

Chapter 1

A Crash Course in Brewing

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What Do I Do?

If you are like me, you are probably standing in the kitchen, wanting to get started. Your beer kit and equipment are on the counter, and you are wondering how long this will take and what to do first. Frankly, the first thing you should do is read all of *Section I—Brewing With Malt Extract*. This book is going to teach you how to brew, from the fundamentals to the advanced methods; you won't be confused by conflicting instructions on a beer kit, and you will have an outstanding first batch.

But if you are like me, you probably want to do this right now while you have some time. (It's going to take about 3 hours, depending.) So, in this first chapter, I will walk you through the steps necessary to get your first batch bubbling in the fermentor, and give you an overview of what you will do to ferment and bottle your beer.

The instructions in this chapter may not explain *why* you are doing each step or even *what* you are doing. To understand the Whats and Whys of brewing, you will need to read the rest of this book. Each of the chapters in *Section I* discuss the brewing steps in detail, giving you the purpose behind each step. You will *know* what you are doing, rather than doing it that way because "that's what it said..." You will know how long to boil the wort, how to really use hops, why to bother cooling the wort, why to bother re-hydrating the yeast, why to wait two weeks before bottling... Get the picture?

Section I—Brewing With Malt Extract

But, if you can't wait, this chapter should see you through. Beer production can be broken down into 3 main events: Brew Day, Fermentation Week(s), and Bottling Day. If you have questions about terminology or equipment, be sure to review the *Glossary* and *Required Equipment* sections at the beginning of the book.

Brew Day

Equipment Needed

Let's review the minimum equipment you will need for this first batch:

- a 20 qt. brew pot (large canning pot)
- large stirring spoon (non-wood)
- ordinary table spoon
- measuring cup (preferably Pyrex glass)
- glass jar (at least 12 oz)
- fermentor (food-grade plastic bucket or glass carboy)
- airlock (get from homebrew shop)
- sanitizer (chlorine bleach or other)
- thermometer





Preparation (45 minutes)

1. Assemble ingredients. Gather together the ingredients for the brew. You may have purchased a brewing kit at a homebrewing shop, and it will contain the ingredients needed to brew a particular style of beer. A kit usually consists of malt extract, yeast, and hops. The extract may already be “hopped” and the kit may not include any hops.

If you don't have a kit, then head to a homebrew supply store and buy the ingredients outlined in the recipe here. You will notice that the recipe calls for various quantities of hops measured in AAUs. AAU stands for alpha acid units. Briefly, an AAU is a measurement unit for hops, which add balancing bitterness to the beer. The actual unit for measuring bitterness in beer is the IBU, for which the AAU is a constituent. The AAU is obtained by multiplying the alpha acid rating of the hop (a percentage value) by the weight (ounces) that you intend to use. For example, 2 oz of a 6% alpha acid hop equals 12 AAUs. Every package of hops you buy will list the hop's alpha acid rating. To figure out how much of a hop you will need for this recipe, just divide the AAU target by the alpha acid percentage on your hops. For example, 12 AAUs divided by 12 (Nugget hop's alpha acid

Section I—Brewing With Malt Extract

rating) equals 1 oz; 12 AAUs divided by 8 (Northern Brewer hop's alpha rating) equals 1½ oz. (See *Chapter 5—Hops*, for more info.)

2. Boil water. You will need at least a gallon of sterile water for a variety of small tasks. Start by boiling about 1 gallon of water for 10 minutes and let it cool, covered, to room temperature.

3. Clean and sanitize. It may seem strange to the first-time brewer, but probably the most important factor for success in brewing is good cleaning and sanitization. Clean all equipment that will be used during the brew with a mild, unscented dishwashing detergent, and be sure to rinse well. Some equipment will need to be sanitized for use after the boiling stage.

You can easily make a simple sanitizing solution by filling the fermentor bucket with 5 gallons of water and adding 5 tablespoons of chlorine bleach (a concentration equivalent to 1 tbs./gallon, or 4 ml/L). Soak all items that need to be sanitized in this bucket for 20 minutes.

After soaking, dump the sanitizing solution and pour in some of the pre-boiled water for a quick rinse to remove any excess sanitizer. Place the small spoon and the thermometer in the yeast starter jar and cover it with plastic wrap to keep it sanitary. Cover the fermentor with the lid to keep it sanitary also. (See *Chapter 2—Preparations*, for more info.)

