

The Brewer's WorkSheet

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Introduction

Thanks for buying The Brewer's WorkSheet. In creating it, it has provided me with a tremendous flexibility in formulating beers that conform to a style and yet reflect my own personal brewing touch. I'm sure that it will help you to analyze your recipes and produce exciting *and* authentic brews. *Ein Prosit!*

The Brewer's WorkSheet is a software product licensed to you, as the purchaser. You are allowed to use it as you need it, but you may not give away copies for others to use, even if you make changes to its formulas.¹

In reading this manual, you may notice that there are a couple of typographic conventions followed. Whenever you see a word in the Chicago typeface, such as *Windows*, it means that you will find that word in the menu bar or under one of the menus in the menu bar. When you see words in the Geneva typeface, as in *brewer's* macros, these are either file names that you will see under the finder or the values you will see while working in the spreadsheet.

The best way to become familiar with The Brewer's WorkSheet is to read the manual while sitting in front of the computer. Because it is based on an existing program, there are certain inherent limitations in the layout of the worksheet, so reading the chapter on Worksheet Layout is important. After that, you can skip to the Tutorials, which will quickly show you how to make use of the features of the worksheet. The Operation chapter is a reference guide and includes many tips to making the fullest use of the template and Excel.

What The Brewer's WorkSheet Does

As an accomplished homebrewer, you have gained a great deal of detailed knowledge. In developing new recipes and adapting published ones, or in reviewing your past triumphs and failures, there is a great deal of tedious arithmetic to work through. On top of that there are those brewers that may use different units of measurement from yours.

The Brewer's WorkSheet provides a uniform way of recording your recipes and the formulation decisions that went into their creation. Besides just listing grains and hops, it also has 3 *calculators*

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that automatically determine your expected original gravity and beer color, hop bitterness, and the kind of water you are using. All you do is walk through the sheet, filling in the boxes, and the calculations are done for you. Once a recipe is entered, the units can be changed to something more convenient for you (e.g., turn grams of hops into ounces).

There are a variety of parameters that you can adjust to match your particular brewing process. You can use these to determine, for example, the extraction rate of a published recipe and then adjust it to match your rate. After the adjustment, you can then tinker with the grains to adjust the color back to the recipe's. Similarly, you can determine the hop bitterness and rework it for different varieties of hops.

With this information, you can quickly double check on later attempts to duplicate a winning recipe, pinpointing troubles or verifying their similarity.

System Requirements

The Brewer's WorkSheet is a *spreadsheet template* that works on top of Microsoft's Excel spreadsheet program on the Apple Macintosh computers. It was developed on an Apple Macintosh II computer, but will run quite acceptably on Macintosh 512K, 512Ke, Plus, or SE machines as well. Although very convenient, a hard disk is not required.

This package does not include the Excel spreadsheet program—you must purchase it separately.

Why Would You Use The Brewer's WorkSheet?

Do the award winning recipes that appear in *zymurgy* fascinate you? I love to go through them and compare the original gravity reported with what I would expect from my brewing setup. The differences can be enormous! Since I read an article about calculating beer color, I also wanted to go back and "see" what color these beers were. But that was complicated enough that I could no longer do it in my head, so it quickly got tiresome. However, now I can sit in front of the computer and enter each recipe and get a complete breakdown on its bitterness, color, and the extraction rate that the brewer got (and, from my experience, what I would get with the same ingredients and my brewing technique).

There is nothing that the Brewer's WorkSheet does that you can't on a hand held calculator or in your head with some scratch paper. It's just that it's a fairly tedious job; most people I've spoken to rarely go through the effort and instead rely on their "common sense." Often enough, these people then employ their common sense to determine what went wrong or

why their previous award winning

recipe is now a dud. With the Brewer's WorkSheet, the differences pop out—it becomes obvious that the brewing liquor is vastly different, or the extract was not what was expected, or the substitution of different grains changed the color, or...

