



## British Pale Ale

# The Home Brewery All Grain Ingredient kit

This ingredient kit is designed to produce 5 gallons of our **British Pale Ale** using the All Grain method. All-grain brewing is a little more involved and will take more time than extract brewing, but it allows you to have more control over your beer. If you are not familiar with all grain brewing, there is an overview of the complete brewing process and a list of useful equipment for your reference located on pages 4-5. This recipe has been designed to make a beer similar to our malt extract kit, but the finished beer will vary in character, depending on your equipment, procedure, and mash temperature. We will give recommendations throughout the recipe and instructions, but feel free to deviate and experiment. That's really the part about all-grain brewing that most brewers enjoy: control over the entire process. If you have experience brewing a different way, please feel free to follow your experience and use whatever brewing procedure you like best. Your procedure should also be suited for the equipment you have on-hand. Be sure to keep a logbook or notebook that details brewing procedures, recipes, mash temperatures, fermentation specifics, as well as tasting notes and other details. That way you will have reference for what works well for you and what does not! If you have questions, we are here to help you! Just email us [brewery@homebrewery.com](mailto:brewery@homebrewery.com), or call us at 1-800-321-BREW (2739) or 417-581-0963.

## Ingredient Checklist

### Grains/malts

8 lbs 8 oz of American Pale Ale Malt  
4 oz 20L Crystal Malt  
2 oz Chocolate Malt

### Hops

9 AAU Glacier (bittering 60 min)  
1 oz Fuggles Flavoring Hop (10 min)  
1 oz Kent Goldings Aromatic hop (2 min)

### Additives/misc.

Irish Moss  
SAF S-05 yeast  
1 cup Priming Sugar

## Quick Reference

Mash	•154°F Mash Temperature
Strike Water	•11.1 quarts clean brewing water • Heat up to 166°F
Sparge Water	•5.13 Gallons of water needed
Gravity	•1.044 sg Estimated Original •1.010 sg Estimated Final

## **Brewing process**

This beer will be brewed using the single step infusion mash method @ 154°F. The Batch Sparge method will be used. The instructions will be geared for an insulated cooler mash-tun with a false bottom or screen of some sort. If your equipment is different, then you will need to adjust your procedures accordingly. The reference section will provide some information on alternative equipment procedures. If you have any questions, we are here to help you! Just Email us [brewery@homebrewery.com](mailto:brewery@homebrewery.com), or call us at 417-581-0963 Or 1-800-321-BREW (2739).

## **STRIKE WATER**

### **11.1 quarts @ 166°F**

The first step in brewing (apart from gathering and cleaning all your brewing gear) is to start heating up your strike water. Strike water is the water you are going to use to infuse the grain. It will need to be hotter than the mash temperature you want to maintain, because until the lid on the cooler has been closed there will be some heat lost when the water is transferred to the mash-tun and mixed with the grains.

If you are using a cooler mash-tun, it will help a great deal to pre-heat your cooler with some extra hot water. This way the cooler will not absorb as much heat when the water and grains are mixed.

Heat up 2 gallons of water to 200°F for use in pre-heating the cooler mash-tun. Place the water in the cooler, and let it heat the cooler while the Strike Water is getting hot.

Heat 11.1 quarts of clean brewing water to 166°F in your brewpot for use as strike water.

Once the cooler is pre-heated and the strike water is at the right temperature, remove the pre-heating water from the mash-tun.

## **MASH-IN**

Add about 75% of the strike water to the mash-tun, and slowly mix in the grains. Be sure that they are thoroughly mixed and there are no dry spots or dough balls. Once the grain and strike water are thoroughly mixed, the temperature should stabilize at 156°F. Close the lid of the cooler and start a timer for 60 minutes.

If the temperature is a little high, a small amount of cool water can be mixed in to drop the temperature slightly. If the temperature is a little low, some boiling water can be added to bring the temperature up.

## **PREPARING SPARGE WATER**

While the mash is resting and the starch is being converted to sugars, the sparge water needs to be prepared. Fortunately there is a little “down time” to do that right now!

Heat 5.13 gallons of clean brewing water to 170 °F in your brewpot for use as sparge water.

