

American Flatbread–Burlington Hearth

Beer School Information Sheet

Revised March 10, 2009

HOW WE MAKE THE BEER

In a nutshell, beer is made from four ingredients: Malted barley, hops, yeast and water.

1. Hot water is stored in the **Hot Liquor Back**, which is a storage tank. We filter and sterilize our brewing water. Depending on the beer style, we add minerals (calcium, sulphate, chloride) to replicate a particular style's water character. The filtered, sterilized, mineral-treated water is now called "Liquor."
2. The hot liquor is mixed with crushed malted barley in the **Mash Tun** until it is the consistency of oatmeal (called the mash). The mash is allowed to rest for one hour while the enzymes naturally present in the malted barley break the starches in the malted barley down into sugars. (Malted barley is barley that has been sprouted, and then dried.) What grapes are to wine, malted barley is to beer: the most important ingredient. For the enzymes to convert starches to sugars, the mash temperature must be between 145 and 158°F. At 145 °F, it will produce a drier more fermented beer and at 158 °F a fuller or full-bodied beer.
3. The sweet liquid thus created is strained through the false bottom of the **Mash Tun**, leaving the spent grain behind. This sweet liquid, called wort, is pumped into the **Brew Kettle**. The spent grain is scooped out and is given to a farmer for cattle feed.
4. The wort is boiled in the **Brew Kettle** for 1½ hours (90 min.). During this time hops are added at different times. Hops are the female flowers of a vine. (The hop plant is related to the hemp or marijuana plant.) The hop flowers, shaped like pinecones, are dried, powdered, and formed into pellets before we get them. Early hopping gives the beer its balancing bitterness, late hopping provides other flavors and aroma described below in (5).
5. The hops are used like spices are used in cooking. We use about 100 times more malted barley than hops. The hops add a bitter flavor to balance the beer. Without hops, beer would taste too sweet. Hops also add beer aroma. Some people describe it as piney, earthy, citrus or floral. The aroma you get from the malt is described as sweet, bready or grain-like.
6. After the wort is boiled, it is cooled with **Heat Exchanger(s)**, and oxygen is added for the yeast. Then it is pumped over to one of the **Fermenters**.
7. In the **Fermenter**, yeast is added. Once the yeast is added, the wort is called beer, because, by definition; *Beer is a fermented or fermenting grain beverage.*
8. The beer ferments for 5 to 7 days if an ale; 10-14 days if a lager. During fermentation, the yeast is eating the sugars, and is creating carbon dioxide (for beer head and carbonation), and alcohol. The alcohol level is a direct result of how much malted barley was used and what temperature it was mashed at.

9. After fermentation is complete, the beer is transferred to age and condition in our **Serving Tanks** downstairs, where we add additional carbonation to the naturally-occurring carbonation. After the beer is aged 2 to 8 weeks longer to smooth the flavors, it is ready to be consumed.

10. After conditioning in our **Serving Tanks**, the beer is tapped directly to the bar, where our customers can enjoy fresh beer brewed here. We do not filter our beer – we add traditional, natural agents to precipitate the yeast.

AMERICAN FLATBREAD-BURLINGTON HEARTH – GENERAL INFO

1. Our Brewmaster, Paul Saylor and his team brew new batches of beer one or two times per week.
2. One batch of beer is 10-barrels or 310-gallons per batch.
3. In addition to our homemade beer, we also offer homemade root beer, which is made locally.
4. American Flatbread – Burlington Hearth opened for business on May 27, 2004.
5. Our most popular beers are TLA IPA, Gruit Ale, and Helles Lager/Kolsch.
6. FYI: We will soon drop the name “Zero Gravity Brewery” and will only be known as “American Flatbread-Burlington Hearth.”

