish moss as directed in recipe. Let wort sit for 15 minutes before cooling. Ferment at 68 °F (20 °C).

Full Sail Wassail clone

(5 gallons/19 L, extract with grains)
OG = 1.070 FG = 1.014
IBU = 55 SRM = 29 ABV = 7.3%

Ingredients

3.25 lbs. (1.5 kg) Muntons Light
dried malt extract
5.0 lbs. (2.3 kg) Coopers Light liquid
malt extract
0.75 lbs. (0.34 kg) 2-row pale malt
9.0 oz. (0.27 kg) crystal malt (60 °L)
2.0 oz. (57 g) crystal malt (120 °L)
2.0 oz. (57 g) chocolate malt
1.0 oz. (28 g) roasted barley
1.0 oz. (28 g) black patent malt
1 tsp. Irish moss (15 mins)
2.75 AAU Northern Brewer
hops (60 min)
(0.39 oz./11 g of 7% alpha acids)
2.75 AAU Styrian Goldings
hops (60 min)
(0.55 oz./16 g of 5% alpha acids)
3.75 AAU Hallertau Hersbrücker
hops (15 min)
(1.1 oz./30 g of 3.5% alpha acids)
3.75 AAU Styrian Goldings
hops (15 min)
(0.75 oz./21 g of 5% alpha acids)
7.5 AAU Hallertau Hersbrücker
hops (0 min)
(2.1 oz./61 g of 3.5% alpha acids)
7.5 AAU Styrian Goldings
hops (0 min)
(1.5 oz./43 g of 5% alpha acids)
Wyeast 1968 (London ESB) or White
Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Begin by heating 2.33 gallons (8.8 L) of water in your brewpot. In a separate pot, heat 0.66 gallons (2.5 L)

of water to 161 °F (72 °C). Place the crushed grains in a steeping bag and submerge in this water. Steep for 30–45 minutes at 150 °F (66 °C). After steeping, remove the grain bag and let drip dry. Add "grain tea" and dried malt extract to brewpot and heat to a boil. Boil for 60 minutes, adding hops at times indicated. With 15 minutes left in the boil, stir in Irish moss and liquid malt extract. (Be sure to stir until extract is completely dissolved, or else extract may scorch.) After boil, let wort sit for 15 minutes before cooling. Then, cool wort and siphon to fermenter. Top up to 5 gallons (19 L), aerate and pitch yeast. Ferment at 68 °F (20 °C)

Thanks to James Emmerson for information on the 2002 formulation of Full Sail Wassail.

Widmer SnowPlow clone

(5 gallons/19 L, all-grain)
OG = 1.068 FG = 1.028
IBU = 27 SRM = 62 ABV = 5.2%

Ingredients

4.5 lbs. (2.0 kg) 2-row pale malt
2.0 lbs. (0.91 kg) wheat malt
1.0 lbs. (0.45 kg) flaked oats
2.1 lbs. (0.95 kg) CaraPils malt (6 °L)
2.1 lbs. (0.95 kg) crystal malt (60 °L)
13 oz. (0.37 kg) roasted barley
6.5 oz. (0.18 g) black patent malt
1.0 lb. (0.45 kg) lactose
1 tsp. Irish moss (15 mins)
7.25 AAU Magnum hops (60 min)
(0.52 oz./15 g of 14% alpha acids)
2.5 AAU Willamette hops (15 min)
(0.5 oz./14 g of 5% alpha acids)
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mill dark grains finely. Mash at 156 °F (69 °C). Boil for 90 minutes, adding hops, Irish moss and lactose for the final 15 minutes of the boil. Ferment at 68 °F (20 °C).

Widmer SnowPlow clone

(5 gallons/19 L, extract with grains)
OG = 1.068 FG = 1.028
IBU = 27 SRM = 58+ ABV = 5.2%

Ingredients

2 oz. (57 g) Muntons Light dried malt extract
4.66 lbs. (2.1 kg) John Bull Amber liquid malt extract
1.5 lbs. (0.68 kg) wheat malt
1.0 lbs. (0.45 kg) flaked oats
1.0 lbs. (0.45 kg) CaraPils malt (6 °L)
1.0 lbs. (0.45 kg) crystal malt (60 °L)
13 oz. (0.37 kg) roasted barley
6.5 oz. (0.18 g) black patent malt
1.0 lb. (0.45 kg) lactose
1 tsp. Irish moss (15 mins)
7.25 AAU Magnum hops (60 min)
(0.52 oz./15 g of 14% alpha acids)
2.5 AAU Willamette hops (15 min)
(0.5 oz./14 g of 5% alpha acids)
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Begin by heating 2.1 gallons (8.1 L) of water to 167 °F (75 °C) in your brewpot. Place the crushed grains in a large grain steeping bag and submerge them in this water. Steep grains at 156 °F (69 °C) for 30–45 minutes. After steep, remove grain bag and let drip dry. Add dried malt extract and 0.9 gallons (3.4 L) of water to brewpot and bring to a boil. (Note: You can be heating this mixture while you are steeping.) Boil for 60 minutes, adding hops and Irish moss at times indicated. With 15 minutes left in the boil, add liquid malt extract — stirring well so extract dissolves completely. After boil, cool wort and siphon to fermenter. Top up with water to 5 gallons (19 L), aerate and pitch yeast. Ferment at 68 °F (20 °C).

Thanks to Joe Casey of Widmer Brothers Brewing for information and feedback regarding this clone.

Pyramid Snowcap Ale clone

(5 gallons/19 L, all-grain)
OG = 1.071 FG = 1.017
IBU = 30 SRM = 28 ABV = 7.0%

Ingredients

13.5 lbs. (6.1 kg) 2-row pale malt
1.0 lb. (0.45 kg) crystal malt (80 °L)
0.33 lbs. (0.15 kg) chocolate malt
1 tsp. Irish moss (15 mins)
6 AAU Willamette hops (60 min)
(1.2 oz./34 g of 5% alpha acids)
5 AAU Willamette hops (30 min)
(1.0 oz./28 g of 5% alpha acids)
1 oz. East Kent Golding hops (2 min)
Wyeast 1338 (European ale) or Coopers ale yeast
1 cup dried malt extract (for priming)

Step by Step

Mash at 154 °F (68 °C). Boil for 90 minutes. Ferment at 70 °F (21 °C).

