

Using Brew4You Systems

1.0 Introduction

In the following sections, we will go through, in detail, how Brew4You Brewing Systems are used to brew beer. When you have read the manual, and possibly been brewing your first All Grain Beer according to the directions, you will be capable of brewing beer according to your own Recipes, using the relevant Mashing Schemes and the parameters, that works for you.

Before starting, it will be a good idea to seek information about brewing beer in general. As an example, You can study www.howtobrew.com.

In this manual, we will be brewing a German Weizen.

Our Weizen are characterized by the following parameters :

OG	FG	Colour (EBC)	Bitterness (IBU)	Alcohol %
1.040-1.056	1.010-1.014	4-18	10-20	4.3-5,6
Approx. 1056	Approx. 1014	Approx. 15	Approx. 13	Approx. 5,5

OG is Original Gravity. FG is Final Gravity.

The bold figures declares the "standard" for the type of beer. The figures below, are what we expect our Weizen to be.

As can be seen, there is a certain amount of slack for the individual parameters. As a Brewer, you can therefore influence your beer in the direction you want, and still be within standard.

The manual is divided in the following sections :

- Preparations
- Heating Program
- Mashing Program
- Sparging Program
- Boiling Program
- Chilling Program
- Ready for next Brew

2.0 Preparations

Before Brewday :

You need to buy the ingredients, that will be used in the recipe. In this manual, the recipe is already prepared, but for you to compose your own recipes, and keep track of how varying the parameters influences flavour, colour, bitterness, amount of alcohol etc, it is advisable to get access to tools, that helps with that. An example is ProMash.

The amounts of malt, hops, yeast and additives depends on the size of your Brew System. The table below shows the Weizen recipes for the B4Y-50, B4Y-70 and B4Y-100 Systems. The table also shows the amount of water to fill into the Mashtun and the HLT before start, the resulting amount of wort transferred to the Boiling Kettle and finally the amount of wort transferred to the fermenter. Amounts in gram and liters.

		B4Y-50	B4Y-70	B4Y-100
Malt	Wheat Malt 3 EBC	3900 gram	5500 gram	9150 gram
	Cara Amber 60 EBC	900 gram	1275 gram	2125 gram
	Pale Ale Malt 7 EBC	2450 gram	3425 gram	5700 gram
Hops	Tettnanger 3,8% Alpha (Bittering)	30 g in 60 min	40 g in 60 min	65 g in 60 min
	Tettnanger 3,8 % Alpha (Aroma)	50 g in 10 min	70 g in 10 min	120 g in 10 min
Yeast	WLP300 Hefeweizen Ale	2 vials	3 vials	4 vials
Additives	Orange (Flakes))	50 gram	75 gram	120 gram
	Coriander	5-10 grain	10-15 grain	15-20 grain
Brew amounts	Liters to be boiled	38 liter	52 liter	82 liter
	Liters to the Fermenter	32 liter	45 liter	75 liter
Water amounts	MashTun (+ covering the false bottom)	25,4 liter	35,7 liter	59,4 liter
	HLT	Approx. 40 liter	Approx. 55 liter	Approx. 80 liter

The hops and the additives are added in the Boiling Program, and for that you will need 2 hop bags. The additives will boil for 10 minutes, and can be put in the same hop bag as the aroma hop. On a B4Y-50 system, 30 grams of hop (Bittering Hop) will boil for 60 minutes, while 50 grams of hop (Aroma Hop) will boil only the last 10 minutes

1.5-2 days before brewday, you will need to prepare a yeast starter (see www.whitelabs.com) which will assure, that we have enough yeast for the fermenting proces.

On Brewday :

On Brewday, we will need to crush the malt. This can be done by using a grain mill. To get the best result, the space between the rollers should be approx. 1.0 millimeters. If you do not have your own grain mill, the supplier of malt will be happy to crush it for you. Notice, that this can result in a somewhat rougher crush, which again can influence the efficiency

The Brew System will need cleaning and sanitizing before use. For cleaning, use mild detergents of percarbonate-based cleaners. For sanitizing use Iodophor. (It is recommended to always clean the kettles thoroughly with a sponge after the brewing proces, whereby the system will be ready for the next batch)

Connect hoses as in the Heat Program (see later). Fill the MashTun with approx. 15 liters of cleaning detergent and start the pump. When the pump have been going for 10 minutes, transfer the content of the MashTun to the Boil Kettle, connect hoses as in the Chilling Program (see later) and restart the pump. Hereby the Boil Kettle will empty, and you will also have your counterflow chiller cleaned. Repeat the proces with a iodophor detergent for sanitizing, and finally again with pure water, to have the system rinsed and ready for use.