RECIPE

Cincinnati Pale Ale

Ingredients for a 5 gallon batch

- ▶ 3-4 lb. Pale malt extract syrup, unhopped
- ▶ 2 lb. Amber dry malt extract
- ▶ 12 AAU of bittering hops (any variety)
For example, 1 oz. of 12% AA Nugget, or 1.5 oz. of 8% AA Northern Brewer
- ▶ 5 AAU of finishing hops (Cascade or other)
For example, 1 oz. of 5% Cascade or 1.25 oz. of 4% Liberty
- ▶ 3 packets of dry ale yeast

BREWING CHECKLIST

Table 1—Cleaning and Sanitization Check List

Brewpot	<input type="checkbox"/> Clean	
Stirring spoon	<input type="checkbox"/> Clean	
Table spoon	<input type="checkbox"/> Clean	<input type="checkbox"/> Sanitize
Measuring Cup	<input type="checkbox"/> Clean	<input type="checkbox"/> Sanitize
Yeast Starter Jar	<input type="checkbox"/> Clean	<input type="checkbox"/> Sanitize
Fermentor and lid	<input type="checkbox"/> Clean	<input type="checkbox"/> Sanitize
Airlock	<input type="checkbox"/> Clean	<input type="checkbox"/> Sanitize
Thermometer	<input type="checkbox"/> Clean	<input type="checkbox"/> Sanitize

Making Wort

(1 1/2 hours)

Now we begin the fun part of the work, creating the wort. Wort is what brewers call the sweet, amber liquid extracted from malted barley that the yeast will later ferment into beer.



Figure 3—Start boiling the water and get your ingredients ready. Do you have yeast?

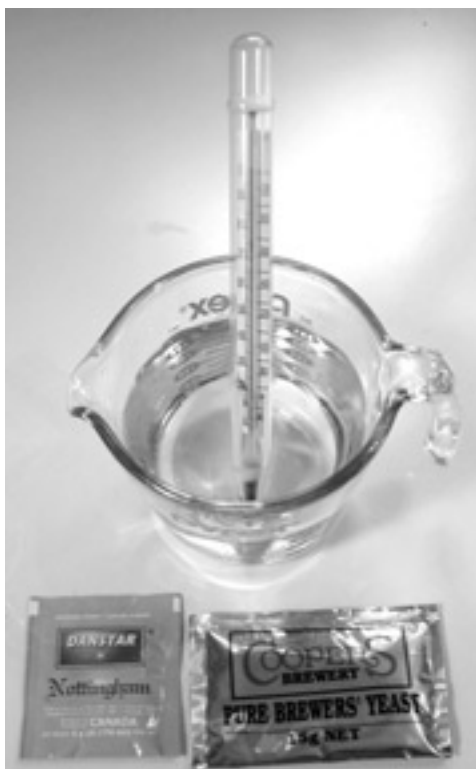
4. Boil the brew water. In the brewpot, bring about 3 gallons of water to a boil. Pour this water into the fermentor and leave it to cool. Now bring another 3 gallons of water to boil in the brewpot. You will be boiling the extract in this water and diluting this concentrated wort with the water in the fermentor to make the total 5 gallons. Some water will evaporate during the boil, and some will be lost to the trub. Starting out with something closer to six gallons will ensure that you hit your five gallon recipe volume. (See *Chapter 4—Water for Extract Brewing*, and *Chapter 7—Boiling and Cooling*, for more info.)

Note: If your beer kit includes some crushed specialty grain, you will need to steep that first, before adding the extract. (See *Chapter 13—Steeping Specialty Grain*, for more info.)

5. Rehydrate the dried yeast.

Although many people skip this step with fair results, rehydrating it assures the best results. While you are waiting for the brew water to boil, rehydrate two packets of dried ale yeast. Put 1 cup of warm (95-105°F, 35-40°C), preboiled water into your sanitized jar and stir in the yeast. Cover with plastic wrap and wait 15 minutes.