The Brewer's WorkSheet is just another tool, like a lauter tun or a siphon hose. But it brings uniformity to your record keeping system and all of the measurements you take while brewing. It allows you to compare recipes on an apples-to-apples basis. And you can customize it for the way you work.

Worksheet Layout

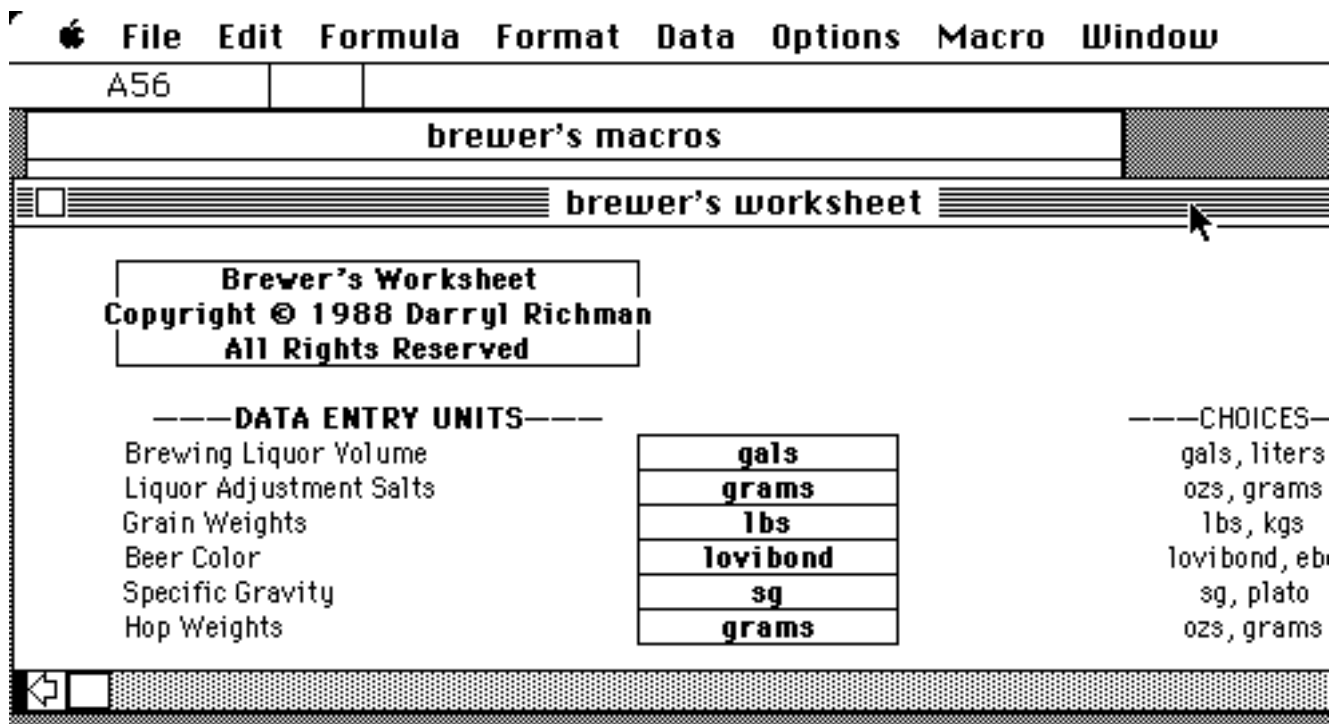
Overview

There are many pieces to The Brewer's WorkSheet. In this section, we will describe each one in order, beginning in the upper left corner of the worksheet, progressing across and then down the sheet. You should bring up the blank brewer's worksheet and brewer's macros files in Excel (see the section on Starting Up, below).

One thing to note is that whenever a piece of information must be entered by you, a place will be provided that has a box drawn around it. Your replies will always appear in boldface. Sometimes values you enter are copied to other places on the worksheet; in these cases, they will appear in boldface but they will not be boxed. Remember, you need only walk through the worksheet filling in boxed areas and the Brewer's WorkSheet will do the rest.

Data Entry Units

Here you select which units the recipe will use. Your values should match one of the choices listed on the right of the boxes. If you enter something invalid, "**<-Bad Value**" will appear on the right.