Now the fun can begin !

In the MashTun, fill with cold water, so that the false bottom is just covered. Then add additional 3.5 liters of water per kilogram of malt. In our B4Y-70 system, the recipe says 10.2 kilogram of malt. Therefore this calls for addition of 35.7 liters of water. You can use the meter to reach the right level.

Experience shows, that the Brew4You systems can work using between 2.75 and 3.50 liters of water per kilogram of malt. In general, a thin mash will give a more fermentable beer, while a thicker mash will give a less fermentable and thereby sweeter beer. Give time, and you will have your own preferences.

Fill the HLT 80-90% with pure water. This is not that important, we just need enough water for the Sparge Program, at the same time securing, that the heat exchanger is covered, so that it will provide optimal performance during the brewing proces.

We now need to program the Brew4You system so that heating, mashing, sparging and boiling will run according to plan. (for details, see User Programming)

The following parameters are entered for our Weizen : (degrees Celcius)

Proces step	Mashtun	HLT	Timer
Heat program	41 degrees	48 degrees	N/A
Mash Step 1 (Mash-in)	40 degrees	47 degrees	25 minutes
Mash Step 2 (Beta amylase)	60 degrees	67 degrees	30 minutes
Mash Step 3 (Alfa amylase)	68 degrees	75 degrees	40 minutes
Mash Step 4 (Mash-out)	76 degrees	83 degrees	10 minutes

Proces step	Mashtun	HLT	Timer
Sparge program	N/A	81 degrees	N/A
Boil Program	N/A	N/A	60 minutes

Note, that the MashTun in the Heat Program is heated to 41 degrees. When the malt is added, the temperature will drop to approx. 40 degrees, ready for the Mash-in proces.

The purpose of Mash-In or "Doughing-In" is mixing the grist with water to allow time for the malt starches to soak up water and time for the enzymes to be distributed. The step is considered optional, but experience shows, that including it will increase overall efficiency by a couple of points.

The Beta amylasis typically takes place in the temperature range 55-65 degrees, while the Alpha amylasis takes place in the range 68-72 degrees. The chosen parameters for our beer will yield a not too sweet Weizen with a rich body.

The reason for the difference in temperature between the 2 kettles is, that the HLT is used as heating source for the MashTun. The difference assures, that real heat is added to the MashTun, when the pump is on, and it must be sized so that loss of heat in the hoses is eliminated. At the same time, the difference must not result in too big a difference between top and bottom in the MashTun. Typically, the loss of heat from the HLT to the sparge ring is about 4 degrees, and from experience, the difference can be set in the range 6-9 degrees between the 2 kettles. Bear in mind though, that the water that is added to the MashTun through the sparge ring, must not exceed approx. 80 degrees. (corresponding to approx. 84 degrees in HLT).

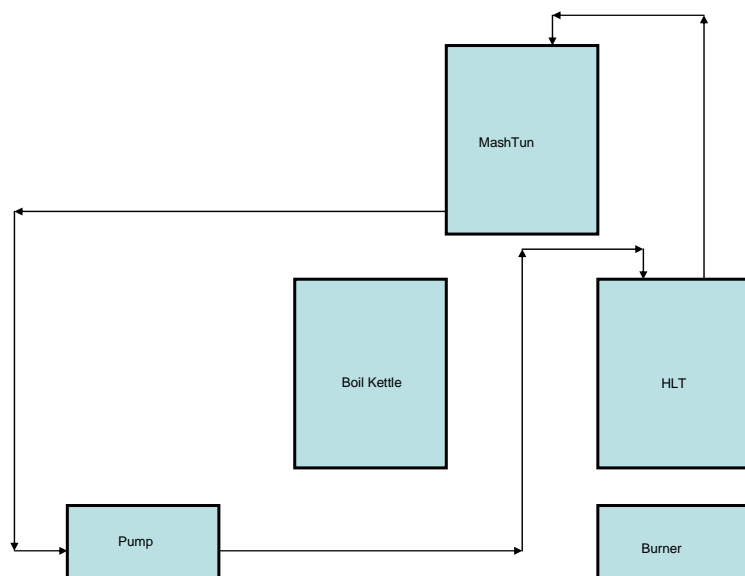
Now, we are ready !

3.0 Heating Program

During the Heating Program, connect the hoses as shown below.

From the pump output, connect the hose to the heat exchanger in the HLT (the small spiral). From the heat exchanger to the sparge ring in the MashTun and finally, from the valve in the MashTun, back to the pump input.

