

## **Setting up your equipment profile in Beersmith 2**

For an introduction for first time users of Beersmith 2 see this article by Pat <http://www.beersmith.com/forum/index.php/topic,5140.0.html#new>

### **Some important considerations:**

For this how to please read the entire article before you start entering figures.

### **Definition of Beersmith 2 efficiency terms.**

You will find these labels on the recipe formulation page with their matching fields for the efficiency figures that can be expected from your equipment.

**Tot Efficiency** - [Total efficiency] this is the actual efficiency returned by your brewery accounting for all losses all the way through to your fermenter.

**Est Mash eff** - [Estimated mash efficiency] This is the figure used to estimate the beer specific gravity, estimate the bitterness, forecast the beer colour and provide an estimate of the beer's alcohol content.

**Tot Efficiency** [or Brewhouse efficiency] uses the **Est Mash eff** figure to estimate the beer specific gravity, estimate the bitterness, forecast the beer colour and provide an estimate of the beer's alcohol content then without altering those figures subtracts kettle and chiller losses to provide a system efficiency you have collected in the fermenter. The greater the losses, the lower the **Tot Efficiency** [or Brewhouse efficiency] figure will be.

### **Two setup methods are available for Beersmith 2**

\* Beersmith 2 is a wonderfully versatile tool and offers two methods to "nail down" the important figures.

\* Either method will return the same Final gravity, Bitterness, Colour and ABV readings so all you need to do is tell the program how to calculate your efficiency factor for either the "Est Mash eff " or "Tot Efficiency" method of equipment efficiency.

"Tot efficiency" is the preferred Beersmith 2 method to establish an equipment profile.

These two terms are now used to guide you as you set up Beersmith 2 for the first time.

You will need to know how much liquid is lost in your system. To do this, if you don't know already put about 15 litres [about 3.5 gals] in your HLT and then transfer that liquid into your mash tun and then into your kettle. Transfer this liquid in the same way you would on a brew day as you want to determine how much is lost in the Mash tun and how much is lost to the kettle. These figures will be close enough to get you started and over the course of about 5 brews you will get much more accurate losses.

The boil off from your kettle will initially be an intelligent guess. You can ask other brewers what they consistently get and average those figure to arrive at a starting point to use and refine over 5 brews. See also this calculator linked in Pat's post.

As a set of test figures and to learn how to create a personal equipment profile follow these steps using these figures. **[Profiles] – [Equipment] – [Add Equip]**

You should have a new form titled My Equipment

Rename that form to - **Test set up** -

set the next field [Brewhouse efficiency] to 74.6% or 66% depending on the efficiency method you intend to use. Either, End of boil [Mash efficiency] or Into fermenter [Tot Efficiency].

**For this exercise set it to 66%**

\* Please note the **74.6% or 66%** figures used here are for example only.

\* Which efficiency figure to use for recipe calculation?

\* The **Est Mash eff** [74.6%] calculates all volumes based on all kettle loses added to the amount you want in the fermenter and counted as your batch size. Using this method on your

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equipment tab you enter "0" as "Loss to trub and Chiller" and set your batch volume to Fermenter amount plus the amount you lose to trub and Chiller.

\* The **Tot Efficiency** [66%] calculates all volumes based on all kettle and chiller losses entered separately into the "Loss to trub and Chiller" field and the Batch volume field. Your batch volume is entered as the final amount you want to collect in the fermenter minus the "Loss to trub and Chiller" amount. Explained as we progress -- Read on.

Leave the Hops utilisation factor at 100%

### **Figures based on a 36 Litre round Rubbermaid with a stainless steel false bottom**

Locate the Mash tun volume and change that to 36 litres  
Mash tun weight can be set at 5 kg [Eventually weigh your mash tun]  
with 0.30 set as the Mash tun specific heat for a plastic cooler.  
Set the Lauter tun dead space at 1.2 litres

How you assign the next set of figures determines the efficiency of your system based on the volume you decide. These figures will be arrived at over at least 5 brews and by keeping careful notes.

\*\* For this example equipment set up use the "**Tot Efficiency**" efficiency method below.

For "**Tot Efficiency**" allocate figures in the following way

Assuming the amount you aim to collect in the fermenter is 23 litres  
and your actual Loss to trub and Chiller is 3 litres  
set your Loss to trub and Chiller field to "3"  
set your batch volume to 23 litres  
Your efficiency method is now "**Tot Efficiency**" [66%] in the Brewhouse Efficiency field.

This will eventually correspond to the 66% figure in a further recipe example. This is the recommended approach to setting up your equipment with Beersmith 2.

Move now to the boiler section.

Top up kettle water = 0

Tick the Calculate boil Vol automatically

Set your boil time to 60 minutes

Boil off = 4.76 litres [Evaporation is 15%]

You should have a Boil Volume of 31.8 litres and a Post boil Vol of 27.04 litres

Leave shrinkage at 4% for this test set up.

For this exercise recheck you have entered the figures as outlined above to give "**Tot Efficiency**". When you are satisfied click "OK" and your new profile will be saved.

Now create a quick simple recipe. **[Add Recipe]** In the situation of a real recipe all losses are being carefully measured.

Click on the Equipment profile tab which is just below the Brewer name field.