Pyramid Snowcap Ale clone

(5 gallons/19 L, extract with grains)
OG = 1.071 FG = 1.017
IBU = 30 SRM = 28 ABV = 7.0%

Ingredients

3.5 lbs. (1.5 kg) Coopers Light dried malt extract
5 lbs. 2 oz. (2.3 kg) Coopers Light liquid malt extract
1.0 lb. (0.45 kg) crystal malt (80° L)
0.33 lbs. (0.15 kg) chocolate malt
1 tsp. Irish moss (15 mins)
6 AAU Willamette hops (60 min)
(1.2 oz./34 g of 5% alpha acids)
5 AAU Willamette hops (30 min)
(1.0 oz./28 g of 5% alpha acids)
1 oz. East Kent Golding hops (2 min)
Wyeast 1338 (European ale) or Coopers ale yeast
1 cup dried malt extract (for priming)

Step by Step:

Begin by heating 2.5 gallons (9.4 L) of water in your brewpot. In a separate pot, heat 0.50 gallons (1.8 L) of water to 166 °F (74 °C). Add crushed grains to grain bag and submerge in this water. Steep grains at 155 °F (68 °C) for 30–45 minutes. Add "grain tea" and dried malt extract to brewpot and bring to a boil. Boil for 60 minutes, adding hops when indicated. Add Irish moss and liquid malt extract with 15 minutes left in boil. Cool wort and siphon to fermenter. Add water to make 5 gallons (19 L), aerate and pitch yeast. Ferment at 68 °F (20 °C).

Clone tweaked from a recipe that appeared in the July 1998 issue of Brew Your Own.

Summit Winter Ale clone

(5 gallons/19 L, all-grain)
OG = 1.058 FG = 1.012
IBU = 20 SRM = 21 ABV = 5.9%

Ingredients

10 lbs. 14 oz. (4.9 kg) 2-row pale malt
1.25 lb. (0.57 kg) crystal malt (75 °L)
1.0 oz. (28 g) black patent malt
1 tsp. Irish moss (15 mins)
4.5 AAU Willamette hops (60 min)
(0.9 oz./26 g of 5% alpha acids)
1.75 AAU Fuggles hops (15 min)
(0.35 oz./10 g of 5% alpha acids)
2 AAU Tettnanger hops (15 min)
(0.5 oz./14 g of 4% alpha acids)
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Mash at 153 °F (67 °C). Boil for 90 minutes. Ferment at 72 °F (22 °C).

Summit Winter Ale clone

(5 gallons/19 L, extract with grains)
OG = 1.058 FG = 1.012
IBU = 20 SRM = 21 ABV = 5.9%

Ingredients

2.66 lbs. (1.2 kg) Northwestern Gold dried malt extract
4.33 lbs. (2.0 kg) Northwestern Gold liquid malt extract
1.25 lb. (0.57 kg) crystal malt (75 °L)
1.0 oz. (28 g) black patent malt
1 tsp. Irish moss (15 mins)
4.5 AAU Willamette hops (60 min)
(0.9 oz./26 g of 5% alpha acids)
1.75 AAU Fuggles hops (15 min)
(0.35 oz./10 g of 5% alpha acids)
2 AAU Tettnanger hops (15 min)
(0.5 oz./14 g of 4% alpha acids)
Wyeast 1968 (London ESB) or White Labs WLP002 (English Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Begin by heating 2.5 gallons (9.4 L) of water in your brewpot. In a separate smaller pot, heat 0.50 gallons (1.9 L) of water to 164 °F (73 °C). Add crushed grains to a steeping bag and steep at 153 °F (67 °C) for 30–45 minutes in smaller pot. Add "grain tea" and dried malt extract to brewpot and bring to a boil. Boil for 60 minutes, adding hops when indicated. Add irish moss and liquid malt extract with 15 minutes left in boil. Cool wort and siphon to fermenter. Add water to make 5 gallons (19 L), aerate and pitch yeast. Ferment at 68 °F (20 °C).

See story "Clone Your Own" on page 36 for details of how this Summit Winter Ale clone was formulated.

Redhook Winterhook clone

(5 gallons/19 L, extract with grains)
OG = 1.056 FG = 1.018
IBU = 28 SRM = 16 ABV = 4.9%

Ingredients

1.5 lbs. (0.68 kg) Briess Light dried malt extract
4.0 lbs. (1.8 kg) Briess Light liquid malt extract
1.0 lb. (0.45 kg) 2-row pale malt
1.5 lbs. (0.68 kg) Carastan malt (34 °L)
0.75 lbs. (0.34 kg) CaraVienne malt (21 °L)
0.25 lbs. (0.11 kg) CaraPils malt (6 °L)
1 tsp. Irish moss (15 mins)
7 AAU Willamette hops (60 mins)
(1.4 oz./40 g of 5% alpha acids)
2.5 AAU Willamette hops (10 mins)
(0.5 oz./14 g of 5% alpha acids)
1 oz. Tettnanger hops (2 mins)
Wyeast 1335 (British Ale II) or White Labs WLP023 (Burton Ale) yeast
0.75 cups corn sugar (for priming)

Step by Step

Begin by heating in 1.3 gallons (5 L) of water to 169 °F (76 °C) in your brewpot. Place your crushed grains in a large steeping bag and and steep at 158 °F (67 °C) for 30–45 minutes. Add water and dried malt extract to make 3.0 gallons (11 L) of wort. Boil for 60 minutes, adding hops when indicated. Add liquid malt extract with 15 minutes left in boil. Cool wort and siphon to fermenter. Add water to make 5 gallons (19 L), aerate and pitch yeast. Ferment at 68 °F (20 °C).

Updated from a January-February 2001–2002 Replicator recipe by Steve Bader.

Samichlaus clone

For clone recipes and information on how to brew, see "SamiClones" on page 50 of this issue.

Winter Brew **TIPS**

Most of these beers are moderately big, malty brews. One of the biggest keys to success in brewing them is to pitch an adequate amount of yeast. We highly recommend that you make a 1 or 2 quart (~1 or 2 L) yeast starter. To do this, boil 2.6 or 5.3 ounces (74 or 150 g) of dried malt extract in 1 or 2 quarts (~1 or 2 L) of water. (This will yield a wort with a specific gravity of around 1.030.) Cool this wort and transfer it to a clean, well-sanitized container. (Gallon jugs and brewpub growlers work well.) Aerate the starter by closing the container and shaking it vigorously, or by injecting sterile filtered air or oxygen. Pitch your yeast to the starter, affix an airlock and let the starter ferment at 70–80 °F (21–27 °C) for 2–3 days. On brewing day, pour off most of the liquid, swirl the yeast around and pitch it to your cooled, aerated wort.

