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# How to Brew

A field guide

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[www.halfmoonbrewer.com](http://www.halfmoonbrewer.com) • May 14, 2010

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# Getting Started

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*It was a woman who drove me to drink and I didn't have the common decency to thank her. -  
W.C. Fields*

For a proper discussion of brewing to begin, we must first have a working definition of what beer is and what forms it takes. Knowing this, all other decisions about what and how to brew become more meaningful.

## **Beer: a definition**

Sparing you the genealogy of beer, one need simply recognize that the drink takes many forms to ascertain that it has a storied past. For this guide, I'll focus on the usual suspects when it comes to brewing and brewing styles: Germany, Belgium, England and the U.S., but before that, let's consider what beer is, regardless of origin.

Beer is a beverage made from some combination of grain (typically barley), water and hops. It is fermented by yeast to attain an alcohol content usually between 2% - 9% ABV (Alcohol by Volume). Beer that is fermented to higher ABV percentages is usually classified as barley wine, but we'll save that for another guide.

That's it. There are plenty of spices, grains or other goodies you could add to this formula, but 90% of all beer is what I've described above. It's what you do with those items that make all the difference. Which brings us to:

## **Styles**

Here's where things get a little messy. At the time of this writing there are 23 styles recognized by the Beer Judge Certification Program (BJCP). These styles often contain sub categories, thus the number 23 is a bit misleading. For example, in the style category #14: India Pale Ale (IPA), there are three sub categories: 14a. English, 14b. American and 14c. Imperial. Each of these sub categories list the specific nuances about the beer, including appearance, flavor, mouthfeel and overall impression. As a new brewer, there's not much reason to dig deeply into these at this

time, but it is important to understand that they exist, so when you have created a beer that you want to call an IPA, you have some sort of guideline to start with and, after you crack the first bottle, to see if you got it right.

For more on styles see the BJCPs site: [www.bjcp.org/2008styles/catdex.php](http://www.bjcp.org/2008styles/catdex.php)

### **Before you brew**

The key to good brewing, like any complex task, is organization and attention to detail. Certain temperatures must be reached or maintained, timing is crucial and above all, sanitization of ALL equipment and tools that touch the brew at any time must be strictly observed. None of what I'm about to share with you is complicated. No one step is beyond your reach or ability. If you can boil water and make oatmeal, you can brew. No rocket science is required, just the basic ability to follow a series of steps. I promise.

### **One last thing**

There are two types of brewing practiced by home brewers: Extract Brewing and All-Grain Brewing. Let me be clear - one is not a better way to brew than the other. It really comes down to how much control you want over your brews and how much time you wish to spend brewing. For this guide, I will explain both options in detail in the following sections.

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# Equipment

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The following items are needed to brew beer. While this list is by no means exhaustive, it represents what the beginning brewer needs to brew successfully and well. I'll start with the basic items, but list certain "upgrades" that you might consider once you find you like brewing and want to take your brews a step further.



## Kettle

An appropriate kettle for a home brewer depends on the amount of beer you wish to brew at one time and whether you want to brew on the stove top, or on a larger outdoor burner. If you want to create 5 gallon batches using malt extract, then all you need is a stainless steel 8 gallon (32 quart) stock pot. If you wish to create 5 gallon brews using all-grain brewing techniques, then you want a 10 gallon (40 quart) stainless steel pot. The difference is in how you collect the liquid for brewing (called wort). When using extract, the amount of liquid needed is less, so thus the smaller kettle.

## Upgrades

Many home brewers like to brew 10 gallons at a time. It takes about the same amount of effort and delivers double the result. If you wish to go the 10 gallon route, then you'll need a 15 gallon (60 quart) pot.



## Mash Tun (all-grain brewing only)

If you've chosen the all-grain route, then you need some place to mash your grains (explanation of this term in the next section). The most basic, and frankly, incredibly reliable vessel for this is a standard picnic cooler. They hold temperatures extremely well and are easy to clean and store. for a 5 gallon brew, you'll need a 40 quart cooler. For 10 gallons, a 60 or 70 quart cooler is best.