Next, “proof” the yeast. Start by adding one teaspoon of malt extract or table sugar to a small amount of water (¼ cup, for example) and boil it to sanitize. (A microwave oven is good for this step.) Allow the sugar solution to cool and then add it to the yeast jar. Cover and place in a warm area out of direct sunlight. Check it after 30 minutes, it should be showing some signs of activity—foaming and/or churning. If it just seems to sit on the bottom of the jar, then it is probably dead. Repeat the rehydration procedure with more yeast. (See *Chapter 6—Yeast*, for more info.)



Figures 4 and 5—Rehydrating and proofing the yeast.

6. Add malt extract. When the water in the brewpot is boiling, turn off the stove and stir in the malt extract. Be sure the extract is completely dissolved (if your malt extract is the dry variety, make sure there are no clumps; if the extract is syrup, make sure that none is stuck to the bottom of the pot). Next, turn the heat back on and resume the boil. Stir the wort regularly during the boil to be sure that it doesn't scorch.



The boil time for extract beers depends on two things: waiting for the “hot break” (See Step 8) and boiling for hop additions. In a nutshell, if you are using hopped extract without any added hops then you only need to boil through the hot break stage, about 15 minutes. With some extracts, the hot break will be very weak, and you may have little foam to begin with. If you are using hopped extract but adding flavoring or aroma hops, then you will probably want to boil for 30 minutes. If you are using unhopped extract, then you will need to add hops for bittering and should boil for an hour. (See *Chapter 3—Malt Extract and Beer Kits*, *Chapter 5—Hops*, and *Chapter 7—Boiling and Cooling*, for more info.)

7. Add hops. If you are using unhopped extract, add the first (bittering) hop addition and begin timing the hour-long boil. (See *Chapter 5—Hops* for more info.)

8. Watch for boilovers. As the wort boils, foam will form on the surface. This foam will persist until the wort goes through the “hot break” stage. The wort will easily boil over during this foaming stage, so stay close by and stir frequently. Blow on it and turn the heat down if it begins to boil over. Put a few copper pennies into the pot to help prevent boilovers. (See *Chapter 7—Boiling and Cooling* for more info.)



9. Add finishing hops (optional). If you are using unhopped malt extract or want to add more character to hopped extract, add finishing hops during the last 15 minutes of the hour-long boil. (See *Chapter 5—Hops* for more info.)

10. Cool the wort. After the boil, the wort must be cooled to yeast pitching temperature (65-90°F, 18-32°C) as quickly as possible. To do this, immerse the pot in a cold water bath. A sink, bathtub, or a handy snow-bank all work well. Be sure to keep the lid on the pot while cooling to prevent any cooling water or other potential contaminants from getting in. (See *Chapter 7—Boiling and Cooling*, for more info.)

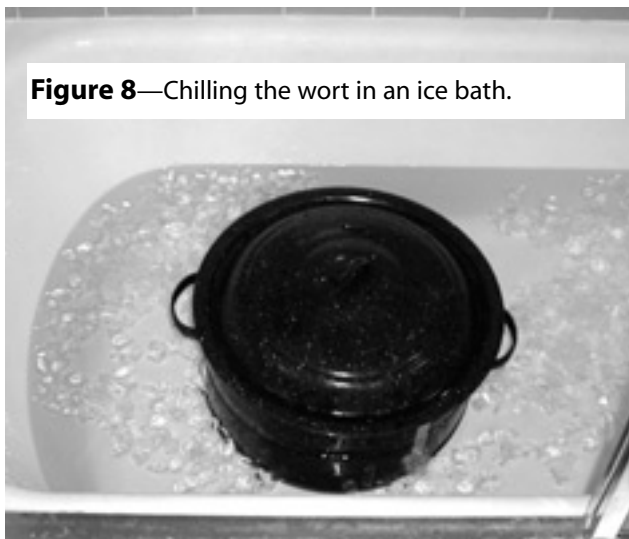


Figure 8—Chilling the wort in an ice bath.

Fermentation Week(s)

The science of fermentation is discussed in *Chapter 8—Fermentation*. *Chapter 9—Fermenting Your First Batch*, walks you through the application of that science, so that you too will be able to amaze your family and friends with a bubbling airlock! (You laugh *now*...)