Sparge water should be hot enough to raise the temperature of the mash to 168°F-170°F which is a mash-out temperature. This temperature is important because it denatures some of the enzymes that have finished their work in the mash, and it decreases the thickness of the mash

to allow the wort to flow more easily. The warmer the sparge water, the more sugars it can absorb from the grains. Caution is required though: if the mash temperature rises over 170°F harsh flavors can be extracted along with the sugars.

Once the sparge water is heated and ready, a test can be done with a few drops of iodine solution to see if the starch-to-sugar conversion has finished. Always perform this test to a sample you remove from the mash. **IODINE IS POISON, SO DON'T ADD IT TO THE MASH OR THE BEER.** The process for testing with iodine is pretty simple. Take a couple of drops of iodine solution or Iodophor sanitizer concentrate and place it on a clean white plate. Then take a few drops of the liquid from the mash, being careful not to get husk material or grain bits, and place them next to the iodine on the same white plate. Stir the two together and look for a color change to black, green or purple. Iodine changes color in the presence of starch; so if the color changes, there is still starch present and the mash needs more time to complete conversion. If there is no color change, then the starches have been converted to sugar and the sparge can begin.

## **BEGINNING THE SPARGE**

Once the mash has been completed, the first part of the batch sparge can be started. Begin by adding 1.71 gallon of the heated sparge water to the mash. Stir it in gently to be sure it is well-mixed.

Re-circulation is the next step. Simply drain a few quarts of sweet wort from the bottom of the mash-tun and gently pour it back in on top of the grains. It can be poured over a spoon, plate, colander or anything else that will break up the incoming hot water so that it doesn't penetrate the grain bed too deeply. The idea behind re-circulation is that the grain bits that have made it through the false bottom or manifold are added back to the top of the grains and thereby filtered out and won't make it to the brewpot.

After the re-circulation has cleared the sweet wort, the mash-tun can be drained into the brewpot. Open the valve as fully as possible and drain all the liquid that will run out of the mash-tun. Shut the valve and re-fill the mash tun with 3.42 gallons of hot sparge water and again gently stir it in completely.

Now start the re-circulation again and drain the remainder of the sweet wort into the brewpot to complete the sparging process.

## **BEGINNING THE BOIL**

With all-grain brewing, we recommend a 90 minute boil for a couple of reasons: a longer boil will help to concentrate the sugars that have been washed from the grains, and also help to drive off undesirable compounds like DMS (think cooked vegetable smells). Bring the sweet wort up to a boil and start your timer for 90 minutes.

After 30 minutes boiling, add the package of Bittering hops

After 75 minutes boiling, add Irish Moss clarifier for protein haze reduction

After 80 minutes boiling, add the package of Flavoring hops

After 88 minutes boiling add the package of Aromatic hops

After 90 minutes boiling, Turn off heat and Chill to 68°F-72°F

Ferment until final gravity is stable.

Transfer to secondary fermenter if desired.

Rack and bottle when fermentation has completed and beer has cleared.

Allow to carbonate for 2 weeks, chill and enjoy.

## EXPLANATION OF BREWING EQUIPMENT AND PROCESS

There are several items and pieces of equipment needed for brewing beer. Those things required to brew beer with malt extract are still mostly the same and very necessary. In addition to those things, several special items are necessities.

Equipment necessary for all-grain brewing:

**Brewpot** – This is a necessary item in all grain brewing. For all-grain brewing it needs to be at least 8 gallons for making 5 gallon batches of beer. Stainless steel is the preferred material, although aluminum and enamel coated steel will work as well.

**Thermometer** – a good quality, accurate, and quick-reading thermometer is an asset when mashing the grains, allowing you to know the exact mash temperature.

**Stirring paddle** – This can be a spoon or paddle, but it needs to be long enough to reach the bottom of the mash-tun and brew pot. It also needs to be very sturdy in order to stir the dense mash.

**Wort chiller** – This useful tool is designed to cool the wort from boiling temperature to 65-78 to allow the pitching the yeast. While it is optional for extract brewing because the wort can be diluted with cold water, it is necessary when all grain brewing as no water can be added after the boil to cool the wort.