Flow – Heating- and Mashing Program



Before starting the program, make sure, that no airlocks are in the system, and that the flow works.

You do that by first open the valves. Now the hose from the MashTun to the pump will slowly fill with water. After about 1 minute, turn on the pump manually via the control panel. The pump will try to press the water through the system and back into the MashTun. If it does not work in first go, turn off the pump, wait for 15 seconds, and try again. After 2-5 trials, the flow will work.

We are now ready to start the Heating Program. Make sure, that the burner is in place under the HLT, connect the gas, and turn on the ignition flame. Place lid on HLT and MashTun.

Via the control panel, go to Main Menu. Press <Heat program>, then <Start>. Now the burner and the pump will start simultaneously, and the system will heat the water in the 2 kettles to the desired level. At all times, you can stop and restart the program by pressing <Stop Reset> and <Start>.

When the MashTun temperature reaches desired level (for our recipe 41 degrees), an alarm will sound from the control panel.

As a rule of thumb, the burner can heat 1.25 liters of water 1 degree in 1 second, if done at surrounding 20 degrees, and with normal considerations for loss of heat in the system.

Therefore, if the water temperature at start-up is 15 degrees, a B4Y-70 system will take about 40 minutes to complete the Heating Program.

Now its time to add the malt. Before adding the malt, close the valve on the sparge ring, and remove it temporarily from the MashTun. Be aware of hot water !

Add the malt slowly and stir thoroughly. When all the malt has been added, and mixed well with the paddle, remount the sparge ring. The ring itself must be about 2-3 cm over the surface. Mount the lid to account for loss of heat, and reopen the valve.

Now, the temperature in the MashTun has dropped a couple of degrees (1-3 degrees), and we are ready to start our multistep Mashing Program.

4.0 Mashing Program

During mashing, the malt enzymes will be activated, and the process of converting the grain starches to fermentable sugars takes place.

Do not change the setup of hoses.

From the Main Menu in the control panel, press <Mash Program>, then <Start>.

The Mashing Program will now start, and automatically go through Mash-In, the Beta Amylase rest, the Alpha Amylase rest and the Mash-out according to the parameters programmed. The control unit will keep track of temperature levels and timers.

When one step in the mashing process is completed, the pump and burner will start to take the system to the next level in the process (Transit time). During transit, clock is stopped, but you can always see total elapsed time for the Mashing Program on the display.

After the Mashing Program has been started, the MashTun must not be stirred with the paddle anymore. The pump will make sure, that the mash will be thoroughly recirculated, and little by little, the grain bed will settle and form the filter that we will later benefit from when, during sparging, the grain bed will be rinsed to extract as much sugar as possible.

When the Mashing Program is completed, an alarm will sound.

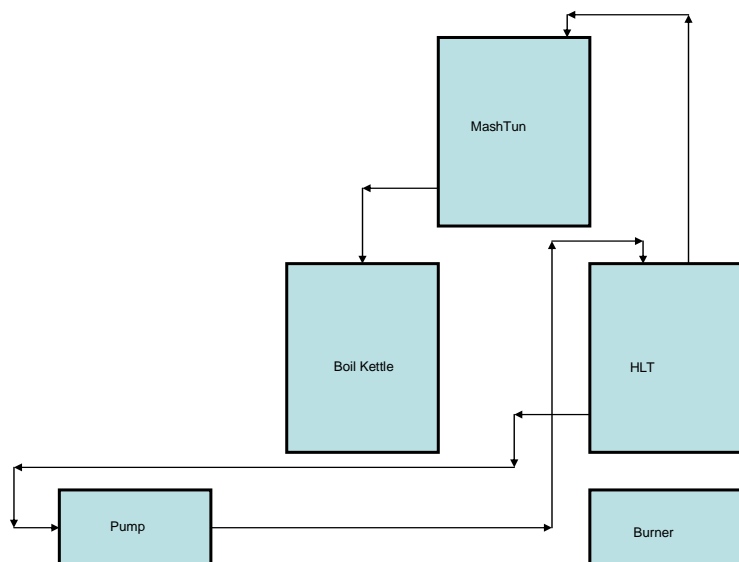
5.0 Sparging Program

The purpose of the Sparging Program is to separate the sweet wort from the mash. Since we have had a lot of recirculation during mashing, the wort is already running clear from the start. Now we just need to add more hot water from the HLT to assure, that as much sugar as possible is extracted from the grain, and that the necessary amount of wort is transferred to the Boil Kettle.