Many of these recipes call for more specialty grains than a typical homebrew recipe. If you are an extract brewer, make sure you have a steeping bag large enough to hold all the grains. When steeping the grains, poke around at the steeping bag with your brewing spoon to ensure the water and grain mix thoroughly. Under some conditions, dry "chunks" of grain can hang together and the inside of these chunks do not get exposed to liquid. Swirl the bag around every 5 minutes or so and check the temperature every 10 minutes. Add heat in 30 second bursts to keep the temperature within about 5 °F (~2.5 °C) of your target.

Some of the extract recipes include 2-row pale malt or other base grains. In these recipes, carefully follow the instructions regarding the volume of steeping water as these are actually small partial mashes.

If you are steeping over two pounds (0.91 kg) of grain, you may wish to rinse the grains after the steep. If you do so, use an amount of water equal to about 1/3 the volume of water that you used for the steep and keep the temperature of the rinse water under 170 °F (77 °C).

SAMICHLAUS CLONES

Among the most famous of holiday beers is Samichlaus, which at around 14 percent alcohol by volume, also can claim to be one of the world's strongest lagers. Every year until 1996, it was brewed only on December 6 — the feast day of St. Nicholas, when presents are exchanged in some European countries. After long fermentation and lagering for almost a year, the beer was released for consumption the following December 6th. For a while after the 1996 batch was brewed, it appeared that the Grinch had stolen Samichlaus and it would be no longer. However, in 1999, the beer was brewed again.

Austria's Castle Brewery Eggenberg, which worked in conjunction with the Hurlimann brewers, revived the beer after Hurlimann gave it up as not being profitable enough.

Samichlaus is an extremely strong lager, with a malty, but not cloying, sweetness and caramel notes. The body is very full, but not quite as syrupy as the original gravity (reputed to be 32 °Plato or 1.140, although some of the brewery's literature gives it as 28.5 °Plato) and final gravity (4.0 °Plato or 1.016, from a hydrometer reading) might indicate. The 30 IBUs of hop bitterness are really only enough to balance the pronounced malt flavor. The color is 18–20 SRM, a deep amber — perhaps largely because of a long (120-minute) boil. The finish is relatively smooth, the result of long lagering at cold temperatures, with a lingering — almost brandy-like — warmth from the high alcohol content.

Challenges

Brewing a Samichlaus clone presents a number of challenges to the homebrewer. The first is the high original gravity, which requires a considerable amount of grain or malt extract. All-grain brewers need to ensure they have the mash tun capacity for mashing such a large amount of grain, up to 25 lbs. (11.3 kg) for a 5 gallon (19 L) batch. For this you'll likely need at least 12.5 gallons (47 L) of mash tun space. It's worth considering a mash with a smaller volume of grain and augmenting it with dried malt extract in the kettle. High gravity mashes result in lower efficiency, so keeping some extract on hand if necessary to achieve the target gravity is a very good idea. The Eggenberg brewery uses runnings from one mash as mash water for the main Samichlaus mash.

High fermentability is an important goal for this beer. Otherwise the final gravity will be too high, resulting in a cloying sweetness that is out of character. The mash should be conducted so as to favor both the alpha and beta enzymes that convert the starches to simple, easily fermentable sugars. A popular step mash is the one advocated by the late homebrewer and author Dr. George Fix, with rests at 40, 50, 60 and 70 °C (104, 122, 140 and 158 °F). Another possibility is a decoction mash. If you use a single infusion mash, convert at a relatively low temperature of about 149–150 °F (65 °C).

Extract brewers should not feel as if they have coal in their holiday stockings. A worthy extract version of Samichlaus can be brewed. The choice of malt extract is important. The recipe is generally believed to have a portion of Vienna malt to increase the malty flavor. Extracts made with Vienna malt are difficult to find, but there are extracts available that contain Munich malt, which is similar to Vienna. The base extract should be light or extra light in color, with relatively high fermentability.

For all-grain brewers, an extended boil is necessary to concentrate the wort unless you stop collecting at a relatively high gravity and spike the wort with malt extract. A

BREWING A MASSIVE CHRISTMAS LAGER

Samichlaus clone

(5 gallon/19 L, all-grain)
OG = 1.139 FG = 1.034
IBU = 28 SRM = 15
ABV = 14.2%

Ingredients

21 lbs. (9.5 kg) Pilsner malt (2 °L)
2.0 lbs. (0.91 kg) Vienna malt (3 °L)
1.5 lbs. (0.68 kg) Carahell dark malt (65 °L)
2.0 lbs. (0.91 kg) cane sugar
12.75 AAU Northern Brewer hops (1.5 oz./43 g of 8.5% alpha acids) (60 min)
2.25 AAU Tettnang hops (0.5 oz./14 g of 4.5 % alpha acids) (15 min)
0.50 oz. (14 g) Hallertauer Mittelfrüh hops (2 min)
1 tsp. Irish moss (15 min)
White Labs WLP885 (Zurich Lager) yeast
(2.5 gallon/9.4 L starter or yeast cake from previous batch)
Champagne yeast (optional)
2.8 oz. (80 g) corn sugar (for priming)

Step by Step

Mash in with 8.3 gallons (31 L) of water (or runnings from another mash). Step mash with rests at 104 °F (40 °C), 122 °F (50 °C), 140 °F (60 °C) and 158 °F (70 °C) or single infusion mash at 148 °F (64 °C). Collect enough wort for a 120 minute boil. (Take pre-boil gravity and add malt extract if needed to hit target gravity.) Boil wort for 120 minutes and add hops as indicated in recipe. Cool wort, aerate thoroughly and pitch yeast from starter. Ferment at 52 °F (11 °C). When fermentation slows, rack to secondary, add fresh yeast and raise temperature to 60 °F (16 °C). Lager at 38 °F (3.3 °C). Bottle or keg, shooting for 2.20 volumes CO_2. If bottling, add fresh yeast to bottling bucket.

Samichlaus clone

(5 gallon/19 L, extract with grains)
OG = 1.140 FG = 1.034
IBU = 28 SRM = 17
ABV = 14.3%

Ingredients

10.0 lbs. (4.5 kg) Muntons extra light dried malt extract
3.0 lbs. (1.4 kg) Alexander's Munich liquid malt extract (12 °L)
1.5 lbs. (0.68 kg) Carahell dark malt (65 °L)
2.0 lbs. (0.91 kg) cane sugar
12.75 AAU Northern Brewer hops (1.5 oz./43 g of 8.5% alpha acids) (60 min)
2.25 AAU Tettnang hops (0.5 oz./14 g of 4.5 % alpha acids) (15 min)
0.50 oz. (14 g) Hallertauer Mittelfrüh hops (2 min)
1 tsp Irish moss (15 min)
White Labs WLP885 (Zurich Lager) yeast
Champagne yeast (optional)
2.8 oz. (80 g) corn sugar (for priming)

Step by Step

Steep Carahell dark malt in 0.6 gallons (2.1 L) at 148 °F (64 °C) for 30 minutes. Add grain tea and extract to kettle. Boil wort for 60 minutes, adding hops as indicated. Ferment 52 °F (11 °C). Lager for at 38 °F (3.3 °C). Prime with corn sugar and fresh yeast.