## Upgrades

This is an area where you can really start pouring in the money on upgrades. In a commercial brewery, mash tuns are usually very large copper, or stainless steel vessels with complex heating elements that allow for a mash temperature to be slowly raised over time. To approximate this in the home brewing world, brewers like to use another stainless steel kettle (generally the same size as the main boil kettle, and line it with copper tubing. The copper tubing allows the brewer to circulate hot water around the mash, raising the temperature gently to avoid scorching the grain. This is a pretty advanced setup, and is not at all recommended for the novice brewer.



### **Burner**

If you choose to go the extract route, you have the option to brew right on your stovetop. If you're fortunate enough to have a high-end stovetop with nice gas burner that put out a fair amount of BTUs - go for it! However, if you want to save a little time on heating up the large amounts of liquid, it's really best to invest in a propane burner, something in the 70k-80k BTU range. They're not terribly expensive and do save lots of time. If you're going to brew all-grain, it's a must. And it sounds like a jet engine when you fire it up, so that's a bonus.

## **Odds and ends**

### **Mash paddle**



Used for stirring the grain in the mash tun. It keeps the grain from clumping together so that all the grain is equally exposed to the heated water.

### **4 quart pitcher**



Used both for measuring and collecting runoff from the mash tun.

### **6 gallon bucket w/lid and 6 gallon glass carboy**



Used for collecting wort. A second bucket or the glass carboy is used as a fermenter.



**Food grade PVC tubing**

Used for moving wort from one vessel to another



**Hydrometer**

Measures the specific gravity of the wort. This is used for determining potential ABV, among other, less important things.



**Sanitizer**

Used to destroy anything that might corrupt the beer.



**Wort chiller**

Used to cool the wort after the boil.



**Digital thermometer**

For measuring temperature, dummy!



**Keg or bottles**

If I have to tell you...

**One other thing**

As you progress in your brewing and want to start formulating your own recipes, you'll need something to help you with the complex calculations. There are several applications for your computer and even your iPhone/Droid/iPad. I use BrewPal for the iPhone/iPad and ProMash for the PC. They're all very inexpensive and are indispensable tools as you advance.

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# Let's brew!

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As mentioned earlier, there are two approaches to brewing: extract brewing and all-grain brewing. I'll give a breakdown of the benefits of both, then detail how to brew using each method.

## Extract brewing

Extract brewing removes the mashing step from the brewing process. As the name implies the brewer uses a concentrated extract, either in a syrup or a dry powder, as the main form of getting the fermentable barely sugars into the wort. The brewer then only need to steep a small bag of grains (much like making a big pot of tea) to impart the proper malt flavors they are looking to get into the beer. the rest of the brewing process is the same as the all-grain process. The benefit of extract brewing is the time savings and lack of cleanup that mashing the grains requires. It can easily cut about 45 minutes off of the standard 4 1/2 hour brew time.

## All-grain brewing

In this process, the brewer will extract the sugars from the grains by pouring very hot water over a bed of crushed grains, then waiting as the water and heat break down the grain sugars into a fermentable liquid. This liquid (called wort) is then collected and the boil begins. The benefit of all-grain brewing is the amount of control over the final beer that the brewer has in the mash processes. The brewer is in control of all the subtle flavors and characters of the base malt and specialty malts. It is often said that all-grain beer tastes fresher, but I have not found that to be true. For this guide, I'll be using a "batch sparge" method for rinsing the grains. This is easier for the new brewer to deal with than "fly sparging", which requires a little more equipment and a bit more finesse. You'll run into these terms more as you progress with your brewing.