**Propane burner** – This is a great way to bring larger brew pots to a boil. Often, kitchen stoves lack the power to bring a full 5 gallons to a boil in a reasonable time. These burners have much higher heat output for a faster boil on 5 gallon or larger batches.

**Mash-tun** – This piece of equipment is where the grains and the hot water are mixed to start the mash. Here the starches from the grain are converted to sugars. This vessel can be constructed of stainless steel, like a brewpot. It can also be an insulated vessel, like a picnic or drink cooler.

**Lauter-tun** – This piece of equipment is designed to separate the liquid from the spent grains after the mash. Typically homebrewers use the same vessel for a mash-tun and a lauter-tun.

**Hot Liquor Tank** – This is a vessel to hold hot water until it is needed for the brewing process. Like the mash tun, it can be stainless steel so that water can be directly heated, or it can be an insulated plastic which will hold the temperature.

**ALL GRAIN BREWING:** A brewing method where you are essentially making your own malt extract through a process called mashing. We will go over some of the basic steps involved.

**MASH:** There are several methods of mashing, but they all involve steeping the grains with roughly 1-2 quarts of hot water per pound of grain. Ideally, the grain is put into a container that is either insulated or stainless steel, so that temperature can be maintained. This grain is then held between 145°F-158°F for 60 to 90 minutes. The mash temperature will have an effect on the finished beer. Keeping the mash temperatures lower in the range will favor enzymes that produce simpler, more fermentable sugars. These sugars ferment more easily, and will result in a beer that has a slightly lighter body and higher alcohol content. Using a mash temperature in the higher end of the range will result in a beer that is fuller bodied or heavier, with slightly less alcohol.

**RECIRCULATE:** Now is the time to separate the sweet wort from the spent grains. Ideally, the grain is in a container with a false bottom or manifold to facilitate draining. Some of the sweet wort is drained from the mash-tun and gently poured back in on top of the grains. This is done a couple of times, or until there are no more bits of grain coming out. This is called recirculation,

and it is intended to set up the grains and husks to act as a filter bed, so that sweet wort can be separated from the spent grain.

**SPARGE:** Once the filter bed has been established through recirculation, the next step is the sparge. Sparging consists of rinsing the grains with hot water to dissolve and remove all the sugars produced during the mash. In continuous sparging, usually another container with hot water (between 170 and 180) is positioned at a level above the grains so that water can be drained gently onto the surface of the mash. Sweet wort is drained from the mash at the same rate as the hot water is added to the top of the mash. This continuously washes all the available sugars from the spent grains. Another method is called batch sparging which is a little less time consuming. In this process, a portion of the sparge water is stirred into the mash after it has finished. Next the wort is re-circulated and drained. Then the remainder of the sparge water is added to the mash tun, stirred, re-circulated and drained again to finish the sparge.

**BOIL:** The sweet wort is then collected in the brewpot and brought to a boil. At this point, you set a timer for at least 60 minutes, although most all-grain recipes boil the wort for 90 minutes. This is where the all grain and extract methods of brewing converge. As the wort is boiling, you will be adding measured amounts of hops to get a bitterness that will balance the sweetness of the malt extract and add flavor and aroma to the finished beer.

**COOL:** After the boil is complete, the wort needs to be cooled down. This would be ideally done in 5-10 minutes, but can take a little longer depending on your equipment.

**FERMENT:** Once the wort is cool, it will be siphoned or poured into a fermenter where the yeast will be introduced. The yeast will start fermenting the malt sugars and converting them into alcohol and CO<sub>2</sub>. Over the course of the next week or two, the sugars will have been consumed. After fermentation has stopped, the beer is ready to be bottled.

**BOTTLE:** Siphon the beer off into a clean container and stir in a measured amount (usually about  $\frac{3}{4}$  cup) of priming sugar, typically corn sugar. Stir this into the beer well, siphon it straight into bottles and cap them up. This will re-energize the yeast and start a new ferment in the bottles, producing a little CO<sub>2</sub> and creating carbonation. The carbonation process generally takes about two weeks at room temperature.

**ENJOY:** Finally the last thing to do is to chill the beer and enjoy!