The units available may not be completely familiar. While many of them are standard weight and volume units, such as gallons, liters, pounds, kilograms, ounces and grams, others are very specialized for brewing chemistry.

The choices for Beer Color are lovibond and ebc. Degrees Lovibond are used by American and British brewers, while the continental Europeans use a different scale approved by the European Brewing Conference. Fred Eckhardt also sights a newer definition created by the American Society for Brewing Chemists called the Standard Research Method, which is very close to the Lovibond scale.

Specific Gravity is usually expressed as either SG (specific gravity itself) or as degrees Plato. Specific gravity is the ratio of the weights of a volume of a sample to the same volume of water. In brewing, the ratio of wort or beer to water is usually in the range of 1.000 to 1.100, and often the leading "1." is dropped. If you choose to use specific gravity here, we will follow that convention. Specific gravity is the common measurement for the British brewing industry. Degrees Plato indicate the percentage of dissolved solids in the beer or wort. This scale is common in Europe and the Americas.

Conversion Units

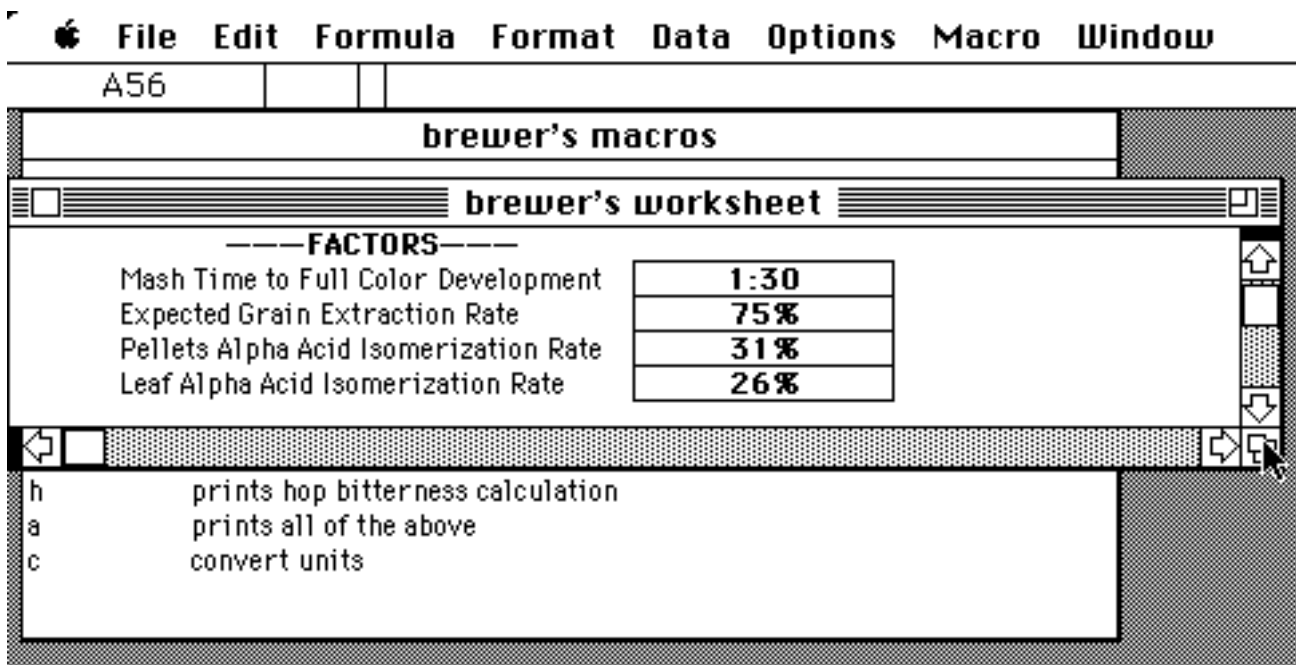
If you have a recipe that uses one or more units that you find inconvenient (such as ounces of hops instead of grams), you can change them after entering the recipe as it is given and filling in the

conversion units fields with the units you would like to use, and activating the convert units function key (see the Converting Units section, below). If there is a typo in one of the fields, “<-**Bad Value**” will appear to its right.