Now, connect the hoses as shown below :

From the valve on the HLT to the pump input, through the heat exchanger in the HLT (as before), to the sparge ring in the MashTun and finally from the MashTun valve down to the Boil Kettle.

Flow – Sparging Program



Be aware to close valves, when hoses are dismantled/moved. The wort is warm, and you can get burned, if not cautious. Remember to reopen the valves.

During sparging, the sweet wort will be transferred from the MashTun to the Boil Kettle, both the wort that has been in the kettle during the whole process, and the water we will add from the HLT, to extract the last amounts of sugar and to get enough wort for the Boiling Program.

Now the pump will be feeding from the HLT. Again, but not likely, airlocks that will have to be removed before start of program, can occur. Start and stop the pump until flow works.

From Main Menu in control panel, press <Sparge Program>, then <Start>.

Now, the pump will add warm water from the HLT through the sparge ring to the MashTun. When the level sensor in the MashTun closes (Status=High), the pump will stop. We now have about 2-3 cm of water over the grain bed.

Now open the valve in the MashTun, but only so that about 0.75 liters of wort is transferred to the Boil Kettle per minute. You will soon find the setting of the valve. The relatively slow flow will assure, that as much sugar as possible is extracted from the mash.

During sparging, the control unit will make sure, that water is constantly over the grain bed, so that it will not be compacted by gravity and the filtering capabilities will be intact. At the same time, the water that will be added from the HLT will be kept at the desired temperature.

The Sparging Program continues until you have enough sweet wort in the Boil Kettle (provided, that you have enough sparge water in your HLT)

Alternatively, you can stop the program, when 10-15 liters are still to be transferred to the Boil Kettle, and drain the MashTun for the missing amount. This method requires less amount of water in the HLT, thereby quicker heating, and in reality, it does not affect efficiency very much when done at this stage, even if the filtering capabilities of the mash will be partly reduced. In general, the use of this technique depends on recipe and quantity of beer. As a rule of thumb, the mash will absorb about 1 liter of water per kilogram of malt.

Stop the Sparging Program by pressing <Stop>.

It is now time to measure so called Boiling Gravity or BG. This can be done using a Hydrometer. Be aware, at which temperature your hydrometer is calibrated (Typically 15 or 20 degrees Celcius). Place the hydrometer in a cylinder glass, add wort, cool under cold tap and read BG. For our Weizen, BG should be about 1050. This corresponds to an efficiency at around 80%, which is what we will typically achieve on a B4Y system, brewing Weizen.

6.0 Boiling Program

We are now ready to take our wort to boiling level and to add hops and other additives. Move the burner to the Boil Kettle. From the Main Menu in the control panel, press <Boil Program>, then <Start Burner>.

During mashing, we have used our scale to weigh out the correct amount of hops and additives, and placed them in hop bags.

The purpose of the Boiling Program are to :

- Extract bitterness, taste and aroma from the hops
- secure formation of Hot Break
- sterilize the wort
- destruct all enzymes
- Boil down the wort to the desired amount

When boiling level is reached, manually regulate the burner, so that the wort is boiling without boiling over. During the first minutes, a foam will rise. This is caused by proteins in the wort, that are coagulating due to the boil. Eventually they will clump together and sink back into the Boil Kettle. Watch out for boil overs.

Let it boil for 5-10 minutes. Now you will see particles floating around in the wort. This is called Hot Break.

Now the first addition of hops takes place. It will provide bitterness to the beer, and will be in the Boil Kettle for the entire 60 minutes boil. On the control panel, You are already in the Boil Program. Press <Start Timer>. Timer will count down from 60 minutes, an sound an alarm when the Boiling Program is completed.

Remember, not to cover the Boil Kettle with a lid during the boil. In the wort, sulfur compounds occur, and we want them to boil off. Using a lid, they will condensate and fall back into the wort. The result can be unwanted flavours in your beer.

The Orange and the Coriander are packed with the second portion of hops. They will be added, when 10 minutes remains in the total boil. The result is taste and primarily aroma to the finished beer.

You can choose to add eq. Irish Moss 10-15 minutes before end of boil. It must be added while stirring in the proportion 8 grams of Irish Moss to 100 liters of wort. Irish Moss, and the like, will increase the formation of Hot-Break, and make it easier to later separate it from the wort, when, using the counterflow chiller, transforming the wort to the fermenter.

When the boil is over, remove the hop bags from the Boil Kettle. Be sure to get as much wort as possible out of the bags. Using the paddle, stir vigorously for 3-5 minutes forming a whirlpool. This technique will cause Hot-Break and other unwanted particles to gather in the center of the Boiling Kettle, and thereby not get transferred to the fermenter in the following process. Let the whirlpool spin for 15-20 minutes. During this period, the wort is cooled to an extent, so that cavitation will not occur in the pump.