1. Pitch the yeast. Pour the rehydrated yeast solution into the fermentation bucket.

2. Add cooled wort. Pour the cooled wort into the fermentation bucket *aggressively*, so that it splashes and churns in the bucket. This action adds the oxygen yeast need for growth. For best results, pour some back into the boiling pot, and then pour it into the fermenter again. This is the only time during the brewing process that you want the beer to be aerated or

exposed to oxygen. All other transfers should be done *quietly*, using a sanitized siphon, and with very little disturbance in the flow and minimal contact with the air.

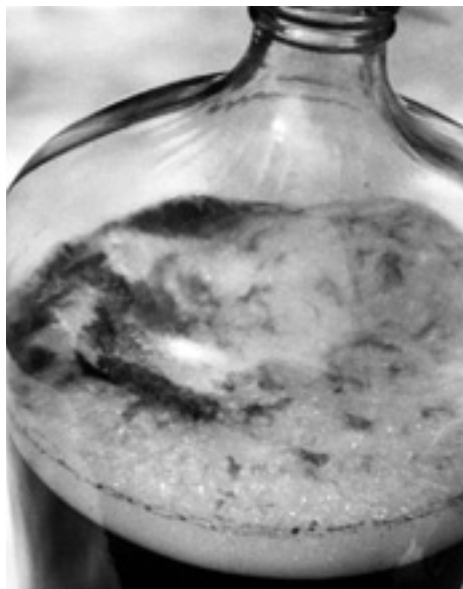
If you had added hops during the boil, you can remove them during this step by pouring the wort into the fermentor through a strainer. It is not necessary to remove the hops, however.

3. Store the fermentor. Put the lid tightly on the fermentor and carry it to a secure location where it will be undisturbed for two weeks. Choose a location that has a stable temperature of 65-70°F (18-21°C). A warmer temperature of 75°F (24°C) is okay, but above 80°F (26°C) the flavor of the beer will be affected. As soon as you have finished moving it, insert the airlock.

4. Leave it alone! After about 24 hours, the airlock will be bubbling steadily, the exciting evidence of fermentation. At right you can see what it looks like inside. The fermentation will proceed like this for two to four days, depending on the conditions of your fermentation. The activity will decrease as most of the malt sugars are consumed by the yeast, though the yeast will continue to ferment the beer long after the bubbling diminishes. Leave the beer in the fermentor for a total of two weeks.



Figure 9—Pouring the chilled wort.



5. Clean Up. Now is the time to wash out your brewpot and other equipment. Only use mild unscented dishwashing detergents, or the cleaners recommended in *Chapter 2—Preparations*, and rinse well.

Bottling Day

The second big day in your career as a homebrewer comes two weeks later, after fermentation is complete. Everything outlined below is thoroughly discussed in *Chapter 11—Priming and Bottling*.

To bottle your beer, you will need:

- ▶ 48 (12 oz) bottles
- ▶ bottle brush (baby bottle variety is okay)
- ▶ bottle capper (from homebrew shop)
- ▶ bottle caps (from homebrew shop)
- ▶ bottling bucket (basically another fermentor bucket with a spigot and bottle filler attached)
- ▶ racking cane/siphon/bottle filler (from homebrew shop)
- ▶ Sugar (6 oz)



1. Prepare your bottles. A typical 5-gallon batch requires two cases (48) of 12-oz bottles for bottling. Thoroughly clean and sanitize the bottles before use. If you are using old bottles, check them inside for dirt or mold deposits. They may need to be scrubbed with a bottle brush to get them really clean. Always clean first, then sanitize.

2. Prepare your bottle caps. Bottle caps should be sanitized before use, and the best way is to soak them in sanitizing solution. Some brewers use flip-top (Grolsch-style) bottles. The ceramic part of the flip tops can be sanitized along with the bottles. The rubber seals can be sanitized like the bottle caps.

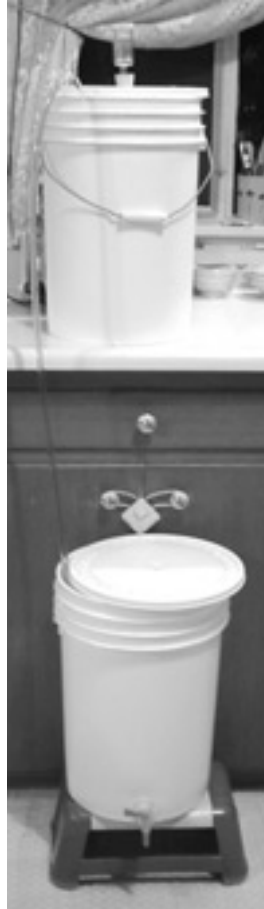
3. Prepare your priming sugar. We add a priming solution just before bottling to provide carbonation to the beer in the bottle. Boil $\frac{3}{4}$ cup (6 oz by weight) of corn sugar or $\frac{2}{3}$ cup (5 oz by weight) of table sugar in two cups of water. Cover the pan and allow it to cool.