---CHOICES---		---CONVERSION UNITS---	
gals, liters		Brewing Liquor Volume	
ozs, grams		Liquor Adjustment Salts	
lbs, kgs		Grain Weights	
lovibond, ebc		Beer Color	
sg, plato		Specific Gravity	
ozs, grams		Hop Weights	

Brewery Dependent Factors

Some things vary according to your brewing setup. They are already filled in with some reasonable *guesstimates* of these values, but you will probably decide to change some of them.



The Mash Time to Full Color Development value is used to pro-rate the color values for short mash times. This will vary most greatly according to how finely your malt is crushed. One particular thing to note is that the value must be entered with a colon to be properly recognized (e.g., use :55 for 55 minutes).

The Expected Grain Extraction Rate is the percentage of the ideal extraction you obtain in your sparge. Most homebrewers experience a 65 to 75% value. You can determine this value by entering a beer recipe and tinkering with this value until the Expected Specific Gravity (or °Plato) displayed in the beer color and extract calculator matches the value you actually got. When you enter this value, type it as a fraction and Excel will display it as a percentage (in other words, if you type 0.75, it will display as 75%).

The last two fields are the α -acid isomerization rate for pellet and leaf hops. This is the rate that your boiling procedure converts the α -acids in the hops into their isomerized forms, which are the only part that is soluble in beer. If you aren't following this, don't worry about it because the supplied percentages are pretty good. They are used in calculating the beer's bitterness, assuming that these percentages are reached after an hour's boil. Once again, enter these values as fractions and let Excel display them as percentages.

Recipe

Here is where the record keeping begins. Fill in your brewing volume, any water treatment you may have added, the grains you used, the length of time that your mash lasted, and the information about

the hops—name, the form they came in, what quantity, how long they boiled, and their α -acid level. This information is used by the calculators to compute your beer's vital statistics.

Apple File Edit Formula Format Data Options Macro Window

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brewer's macros

brewer's worksheet

---RECIPE---

Brewing Liquor	Volume	<input type="text"/>	Gallons
Water Treatment	Calcium Carbonate	<input type="text"/>	Grams
	Calcium Chloride	<input type="text"/>	Grams
	Calcium Sulfate	<input type="text"/>	Grams
	Magnesium Sulfate	<input type="text"/>	Grams
	Potassium Chloride	<input type="text"/>	Grams
	Sodium Chloride	<input type="text"/>	Grams

Apple File Edit Formula Format Data Options Macro Window

B48

brewer's macros

brewer's worksheet

Grain Bill	Quantity in Lbs.	Grain
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>

Mash Time

Water Treatment Calculator

Using the water report you have for your brewing water, you should fill in the first column of figures. For each recipe, you should have some target values that you are working towards; these should go into the second column. These values, combined with the quantities of salts you listed in your recipe will show you the parts-per-million of each ion in your treated water and point out which ions are too scarce or plentiful. The values are calculated from a table to the right and down a bit that gives the percentage of each ion in a salt molecule.

File Edit Formula Format Data Options Macro Window					
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brewer's worksheet					
	My Water	Target Water	Difference Before Treatment	Difference After Treatment	Total PPM
Calcium	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm
Carbonate	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm
Chloride	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm
Magnesium	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm
Potassium	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm
Sodium	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm
Sulfate	0 ppm	0 ppm	0 ppm	0 ppm	0 ppm

Beer Color and Extract Calculator

This calculator works from your recipe and a table of values for brewing malts. The table is to the right of the calculator, and has room for 20 entries of your own (I couldn't possibly think of everything that someone might conceivably put in their beer.) The calculator itself computes the beer color, and the theoretical and expected original gravity.

Hop Bitterness Calculator

This figures the bitterness of your beer in International Bitterness Units (or i.b.u.s), which are one of the few units used nearly worldwide in brewing. The actual definition of an i.b.u. is the number of parts per million of isomerized α -acids in the beer.

