



All Grain Brewing Instructions

Introduction:

Welcome to the world of all-grain brewing! This guide will build upon everything you know about extract brewing and help answer any questions you may have along the way. The first thing to do before you brew is make sure that you have all the ingredients you need for the recipe. If you are brewing one of our kits, we can replace any of the parts before you start but not once you have started.

Equipment:

There are a number of different systems, setups and methods that can be used for all-grain brewing. These can include traditional three vessel setups, brew-in-a-bag (BIAB), and all in one systems (such as the Grainfather, Brewzilla, Guten or Braumeister). The process will vary slightly with each system however the following guide will cover the basics that apply to all systems.

For specifics on the different systems and how the processes vary it is best to consult the manufacturer of the unit or have a chat with us.

Yeast Health:

Depending on which yeast is being used there may be further steps required before the brew day begins. Typically for batches larger than 23 litres or 23 litre batches with an O.G. above 1.060 more than one pack of yeast is necessary so that there are enough yeast cells for healthy fermentation. A yeast starter is a helpful method for increasing the yeast cell count which involves pitching the yeast into a malt extract/water solution for 2 to 3 days to allow it to grow. An online yeast calculator is a useful resource for calculating how much yeast you will need.

The Mash:

The mash is the process that converts starch in the grain into sugars that can be metabolised by yeast. The efficiency of the mash will vary depending on the system and grain used but 75% is typical. The first step is to prepare the strike water (the water used to mash). Approximately 3 litres of water for every 1kg of grain is used and this should be heated 5-10°C above the mash temperature to account for the decrease in temperature when the grain is added. For a balanced conversion a mash temperature of 63-69°C is used for 60 to 90 minutes. The exact temperature will depend on the body desired in the final beer (see below). Once full conversion has taken place the mash is finished, this can be tested by adding a small sample of the mash liquid to a plate and adding a drop of iodine. If the iodine disperses outwards quickly and does not significantly change colour, then conversion is complete and the mash is finished. If the iodine turns black, then there is still starch to convert.

Mash temperatures:

Light body:	63-65°C
Medium body:	65-67°C
Full body:	67-69°C

A mashout is often performed after the mash at 75°C for 10 minutes with the grain still in the wort. This stops enzyme activity and can help prevent a stuck mash.

The Sparge:

Before the mash is over prepare the sparge water at a rate of 4 litres per 1kg of grain. Bring the mash temperature up to 75°C (mashout) and slowly start to the collection of sweet wort. The run-off must be slow as the grain bed can collapse if it is too quick. Add the collected sweet wort back to the mash until the wort is running clear and free of debris. Now the mash bed is set the sparge can begin. Sparge with either a sparge arm or with a colander to gently disperse the sparge water over the grain. Slowly collect the sweet wort in the boil kettle.

The Boil:

Once the pre-boil volume has been collected the wort can be brought to a boil. It is useful to start ramping the temperature up to a boil which the run-off from the sparge is being collected to save time however if the boil kettle uses electric elements ensure that the elements are covered with liquid first. Once a rolling boil has been reached the boil timer can be started (typically 60 minutes) and the hops can be added as per the hop schedule in the recipe.

Cooling the wort:

There are a number of ways to cool the wort to yeast pitching temperature after the boil. The most common methods are with an immersion chiller, counterflow chiller, or plate chiller. It is important to ensure that the chilling equipment is fully sterilised before use so put the immersion chiller into the boil kettle (without the cooling water running) with 15 minutes left in the boil. Similarly, turn the pump on for the counterflow/plate chiller so the boiling wort can run through the chiller for 15 minutes before the boil is over. Another popular method of chilling is no-chill – the boiling wort is transferred directly to a plastic container after the boil and sealed to cool to yeast pitching temperature.

Fermentation:

The fermentation stage of making beer is as important as the brewing of the wort. The temperature should be kept consistent throughout fermentation and is often dropped to around 2°C once final gravity has been reached. This is known as cold crashing and helps clear the beer before packaging.

For ales, the typical fermentation temperature is around 18 to 22°C.

For lagers, typically fermentation temperature should be kept between 12 to 15°C.

If a dry enzyme are included in the recipe now is the time to add it to the fermenter.

Overview of the all grain process:

1. Create recipe/check ingredients
2. Clean and set up all grain equipment
3. Calculate mash and sparge water volumes and prepare for brewing
4. Heat mash water to strike temperature
5. Stir grain into mash water for 3 minutes ensuring there are no dry spots (dough balls)
6. Mash for 60 to 90 minutes depending on recipe
7. Increase mash temperature to 75°C for 10 minutes (mash out) and begin sparging slowly until full pre-boil volume has been collected
8. Bring sweet wort to a rolling boil and add hops as per recipe
9. After the boil, cool wort to yeast pitching temperature and transfer to fermenter for fermentation
10. Take a reading using your hydrometer! This is very important to calculate the final alcohol content of your beer as well as troubleshoot any roadblocks that you may run into along the way.

Hints & tips:

All the calculations for mash and sparge water can be calculated manually however there are a number of helpful apps and websites that can help you out. A few of the most popular ones are:

Brewfather
BeerSmith
Brewer's Friend

There is also a plethora of information online regarding the whole brewing process from building a brewing system to the science behind mashing at different temperatures.

For further information about brewing beer and some great recipes the following books are a great place to start:

How to Brew – John Palmer
Designing Great Beers – Ray Daniels
Clone Brews – Tess & Mark Szamutulski
Brew Chem 101 – Lee W. Janson, Ph.D