4. Combine beer and priming sugar. The best method for preparing the beer and priming sugar solution is to use a separate container the same size as your fermentor as a “bottling bucket.” Clean and sanitize it and gently pour the priming solution into it. Next, siphon the beer from the fermentor into the bottling bucket. Don’t simply pour the beer into the bucket, and don’t let the beer splash as you siphon it in. Instead, put the end of the siphon under the surface of the beer as it fills. The swirling motion of the beer as it enters the bucket will be sufficient to evenly mix the priming solution into the beer without aeration. See *Figure 13*.

If you don’t have a bottling bucket, you can gently pour the priming solution into the fermentor and gently stir it. Allow the sediment in the fermentor to settle for 15-30 minutes before proceeding. You can fill the bottles using the bottle filler attachment on your siphon. See *Figure 14*.

5. Bottle. Carefully fill the bottles with the primed beer, place a sanitized bottle cap on each bottle, and crimp it using the bottle capper. At this stage it is helpful to have a friend operate the capper while you fill the bottles.

Figure 12—Racking to the bottling bucket.





6. Store the bottles. Place the capped bottles out of the light in a warm (room temperature) environment (65-75°F, 18-24°C). The bottles will take about two weeks to carbonate. The bottles will have a thin layer of yeast on the bottom.

Figure 13—Filling bottles from the bottling bucket (preferred method).



Figure 14—Filling bottles from a siphon with a bottle filler attachment.

Serving Day

At last, you get to sample the fruit of your labors. It's been about a month since Brew Day, and you are ready to open your first bottle and see what kind of wonderful beer you have created. During the past two weeks, the yeast still swimming around in the beer have consumed the priming sugar, creating just enough carbon dioxide to carbonate your beer perfectly.



Okay, so maybe you couldn't wait this long and you already opened a bottle. You may have noticed the beer wasn't fully carbonated or that it seemed carbonated but the bubbles had no staying power. You may have also noticed a "green" flavor. That flavor is the sign of a young beer. The two-week "conditioning" period not only adds carbonation but also gives the beer flavors time to meld and balance out.

1. Chill your beer. The bottled beer does not need to be stored cold. It will keep for approximately six months, depending on how well you managed to avoid exposure to oxygen during the last stage of fermentation and the bottling process. You will probably want to chill it before serving, however. The optimal temperature for serving beer depends on the style, varying from 40-55°F (4-12°C). In general, the darker the beer, the warmer you serve it.

2. Pouring your beer. To pour the beer without getting yeast in your glass, tip the bottle slowly to avoid disturbing the yeast layer on the bottom of the bottle. With practice, you will be able to pour everything but the last quarter inch of beer without getting any yeast in your glass.

3. Savor the flavor. Finally, take a deep draught and savor the flavor of the beer you created. Take time to evaluate the flavor, its bitterness qualities, its sweetness, the level of carbonation. These observations will become your first steps to beer appreciation and designing your own recipes.

But Wait! There's More!

If you want to learn more about brewing beer—how it works, why it works, and how to have fun creating your own recipes and trying advanced techniques—then I encourage you to keep reading. The next chapters in this book will lead you through extract brewing again, but this time with more explanation. They include descriptions of the great variety of hops, yeast strains, and malts that can make each brewing session and every beer unique. In later chapters, I will teach you how to brew beer from scratch, without extracts, using the malted barley itself. This kind of brewing really puts you in control of the final product, and many brewers find this “all-grain” type of brewing to be the most satisfying.

It is my sincere hope that this book will enable you to derive the same sense of fun and enthusiasm for this hobby that I have experienced, and that it will help you brew some really outstanding beer along the way.

The next chapter describes brewing preparation in more detail. Good preparation is the most important step to assuring a successful batch.