From the form that appears select the "Test set up" Equipment profile you created and saved. Batch size should read 23 litres, efficiency should read 66% and boil volume should be 31.8 litres. Our system will now calculate our recipe based on "Tot Efficiency" an automatic Est Mash eff figure will be calculated from your equipment set up when you have entered your recipe.

### **Mock recipe:**

Add 5 kg of Pale malt (2 Row) UK [1.036]

Add 200 gms [.2 kg] of 60L crystal

Add 30 grams of Amarillo at 8% Alpha Acid @ 60 minutes

If your grain figures are the same as mine then --

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Your Est Original Gravity should read 1.045  
Your bitterness should read [Tinseth] 26.3 IBUs  
Colour is 16.6 EBC  
and the ABV is 4.6%

### But what if I do want to work with "Est Mash eff ". How do I do that?

Easy - "Est Mash eff " is provided automatically on your recipe creation page based on your equipment set up but you must still accurately assign kettle trub and chiller losses.

So that you can appreciate that both methods "Est Mash eff " and "Tot Efficiency " factors produce exactly the same results, leave your recipe as you have created it - give it a name - and save it.

Reload that same recipe again but now we are going to alter the equipment details to reflect how the system would calculate the same recipe as "Est Mash eff " .

Beside the Equipment button now labeled "Test set up" there is a tick icon - click that with your mouse and it will open up your equipment form.

Change the Brewhouse efficiency figure from 66% to 74.6%

set your Loss to trub and Chiller field to "0" - zero litres.

set your batch volume to 26 litres

You have now added the Loss to trub and Chiller amount to the amount you want in the fermenter. You wont transfer all that to your fermenter however.

Your efficiency method is now "Est Mash eff "

Click OK

Your recipe components are still the same and all previous numbers provided are the same so how can that be when we are now increasing our efficiency number?

At the end of the boil your mash efficiency for your setup is 74.6% based on a total flame out volume of 26 litres.

The final specific gravity of your beer will not alter after the boil is ended but if you base your efficiency on the amount collected in the fermenter, "Tot Efficiency ", the percentage figure will drop relative to the amount left in the kettle as your actual Loss to trub and Chiller.

**Remember that although the efficiency numbers are different they are in reality providing you the same beer. The different numbers are based on what is in your kettle at the end of the boil and the real amount you collect in your fermenter.**

You can summarise as follows -- Tot Efficiency - this is the actual efficiency returned by your brewery accounting for all losses all the way through to your fermenter.

Est Mash eff - This is the figure used to estimate the beer specific gravity, estimate the bitterness, forecast the beer colour and provide an estimate of the beer's alcohol content and is based on the total contents of the kettle at the end of the boil. This percentage figure can also be regarded the same as the percentage figure transferred to the kettle after the runoff from the sparge and at the start of the boil. Percentage wise it will not change at the end of the boil if you are consistent with everything in your process. At all times though you will only get accurate results with accurate figures.

Tot Efficiency uses the Est Mash eff figure to calculate the beer specific gravity, estimate the bitterness, forecast the beer colour and provide an estimate of the beer's alcohol content then without altering those figures subtracts kettle and chiller losses to provide a system efficiency you have collected in the fermenter.

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After about 5 careful brew days you should have a fairly repeatable understanding of the efficiency from your system.

### **Fine tuning:**

For an accurate reading of your "**Tot Efficiency**" on a real brew day take a cooled hydrometer reading from a sample from your fermenter [This assumes you have achieved all the target figures you set for volumes and losses] read the hydrometer and take the reading. If it matches your recipe then the number set for your efficiency factor is correct. However if the hydrometer reading is higher adjust your "**Tot Efficiency**" number up until the final gravity slider/number matches your hydrometer reading. For a lower hydrometer reading lower the "**Tot Efficiency**" number until it matches the hydrometer.

### **Important:**

When you adjust this "**Tot Efficiency**" figure on the Recipe formulation page it will not alter the **Est Mash eff** figure next to it at the head of the recipe. The **Est Mash eff** figure is derived from your recipe and the efficiency figure entered in your equipment setup form. To ensure both figures are correct to your brew day hydrometer reading, click on the tick icon beside your equipment button and change the "Brewhouse Efficiency" figure in your equipment form to reflect the new "**Tot Efficiency**" figure arrived at as you fine tune your system

Your "**Est Mash eff**" figure will be adjusted by Beersmith 2 as you enter the new "**Tot Efficiency**" figure in the "**Brewhouse Efficiency**" field within the equipment form used for your system.

Your system [**Tot Efficiency**] figures rely on your consistency with grain measurements, water volumes and equipment losses and will provide you with an accurate **Est Mash eff** figure which is derived from your equipment setup .

### **In summary:**

You can use either method to achieve reliable efficiency figures with Beersmith 2 however it is recommended that you allocate all kettle, trub and chiller losses in their appropriate fields and use the "**Tot Efficiency**" method of equipment set up and allow Beersmith 2 to display the **Est Mash eff** figure for you. As stated earlier both methods return exactly the same beer specific gravity, estimate of the bitterness, forecast beer colour and estimate of the beer's alcohol content.

If you decide to share your recipes on line make a note what efficiency method you used and even post your batch volumes and losses. This will help other brewers understand what your efficiency numbers mean.

Finally when you are satisfied with all data collected after about 5 brews create a new equipment profile that contain all the information you have collected.

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