Note: The use of cane sugar in these recipes helps increase the fermentabiity of the wort and can be replaced by adding more malt or malt extract. Likewise, adding Champagne yeast is an option if your fermentation stops prematurely. Keep the temperature of the wort over 55 °F (13 °C) for best results when using Champagne yeast.

partial-wort boil and topping off the fermenter with cold water may be a more practical alternative for those with small kettles. Remember that hop utilization decreases with increasing wort gravity, so plan to use additional bittering hops if you do so.

Yeast and Fermentation

The White Labs yeast strain WLP885 (Zurich Lager) is widely believed to be the strain of yeast used to brew Samichlaus, and is available seasonally. However, our information indicates that multiple yeast strains are used. Homebrewed examples using WLP885 have, however, been successful.

High gravity fermentations are notorious for problems because they place so much stress on the yeast. Moreover, lager yeast strains are less tolerant of underpitching — that is, using less than the optimum population of yeast. With liquid yeast, making a starter is a necessity. Even the largest packages of liquid yeast available to homebrewers do not begin to be adequate for a beer this big. In fact, I would strongly recommend pitching the entire primary yeast sediment from another batch of a lower gravity lager if you want to avoid the issues associated with a stuck or incomplete fermentation. Alternately, make a yeast starter with a volume of 2.5 gallons (9.4 L) for a 5-gallon (19-L) batch. Or, perhaps you are fortunate and have access to yeast slurry from a brewpub or microbrewery that brews lagers. In that case, you'll want about 4 cups of yeast slurry.

High gravity worts also require oxygen for healthy yeast reproduction. The chilled wort should be very well aerated, far more so than an ordinary beer. Some brewers provide additional oxygen up to 24 hours after the initial yeast is pitched. However, the beer should not be aerated once there is active fermentation, for fear of oxidation that can cause premature staling.

Another way to encourage a beer to finish fermenting is to raise the temperature once fermentation slows. This will not greatly affect flavor, most of which has already been determined.

It may be necessary to "rouse" (gently but thoroughly stir) the yeast sediment back into suspension periodically during the primary fermentation. This brings more of the fermenting beer into contact with the yeast as it flocculates and settles to the bottom of the fermenter. The Eggenberg Brewery racks Samichlaus periodically and adds a bit of fermenting wort to move the fermentation along.

Conducting a fermentation with a gravity this high requires monitoring its progress, taking periodic specific gravity readings and modifying the procedure as necessary. For example, it may or may not be necessary to pitch additional yeast, even when using the Zurich strain, or to rouse the yeast sediment. There is no precise estimate of the time necessary to reach the target final gravity, or even specifically what that gravity should be. Each batch should be thought of as its own special case.

Long, cold winter nights

As with any lager, the fermentation temperature is critical. Almost all lager strains work best at a temperature in the 45–55 °F (7–13 °C) range. Once the primary yeast has finished its job, the beer can be warmed to room temperature if a second yeast strain is pitched or if the fermentation becomes stuck or is unduly slow. Then when the beer is close to the estimated target final gravity and ready for lagering, it can be racked to a secondary fermenter and chilled to below 40 °F (5 °C). A beer of this gravity benefits greatly from long cold lagering, for at least six months, in order to smooth and mellow and to lose the sharp "bite" from the high alcohol content. Patience is definitely a virtue. Remember that Christmas comes only once a year.

After its long sleep (the original Samichlaus was literally lagered in a Swiss mountain cave), the beer is ready for bottling. The remaining yeast will have lost much of its vitality by this time, so another charge of bottling yeast is recommended to ensure adequate carbonation of the priming sugar. Again an alcohol tolerant strain such as dry Champagne yeast should do an

GUTEN TAG, EGGENBERG

I called Castle Brewery Eggenberg in Austria to get some information on how they brew the official Samichlaus. The Braumeister, Anton Hemetsberger, was on vacation so I spoke to the Quality Control Manager, Peter Kaufmann.

As in Germany, Austrian brewers adhere to the Reinheitsgebot, so malt contributes 100% of the extract in Samichlaus. The malt bill consists of helles (pale, likely Pilsner) and dunkels (dark, perhaps Munich) malt that the brewery mashes in a single decoction process. To achieve the original gravity of 32 °P, Eggenberg uses runnings from a previous brew as water in the final mash and then concentrates the wort further through a 2-hour boil heated by an external calandria (a heating device outside of the kettle). The target bitterness level ranges from 26 to 30 IBU. Primary fermentation lasts for 4 weeks at around 10 °C (50 °F) followed by about 9 months of conditioning between 0–10 °C (32–50 °F). Herr Kaufmann did not describe in detail the yeast strain or fermentation parameters, but he did confirm that they employed more than one yeast strain by means of one or more additions of kraeusen during conditioning.

I also called German Braumeister Hermann Hörterer, who works for Esau-Hueber — which manufacturers brewing equipment and is especially well known for its yeast propagation equipment — to obtain a general outline of techniques for producing a high-alcohol lager beer. Hörterer formerly worked for a brewer in Bavaria that made a strong doppelbock as well. He recommended pitching 30-40 million yeast cells/mL — at least twice the rate for normal lagers. Also, to promote yeast activity under a high alcohol environment, he recommended repitching one or more times with new vital yeast and to rouse the yeast by transferring the beer. — Steve Holle

excellent job. Samichlaus is not a highly carbonated beer, but neither is it flat. The target carbonation is about 2.2 volumes of carbon dioxide. If you are kegging the beer, it can be force carbonated without additional sugar or yeast.

Homebrewed clones

Walt Fischer, avid homebrewer and proprietor of My Home Brew Shop in Colorado Springs, Colorado, is a fan of high gravity brewing and large batch sizes. On December 6, 2003, he and two friends brewed 30 gallons (114 L) of a Samichlaus clone. The grain bill was more than 150 lbs. (68 kg), most of which was mashed in Walt's system constructed from 55 gallon (208 L) stainless steel drums, and the remainder in a second much smaller mash tun. He says the efficiency suffered from the lack of sufficient mash tun capacity.