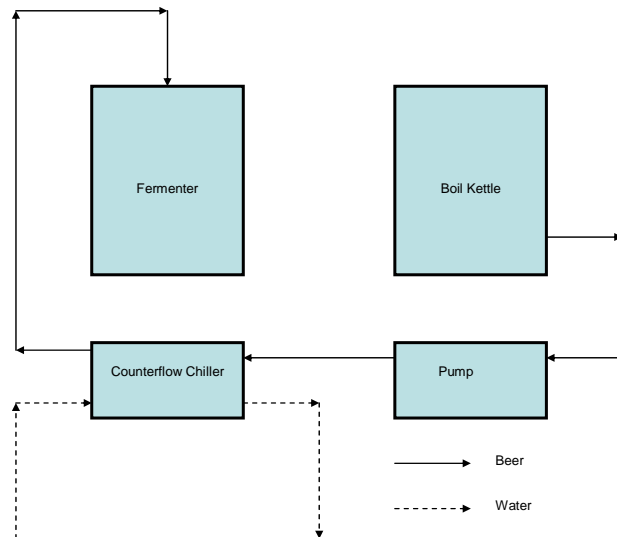
It is now time for the last step in the brewing process, namely the cooling.

7.0 Cooling Program

The purpose of the Cooling Program is, to have the wort cooled quickly, and at the same time transfer the wort to the fermenter, which will have to be cleaned and sanitized in advance.

Mount the hoses as shown below :

Flow – Cooling



From the Boil Kettle to the pump input, to the beer input on the counterflow chiller. From the chiller output directly to the fermenter. Remember to counterflow connect the water.

Again, watch out for hot fluids. Open the valves. If needed, manually secure the flow through the system as described earlier.

Turn on the water and manually start the pump. Let the cooled wort splash into the fermenter in order to have it well aerated.

With a thermometer, read the temperature. Our Weizen is a top-fermenting Ale, and the ideal fermenting temperature is about 22-24 degrees. Control the valve, and possibly the cold water, so that the desired temperature is achieved. The rate of cooling will be in the area of 10 liters per minute.

During the transfer to the fermenter, fill your cylinder glass again. We have had some boil-off, and must measure gravity once more (Original Gravity or OG). This time, the hydrometer should read about 1056.

Stir the fermenter well with a sanitized paddle, add the yeast starter, place the lid and airlock, and look forward to enjoying your Weizen, when fermentation, conditioning, bottling and aging is done.

The brewing process is now completed. Total elapsed time is +/- 6 hours depending on volume. About 1,5-2,5 kilograms of gas has been consumed.

A Weizen like this, typically ferments 8-12 days in first fermentation and 3-8 days in second fermentation.

If it is to be bottled, add about 13 grams of sugar per liter of beer for the carbonation. Dissolve the sugar in 0.25 liters of warm water, cool it and add it to the beer just before bottling. Let the bottles rest for 2 weeks in room temperature, and transfer them after that to your cellar, where (if kept at 6-8 degrees) they will be ready for drinking after another 2-3 weeks.

If you keg your Weizen, carbonation will be done using Co₂. For best result, carbonate through the beer line. Scale the pressure to 2 bar. Place the keg under pressure for one week at 6-8 degrees, and your Weizen is ready for you to drink. It will not damage the beer though, to let it age for some more time.

8.0 Ready for next Brew

When the brewing is done, we must clean and sanitize the equipment, so that it is ready for our next brew.

The sparge ring and the heat exchanger has been thoroughly flushed with warm water during the Sparge Program. No further cleaning is therefore needed at this time.

In the MashTun, the mash together with the amount of water that was not transferred to the Boiling Kettle during the Sparge Program, still remains. When the Boiling Program starts, mount a hose from the Mashtun to an empty bucket. Open the valve. This will transfer most of the remaining water to the bucket. Dismount the sparge ring. It is now possible, gently via the slide, to pour the mash into an empty container. Dismount the MashTun and clean kettle and false bottom with a sponge and the cleaning detergent.

Clean the Boil Kettle the same way.

After this, mount the hoses from the valve on the HLT to the pump input, to the beer input on the counterflow chiller and directly to the zink. We will now use the remaining hot water in the HLT to flush pump and chiller.

Finally clean the HLT in the same way as MashTun and Boil Kettle.

End the process by wiping the entire system with a soft wet, then dry cloth. Turn off the gas and power.

Now you are ready for your next brew.