Function Key Menu

We have now covered everything in the brewer's worksheet file. The brewer's macros file has just one thing of interest. Just below the copyright notice is a menu of commands available to you. Their use is described in the appropriate sections in the next chapter. By placing them here, you can always find them when you are working.

Operation

This section gives detailed documentation of the Brewer's WorkSheet. It assumes a working familiarity with both the Macintosh finder and Microsoft's Excel. For more general information, read and work through the tutorials; they will quickly show you how to get going on the Brewer's WorkSheet.

Files

The Brewer's WorkSheet comes with several files, but the package itself is made of two: brewer's macros and brewer's worksheet. The former contains many programs and functions required by the latter. For each recipe that you want to work on, you will need a new copy of the brewer's worksheet file; you only need one copy of brewer's macros.

The other files are example recipes to show you what kinds of information are available. By working with them and this manual, you can quickly learn how to make the most of The Brewer's WorkSheet.

The first thing you should do is copy the files onto a working disk and store the original disk away in a safe place. Disks can go bad and without this precaution you are taking a risk of losing your original.

Your mode of operation should be to create a new copy of the brewer's worksheet file for each recipe. You should keep the original file available and work from a copy of that as a clean slate. Excel can have many worksheets open at once (in different windows) and even keeps them handy under the Windows menu; this is a convenient way to work when comparing two or more recipes.

Whenever you want to begin working on a new recipe, you should use the finder's Duplicate command to create a new copy. You can then rename it to match the recipe. If you are already working on one recipe and don't want to leave Excel to create a new one, an alternative is to use Excel's Open... command to bring up the brewer's worksheet document and then Save As... with the new recipe's name.

Starting Up

The Brewer's WorkSheet cannot operate without the functions provided in the brewer's macros file. You must have this file open during your session or else you will not see any results, and many of the cells will be filled with the rather cryptic remark "#REF!". If you do start a session and see this, no harm has been done (*Relax! Don't worry...*) All you need to do to rectify the situation is to Open... the brewer's macros file and all will be well.

Perhaps the best way to operate is to begin a session by double clicking on the brewer's macros file and then using the Open... menu to get at any recipes (see the discussion above under Files for more tips). This procedure ensures that the brewer's macros's functions will always be available.

Another approach is to select any of the recipes you want to work with from the finder (either dragging a rectangle around them all or shift clicking to select specific ones) and shift clicking the brewer's macros file as well. Select Open... from under the finder's File menu to start Excel with all of the documents. This is not as effective because Excel may open some of the recipes before it gets to the macros file; if this happens Excel will put up a dialog box (for each file) asking if you want to update the references for this file. Just click no and let it go ahead. When it does open the macros file it will then properly update and remove all of the #REF!s.

Saving and Quitting

You should always be sure to save your recipes as you work. This will eventually save you a lot of grief when there is a power outage while you are working. If you Save every 15 minutes or so, that is all you will have to spend recovering from a disaster.

When you are finished working, just select Quit and let Excel ask you about each file that hasn't been saved since you changed it.

Often I find it useful to "push" a recipe in several different directions. A convenient way of saving several variants is to begin by entering the base recipe and saving it (see Files, above). Then Save As... for the first variant and work on it until you are satisfied. Go back to the original and Save As... again for the second variant. This is especially convenient if you keep all of the variants and the base open so that you can look back and forth, just like you might with separate sheets of paper. If you get confused, you can always look under the Windows menu and bring the exact recipe you want to the front.

Creating Personalized Templates

Using The Calculators

Cataloging Old Recipes

Working Up New Recipes

Converting Units

Printing

Tutorials

I. How to Create Recipes with The Brewer's WorkSheet

Vienna Lager

II. How to Compare Recipes

Two Pale Ales

III. Converting Units

Alt vs. Best Bitter

Bibliography

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Fix, George. *Hop Flavor in Beer*, 1988, to be published.

Bug Reporting