**Extract steps**

1. Collect 3.5 gallons of filtered water in the boil kettle and bring to a temperature of 158 degrees.
2. Put your steeping grains into a mesh bag (available at home brew shops) and drop into the heated water. Be sure to shut off the heat and put the lid on the kettle. Let the grains steep for about an hour.
3. Lift the bag out of the wort and let drain. Then dip the bag back into the wort for a 20 seconds or so, and lift out and drain again. Do this 7 - 10 times to make sure the specialty grains impart all the flavor they can to the wort. But DO NOT SQUEEZE the bag! This will release tannins into the wort which you do not want.
4. Bring the wort to a boil.
5. Shut off the heat and add the extract, stirring constantly until the extract is completely dissolved into the wort.
6. Add enough water to have a total of 6 gallons of liquid to boil (it helps to mark the outside of the kettle with a permanent marker at the 6 gallon level).
7. Bring the wort to a boil. Be careful to watch for boil-over. If the wort begins to boil over, drop the heat (or turn the heat off) and slowly stir with a large metal spoon until the head recedes.
8. Add the first charge of hops to the boil. Again, watch for boil-over.
9. Boil for 60 minutes. Add the additional hops (if any) at the prescribed time indicated on your recipe's instructions.
10. With 15 minutes left in the boil, submerge the sanitized wort chiller. Be sure to hook the chiller up to your water source FIRST. it get's very hot when submerged. This would also be the time to add any clarifiers such as Irish Moss or Wirlfloc.
11. At the 60 minute mark, shut off the heat, put on the lid, or cover the kettle with foil and turn on the wort chiller. Chill the wort until it hits 70 degrees.
12. Transfer the wort to your fermenter and add your yeast.

13. Aerate the wort by swishing it around vigorously for at least a minute or two. This gets air back into the wort which the yeast needs during the initial stage of fermentation.
14. Add the lid or stopper, to the fermenter and insert the air lock.
15. Put the fermenter in a cool place, that keeps a reasonably constant temperature. Usually for ales, that's about 67 degrees. Spare bedroom closets are very good for this, but basements are outstanding.
16. In 6-8 days you are ready to bottle or keg. Wait another week or two before drinking to let the beer age just a bit.
17. Enjoy your home brew!

### All-grain steps

1. For a 5 gallon batch, you'll bring between 3 and 4 gallons of water to the proper strike temperature prescribed by the recipe. Use a mash calculator to determine this temperature [www.rackers.org/calcs.shtml](http://www.rackers.org/calcs.shtml)
2. Put your grains into your mash tun. Pour the water on the grains and stir with the mash paddle until all the gain is exposed to the water (break up all the "dough balls")
3. Close the lid and leave for 1 hour.
4. Heat enough sparge water to collect a total of 6 gallons of wort for the boil (the grains will soak up about 1/2 of your initial strike water, but then become saturated, so figure your sparge water should be  $[6 - (\text{initial strike water}/2)]$ )
5. Collect the wort from the mash tun in a sanitized bucket. Dump the sparge water into the mash tun and stir well, about 3 - 5 minutes. Close the lid and wait 15 minutes. Put the kettle on the burner and dump in the initial wort collected.
6. Collect the rest of the wort in the bucket and then add to kettle
7. Follow steps 7 - 17 above.

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# Resources

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Hopefully, you'll give brewing a shot and enjoy it enough to want to do it again (and again and again...). If that's so, you'll really want to know much more about the process than this simple starter guide is meant to impart. For that, I suggest the following resources. For convenience, I've listed them in order of how I would consider reading them as a new brewer to gain the maximum benefit of the information within.

1. "How to Brew" by John Palmer - This is the bible for most homebrewers I know. You can not get a better, more digestible book for learning this craft. I still consult this book from time to time when I need some refresher on the details of what I'm trying to do with a brew.
2. "Radical Brewing" by Randy Mosher - A bit shorter and perhaps more digestible than How to Brew. It focuses on the history and stylistic ideas around brewing and is an excellent companion to how to brew.
3. "Brewing Classic Styles" by Jamil Zainasheff - Jamil is one of the most award winning homebrewers ever. This book delves into each beer style and dissects them so that you get a very clear understanding of how to approach any particular beer.
4. "Designing Great Beers" by Ray Daniels - Before Jamil's book came out, this was my go-to text for creating a beer recipe. It holds more in-depth analysis of the beer styles and is very good to have around when you want to know a bit more about particular items within a style of beer.

**Now go forth and BREW!!!**