After a 90-minute boil, they pitched a mere half-gallon (1.9 L) starter of White Labs WLP885 into the chilled

wort with an original gravity of 1.120. Fermentation was slow to begin, and the yeast had to be roused multiple times, but after one month they had achieved a specific gravity of 1.050. They debated whether to pitch additional yeast but decided against it, racking the beer to secondary fermenters. In a few more weeks, the gravity was 1.040 (yielding 10% ABV) and the beer was refrigerated for lagering, where it has remained since.

Walt has sampled the beer on several occasions. "It tastes a lot like Samichlaus," he says, "but it's a little on the sweet side and the body is a little bigger than the commercial beer."

Joe Walton, a member of the Austin ZEALOTS, brewed his version of Samichlaus in the summer of 2003. "I started with 18.5 lbs (8.4 kg) of Munich malt and 8.5 lbs. (3.9 kg) of Pilsner malt and performed a triple decoction and collected enough wort for a 5-hour boil." His brew day was 12 hours long and the original gravity was 1.160. "I don't know if I did not pitch with enough yeast or if the wort was not aerated enough, but the fermentation petered out. I did lager for a year to help it mellow. It was drinkable with nice caramel malt characters, but not as balanced as I would have liked. Next time I am going to make sure I have sufficient aeration and pitch a massive amount of yeast."

Chris Colby — another ZEALOT and editor of *BYO* — also made a "Samiclone" in 2003. "I did a single decoction mash and ended up with 3 gallons (11 L) of wort at around 1.125 — lower than the 1.140 I had planned. I pitched the yeast from a 1-gallon (3.8-L) starter and the fermentation really took off, but then slowed around 1.050. At this point, I racked to secondary and let the carboy sit at room temperature to finish. I was initially worried that I would get too many esters, although my clone turned out less estery than the real beer. The final gravity was 1.025 (for an ABV just shy of 13%)."

Dan and Joelle Dewberry, also ZEALOTS, boiled their wort for three hours, "to achieve that delicious caramelization." They added yeast from a 1-gallon (3.8-L) yeast starter to the primary and aerated with an aquarium pump for 1.5 hours. Joelle says, "We kept some yeast in reserve, worked it up, and added 27 oz. (800 mL) to the secondary and 34 oz. (1 L) at bottling. All of this really seemed to help as the FG was 1.033, producing an ABV of 14.5%. All in all, this beer needs quite a bit of yeast!"

Clone recipes for Samichlaus abound. (See page 52 for two.) But, learning from homebrewers who have actually tried brewing one, the key to success is clear — pitch enough yeast.

Bill Pierce is Brew Your Own's *Advanced Homebrewing columnist.*

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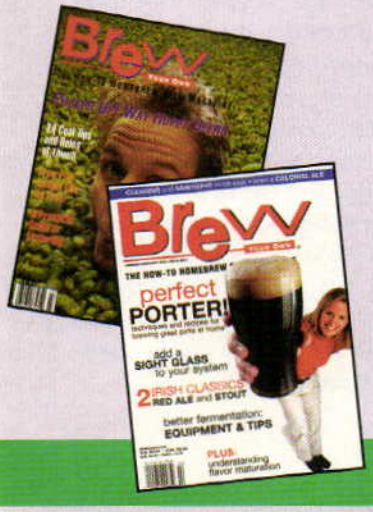

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Draftline Cleaner

Cleaner lines bring cleaner flavor to your glass

Story and photos by Thom Cannell

Entering one of my favorite brewpubs, I stumbled over three oversized pressure vessels. They looked like five-gallon garden sprayers with Sankey (commercial) beer line fittings and a high pressure CO_2 inlet. The brewpub was getting its draft beer lines cleaned.

I sat with the brewer, someone I know to be meticulous about line cleaning. "I thought I'd give it a try — the guy doing the line cleaning opened his own business after resigning as head brewer at Bell's," he told me.

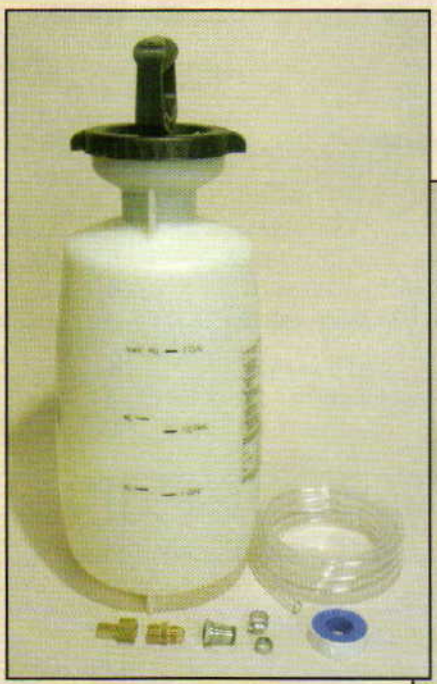
As we watched, aghast, successive strings of what looked like snake skins spewed out of an unused line. The clean lines produced much smaller blobs of debris, but they were unsightly all the same. The brewer was stunned and convinced that having lines professionally cleaned was "a very good idea."

Watching this process, it dawned on me that I may have been mistaken in assuming my own beer lines and taps were clean.

That night, I drained a beer line from a keg filled with stout and was taken aback from what I discovered. The dark beer had hidden a heavy deposit of beer stone (i.e. proteins from the beer that accumulate into a type of sludge.) I then unscrewed the cobra-head tap — it too, was filled with the same disgusting junk.

I disconnected all my kegs and took the lines and taps into the basement. There I made up some heavy duty cleaner, and commenced to connect a pump with a beer-out keg connector to clean my lines. Several hours later, the lines were sparkling clean and I felt the need to share the importance of line cleaning with you.

Keeping your lines clean and free from infection preserves your beer and its flavor. Making the cleaning easy and swift encourages frequent cleaning.



(Left): Our tap line cleaner was built in about an hour for less than $50.
(Right): Critical parts include a compression fitting, an FIP hose barb adaptor and a beer-out keg body connector.

How TO CLEAN

Alec Mull of Capital Draft in Lansing, Michigan was formerly head brewer at Kalamazoo Brewing Company (Bell's). He knows beer, production brewing and how to keep a brewhouse clean and sanitary.

"There should be no difference in the taste of a beer served from the keg and one that emerges from draft towers, however distant they may be. This is often untrue. Cleaning is like doing dishes, you have to circulate the cleaning solution in the lines. Like dirty dishes, soaking is not sufficient to remove built-up soil, you have to have movement."

There are two kinds of debris in lines and taps — organic and inorganic. To remove organic materials, Alec uses strong caustics. For inorganic-minerals he uses acid. Before, after and in between he rinses with water. We discourage homebrewers from using caustics because they are dangerous. Instead we can use TSP, PBW and other less aggressive chemicals.

Follow the manufacturers recommendation, generally pumping cleaning solution through, then allowing a soak, and pumping again. Rinse with clear water, then use a mild acid like food grade phosphoric acid, followed with a water rinse. If you have multiple taps, you can connect the taps' nozzles with large diameter tubing and circulate cleaning solution. Don't forget to disassemble your taps and scrub them clean. You could also keep a keg line cleaner filled with sanitizer in your draft fridge and push some water or sanitizer through the lines after every session. However, acid sanitizers like StarSan attack the lines and should not be left in vinyl tubing. Bleach solutions are likely to cause corrosion of stainless steel.

Wouldn't it be easier to take the cleaning to the beer fridge or kegerator? My goal was to make some sort of device that would do an equivalent job of line-cleaning as the professional's equipment I saw that day.

The professional cleaning system consists of pressure tanks filled with various chemicals, typically a caustic, an acid and water. To push each solution through 10–300 feet of beer line, pros often rely on the brewery's CO_2 for the necessary pressure.

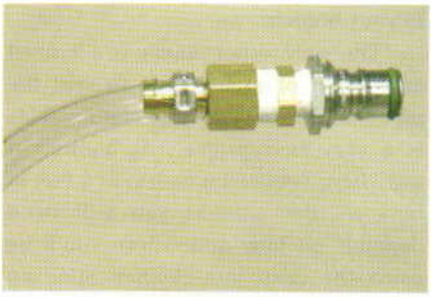
To translate this system into one that will be useful in a homebrewery requires a tank that can be filled with cleaning solution and then pressurized for delivery into draft lines. An ordinary garden sprayer, one adapted to connect to beer line equipment, fulfills our needs precisely. Do not, however, reuse a sprayer used for lawn chemicals. Head for the home store and select a new 2 to 3 gallon (7.6 to 11.4-L) hose-end sprayer. I found several models priced at $20. Look for a sprayer that has a molded-in barb fitting, it will make the connection stronger and much more convenient.

Once you have purchased your sprayer, determine the internal diameter (i.d.) of the hose that came with it. Mine was ⅜ of an inch. Then you will need to purchase 10 feet of hose for our project. Ordinary clear vinyl hose is rated at 55 psi at normal room temperatures (approximately 70 °F or 21 °C). If you plan on using hot water with your cleaning solution (between 120–140 °F), your best bet is to go with braided hose that is more durable and fit for higher temperatures.

On your way to the store, stop at the local homebrew store and buy a new or used beer-out keg body connector (be sure to take it with you to the hardware store). Though our parts fit together, yours may differ in size; having the connector in your pocket for a trial fit is good insurance.

The gas-in and beer-out keg body connectors require different size barbed adaptors. Once you have hose and a sprayer, head for the plumbing

Be sure to remember your hose clamps to ensure a tight seal.



Assembling the shiny bits is easy, as is pushing the beer line over barbed fittings.

department. You'll need two brass pieces to connect the keg body connector to your vinyl hose (or braided hose if you went that way), a compression flare-to-MIP half union and a FIP-to-barbed-end connector. Note that the threads on the keg body connector have a different pitch (threads per inch) than either pipes or bolts. Compression fittings, fortunately, have the correct pitch and the half union will be able to connect your flare to the pipe fittings. Do a trial fit of your half union and FIP adaptor in the store to ensure it will work when you get back to your homebrewery.

The only other items you'll need are Teflon plumbing tape to seal the pipe threads and two hose clamps. This is a very easy project. At home, cut anywhere between 6 inches to 6 feet of hose — the amount you will need depends on how and where you'll be using the draft line cleaner. Slide an adjustable stainless steel hose clamp over one end and push it onto the barbed fitting on the sprayer. If you are using reinforced vinyl tubing, dip the cut end into very hot water or heat the end with a hair dryer to make fitting the hose over the barb easier. After you tighten the clamp, wrap each end of the half union with Teflon tape and assemble the pieces together tightly.

Slip a clamp onto the free hose end, push it onto the brass barb until the hose hits the bottom and tighten the clamp. Tada . . . your project construction is complete and you're ready to clean those nasty lines!

To try out your new line cleaner, fill your sprayer with a couple gallons of water or cleaning solution and adequately pressurize the sprayer to push your cleanser through the length of draft line you are cleaning. To test your project, dispense a glass of brew before line cleanup and compare this to a freshly drawn pint through clean lines.

Thom Cannell writes "Projects" in every issue of Brew Your Own.

PARTS and TOOLS

Parts

Pressure sprayer, various makers	$20
10 feet tubing, ⅜" i.d. ½" o.d. (may vary by sprayer make)	$2.00
hose barb to FIP adapter, ⅜" x ⅜"	$2.00
flare to MIP Half Union, ⅜" x ⅜"	$2.00
beer-out keg connector (ball-lock or pin-lock, new with poppet)	$8.00
Teflon tape	$1.00
hose clamps, 2 each	$0.50
Total	$35.50

Tools

screwdriver
razor blade/scissors
hot water or hair dryer
adjustable crescent wrench (or box-end wrenches)

Home Lab Tests

How clean is your wort and beer?

Story by Chris Colby

Every homebrewer knows that unwanted microorganisms are an enemy to our beer. Most of us clean and sanitize our equipment scrupulously. And, for most, the result is that our beer does not suffer from obvious contamination, as evidenced by sour flavors, gushing bottles or "ring around the collar" (a line of growth around the neck of a beer bottle). However, all beer — commercial or homebrewed — is contaminated to some extent, even if it tastes, smells and looks fine. Sometimes it is worth taking extra steps to examine just how clean your beer really is. In this article, I'll describe a few easy tests that can give you an idea of the level of contamination in your homebrewed wort and beer. They may also be able to tell you where the contaminating microorganisms came from.

These tests can be especially helpful to homebrewers who plan on repitching their yeast to another batch of beer. A level of contamination that was undetectable by taste in an initial batch of beer may blossom in the next, leading to off flavors and aromas. Knowing the condition of your wort can help you decide whether to repitch or to start with a fresh culture of yeast.

Likewise, these tests can also help you evaluate if you are cleaning all of your equipment adequately. These days, many of us use counter-flow wort chillers. These chillers cool wort quicker and with less water than immersion chillers. However, many homebrewers worry because they cannot see inside the chiller. (With most other pieces of homebrewing equipment, you can visually inspect every surface the wort will touch.) The deep recesses of the chiller are a perfect place for bacteria to take hold and potentially be passed on to all our subsequent beers.

Finally, given how easy the tests are, you may simply want to run these tests to check on your cleaning and sanitation practices, even if you can't detect any problems in your beer.

Wort Stability Test

The first test is extremely simple and requires only a small sanitized container, a sample of your wort and a relatively warm place to store the sample. On brewing day, take a sample of your wort after cooling but before pitching. You can do this by simply intercepting a small amount of wort as it exits your counter-flow chiller or kettle on its way to your fermenter. Alternately, you can use a sanitized wine thief or other sampling device to grab some unpitched wort from your fermenter. Any kind of small glass jar will work as a sampling vessel. Used spice jars, baby food jars or other household containers will work, as will Erlenmeyer flasks, laboratory media bottles, sterile test tubes, sterile culture tubes or sterile specimen cups. Make sure the container is spotlessly cleaned and sanitized.

Once you've taken your wort sample, lightly cap the container or cover it with sanitized aluminum foil. Leave the cap loose enough so that any gas produced in the test can escape. Place the sample in a warm place for a few days.

Optimally, you would like the temperature to be 80–90 °F (27–32 °C). Setting the jar on top of a refrigerator or near any appliance that gives off some heat may be sufficient. In the summer, a garage or shed may stay in that range. If you want to get a little more fancy, it's not too hard to attach a thermostat to a hot pot (or even a Crock Pot slow cooker) and construct a make-shift, temperature-controlled hot water bath. Do not set the sample in direct sunlight or near any bright light source, however.

Once the sample is in its incubator, examine it periodically. Look for signs of haze, bubble formation or full on fermentation. The length of time your wort remains clear is an indication of how clean it is. If your unpitched wort sample lasts longer than 72 hours (3 days) at 80–90 °F (27–32 °C) without showing any signs of contamination, you are producing very clean wort. Yeast harvested from this beer can be repitched with confidence. This would also be good evidence that, if you are using a counter-flow chiller, the cleaning and sanitation practices you use on it are sufficient.

(This assumes the wort has not been contaminated subsequent to you taking the sample. For example, if you took the sample prior to it reaching your fermenter and the fermenter wasn't properly sanitized, the result of the test is irrelevant.)

If the sample lasts 48 hours (2 days) without showing signs of contamination, your beer will probably not taste or smell contaminated, but repitching your yeast from this batch is not advisable. You will likely want to re-examine your cleaning and sanitizing routine to look for ways that contaminating microorganisms may be entering your wort.

If the sample only lasts 24 hours (or less), it's time to start taking your

> Here are a few easy tests that can give you an idea of the level of contamination in your homebrewed wort and beer.

cleaning and sanitation much more seriously. Once the test is over, you may want to taste the sample to determine what sort of contamination is present.

Pitched Wort Stability Test

One possible source of beer contamination is your yeast, especially if you are repitching yeast from a previous batch or pitching yeast from starter that has been stepped up a few times. (Every time you transfer a yeast sample, there is a chance of contamination.) A Pitched Wort Stability Test can tell you if your yeast sample is clean. A Pitched Wort Stability Test is conducted in much the same way as the previously explained Wort Stability Test. In fact, both tests are usually run in parallel (i.e. at the same time and under the same conditions). The only difference between the two tests is that a yeast inhibitor is added to the pitched wort sample.

To run this test, simply take a sample of pitched wort from your fermenter after you take the sample of unpitched wort for the first test and after you've pitched your yeast. (A sanitized wine thief will work for taking a sample, so will a sterile pipette.) As with the unpitched wort sample, place it in a sanitized jar with a lightly sealed lid or foil wrap. Label the unpitched and pitched samples so you can tell them apart.

One possible source of contamination is yeast, especially if you are repitching yeast from a previous batch.

The yeast inhibitor — cyclohexamide, sometimes called actidione — you will add prevents the yeast from multiplying in the wort, but does not interfere with bacterial growth. Thus, if there is any bacterial contamination of your yeast sample, the wort sample will eventually show signs of this.

Cyclohexamide is a poison. (It inhibits protein synthesis in many types of eukaryotic cells, including brewers yeast and human cells.) As such, you need to clearly mark the cyclohexamide-containing sample with the word "poison," biohazard tape, a "Mr. Yuk" sticker or something similar. Add 1 mL of a 0.1% cyclohexamide solution to every 100 mL of your pitched wort sample. Often, the working cyclohexamide solution is stored in a syringe and pushed through a 0.22 micron filter.

Incubate the pitched wort sample, treated with cyclohexamide, alongside the unpitched wort sample, which was not treated with anything. There are essentially four different outcomes to this paired test.

One possible outcome is that both the unpitched and pitched, treated samples last 72 hours (or longer) at 80–90 °F (27–32 °C) before showing signs of fermentation. This would indicate that both your wort and your yeast culture are very clean.

Another possible outcome is that your pitched, treated sample shows signs of contamination well before the straight unpitched sample. This indicates that your wort is fine, but your yeast is contaminated.

A third possible outcome is that both samples show signs of fermentation within 24 hours. This indicates that your wort is contaminated. Your yeast may (or may not) also be contaminated, but you can't tell from the test results.

The final possible outcome is that the unpitched sample shows signs of contamination well before the pitched, treated sample. This indicates something has gone wrong with the test. If the unpitched sample is contaminated, the pitched sample should also be because it's the same wort. In this case, your sample jar for the unpitched sample was probably not sanitized adequately.

One way to give your test a better chance of validity is to use sterile test equipment.

This last outcome points out one key aspect required for a valid test — clean, sanitized (or better yet, sterilized) labware. Wort is a very nutrient-rich media — and when it's held at 80–90 °F (27–32 °C), many kinds of bacteria or yeast present will grow quickly. This includes any contaminants in your sample jar or introduced from any device that you used to sample the wort (such as a wine thief).

One way to give your test a better chance of validity is to use sterile test equipment. Most scientific supply stores sell individually packaged sterile test tubes, culture tubes or vials in a variety of sizes. Likewise, it's not too hard to track down sterile sample cups (the kind that urine samples are typically collected in) at many medical supply stores. These can only be used once, but are fairly cheap. (If you use vials or tubes, you will want to get a simple rack to help keep them upright during the test. These are cheap.) Scientific supply stores also sell individually wrapped sterile pipettes in a variety of sizes (including 5, 10 and 25 mL). These are also fairly cheap and can be used to sample wort from your fermenter.

If you don't like using disposable equipment, you could get some small

Erlenmeyer flasks and glass pipettes. These can be cleaned the same as any of your brewing equipment and easily sanitized in your oven. Put aluminum foil caps on the Erlenmeyer flasks, wrap the pipettes in aluminum foil and heat the glassware in your oven at 350 °F (177 °C) for about an hour. Obviously, you will want to let the glass cool before you use it. Using sterile labware ensures that you aren't contaminating your wort sample with your test equipment, yielding false positives.

Beer Stability Test

You can also use the same procedure to test the stability of your beer. By the time your beer is in bottles or kegs, it has has several opportunities to become contaminated. Beer can pick up "bugs" when it is transferred to secondary, to a bottling bucket or a keg. Likewise, your bottles or kegs may be contaminated. Knowing the level of contamination in your beer can give you some idea of how long it will remain stable.

To run a beer stability test, just take a sample of beer and place it in a sealed tube. Incubate the sample at 80–90 °F (27–32 °C) and watch for signs of contamination. Signs include turbidity (haze or "rope" forming in the beer), bubbles, visible growth, off aromas and, of course, off flavors.

Because this test is done in a sealed container (to keep oxygen away from the beer as it incubates), there is always a chance the container will burst. For this reason, it's a good idea to watch this test carefully and remove any sample that is obviously producing gas. As before, it is very important to use well-sanitized (or better yet sterile packaged) containers for this test.

To evaluate the results of the test, keep in mind a simple rule of thumb (attributed to a Dr. Farnsworth) — beer lasts ten times as long at 38 °F (3.3 °C) than at 80 °F (26 °C). So, if it takes 2 weeks for your incubated sample of beer to go bad, it should last about 5 months if refrigerated.

I first became acquainted with the topics presented here at a talk given by Louis Bonham at the 2002 National Homebrew Conference. At his talk, Louis stated that he thought that homebrewers should run this series of tests on every batch of beer they brew. That may be excessive, but these tests are extremely easy to run once you have the materials on hand. If you use sterile 25 mL disposable pipettes for sampling, sterile 15 mL disposable culture tubes for holding the sample and your Crock Pot water bath is up to temperature, setting up the wort tests takes less than a minute.

Chris Colby is the editor of BYO. *Bill Pierce, the usual author of Advanced Homebrewing, wrote a feature article on Samichlaus on page 50 of this issue. He will return to this column in the Jan–Feb 2005 issue.*

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The Beer Garden

Day dreaming of barley, hops and the lovely wife

by John Hershey
Denver, Colorado

photo courtesy of Hop Union

Growing your own hops and grains can be a fun and exciting addition to your current homebrewing method. Imagine the possibilities . . .

This past September, as I do every September, I attended my town's Oktoberfest celebration. This fun celebration of autumn and beer, held on two weekends in September each year, is a ritual heralding the arrival of fall. Nothing says September like Oktoberfest. Pondering the fact that Oktoberfest happens in September got the creative juices flowing and I had a brilliant insight when I glanced up at a sign that read "Beer Garden." As an avid gardener, I've heard of people growing salsa gardens and lasagna gardens and even pizza gardens. Next season, I announced silently yet triumphantly to myself, I will grow a beer garden.

Great gardening brainstorms like this often occur in autumn. In the spring and summer, gardeners are too busy planting and tending the garden to think about the big picture. So we really enjoy the period of quiet contemplation that comes after the harvest. Seeds may germinate in the spring, but truly original and ingenious ideas — like the beer garden — tend to take root in the fall.

My mind raced forward to next summer and I pictured a scene like this: Late one sunny afternoon, I come in after a long day of working in the garden. My wife greets me with a kiss and a glass of ice-cold lemonade. We retire to the patio to enjoy the sunset and some good conversation as our children play in a backyard bathed in warm golden light. It's a moment of domestic bliss.

Wife: (resting her head softly on my shoulder and gazing out toward the western horizon) What have you been up to all this time?

Me: Oh, just doing a little gardening.

Wife: You know, I think it's just wonderful that you devote so much of your free time to gardening.

Me: Really? Thanks!

Wife: You are such a dedicated husband to work so hard growing healthy vegetables for our family.

Me: Aw, it's nice of you to say so.

Wife: So many guys spend their weekends out on the golf course or doing things with their buddies, and here you are, right in the backyard, spending quality time with the kids and providing us with fresh, nutritious food. I'm so lucky.

Me: There's no place I'd rather be. It's my pleasure.

Wife: What exactly are you growing in the garden, anyway?

Me: (absentmindedly thumbing through the newspaper, pretending not to hear).

Wife: Hon?

Me: Hmm?

Wife: I say, what are you growing out there?

Me: Oh, you know. The usual. Is there any more lemonade?

Wife: Like what?

Me: Wow, what a glorious sunset tonight!

Wife: Tomatoes? Corn? Help me out here.

Me: Well, not those particular plants. But, you know, things that grow on stalks and vines. Have you seen the sports section?

Wife: Why do you keep changing the subject? I'm just interested in the delicious vegetables we'll be enjoying this summer. What stalks and vines?

Me: I don't see why you're getting so testy. If you must know, I'm growing some grains. Grains are very healthy, you know.

Wife: Grains? What kind of grains?

Me: Barley, for one.

Wife: I've never heard of growing barley in a home garden. But I suppose I could make that vegetable barley soup you like.

Me: Mmm-hmm.

Wife: What else? You mentioned vines. Pumpkins? Watermelon?

Me: No, not exactly. More like, you know, hops and stuff.

Wife: Hops?

Me: Yeah.

Wife: OK, what the hell's going on here?

Me: What do you mean?

Wife: Why are you spending hours a day tending a crop of barley and hops instead of things we can eat?

Me: It's a beer garden (sound of screen door slamming).

Me: (following her into the house) Honey — just listen. It's really a great idea. See, we'll save a lot of money by brewing our own fresh
(sound of bathroom door slamming.)

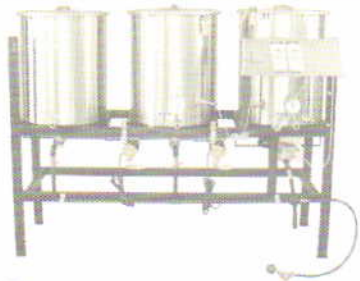
Me: (talking sweetly through the door) Sweetie?

Wife: What.

Me: Please don't scrape off that fungus growing on the shower curtain.

Wife: Why not?

Me: It's my yeast!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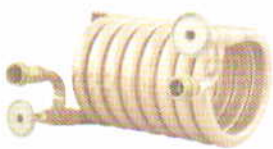

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