OUR BREWING EQUIPMENT

Our brewing equipment was made by Newlands Systems in Canada. There are five kinds of tanks in our brewery:

1 Mash Tun	1 Brew Kettle
1 Hot Liquor Back	14 Serving Tanks (which are also Conditioning Tanks)
4 Fermenters or Unitanks	

OUR BEER SERVING EQUIPMENT

We have three separate beer coolers. Two of these coolers contain our house beers. Our Ale Walk-in is kept five degrees warmer than the Lager Walk-in. This temperature variation brings out the sweet malty characters in our ales, and the crisp refreshing flavors of our lagers. The third cooler is our Cask Walk-in where we keep our Firkins of cask ale. The Cask Walk-in is kept at British cellar temperature of 54°F. The cask ales are served via three authentic British beer engines.

BEER HISTORY AND STYLES

WHAT IS A BREWPUB, COMPARED TO A MICROBREWERY?

A brewpub is a type of microbrewery. Both brew very small quantities of beer. A brewpub sells the majority of their beer onsite, as well as food, in an attached pub or restaurant. Microbreweries generally do not sell their beer, (or have food,) onsite. They sell the majority of their beer in kegs or bottles to distributors, or retail outlets that resell it to their customers.

WHAT IS ALE, COMPARED TO BEER?

Beers are fermented beverages made from grain. Wine is made from fermented fruit, especially grapes. Hard liquors are distilled fermented beverages made from grain **or** fruit. Scotch whiskey is basically distilled beer! (Fermentation creates alcohol.)

Since we make a beverage from barley grain, the beverage we make here is a beer. Ale is a type of beer. There are two main types of beer, called Ales and Lagers. They are differentiated by the yeast type and fermentation temperatures used. This difference creates different flavors in the final beer.

Lagers are fermented cold with a bottom fermenting yeast, and are aged cold for a long time. Lagers are smoother, and more delicate in flavor. They can be brewed quite bitter or sweet. They are more easily recognized by what flavors they don't have, rather than by what they do have. They can be gold (pilsners), or dark brown (dunkel.) All of the major brand beers in this country like Coors, Miller, and Budweiser are lagers. American Flatbread-Burlington Hearth proudly brews lagers on a regular basis.

Ales are fermented warm with a top fermenting yeast, and are aged warm for a short time. Ales are robust and strong in flavor. (Stronger flavor does not necessarily mean more alcohol.) They are fruitier in flavor and aroma, and can be brewed sweet or dry. Ales have more complex flavors and aromas, and do not have the delicate flavor characteristics of lagers because of the warmer fermentation temperature. Because of the short, warm aging period, they are not as smooth as lagers and are generally brewed fuller-bodied too. They can be gold (pale and cream ales), or black (stouts.) Most of the microbrewed beers available in the United States are ales.

HISTORY OF ALE

There are many classic ale styles available throughout the world. Most of them developed in their original location because of the water and the local varieties of barley and hops available. We adjust the mineral content of our water to create brewing liquor in order to replicate the native water where our beer styles originated.

At one time (up until the early 1800's) there was only dark ale. Then the Germans developed the yeast and technology to brew the smoother, delicate lagers, and the Czechs (in Bohemia) developed new varieties of barley and hops to brew pale beers. Suddenly a pale lager explosion swept the world. Only Britain, Ireland and Belgium kept ale as their national beer. There were still pockets of ale brewing throughout the world, including Germany, where the word for ale, Alt, means Old.

In the United States of the 1970's and 1980's, ale brewing had basically died off, and full-flavored lagers were no longer being made. This void set the stage for the coming Craft Beer Revolution.

WE'RE MAKING HISTORY

Now ale is making a comeback in the United States through the microbreweries and brewpubs that have sprung up. This trend started on the west coast in 1979, faltered, gained a toe-hold in 1982, and then took off around 1989. The rest of the country only "discovered" microbrewed beer in the last 15 years. American Flatbread-Burlington Hearth is a pioneer of this exciting revolution!

OLD & NEW ALE STYLES

Some of this new ale is traditional, such as the classic English ale styles such as Pale Ale, Best Bitter, Brown Ale, Mild Ale, Scottish Ale, Porter, and Stout. Some of the new microbrewed products are very American. For example, styles such as American Cream Ale, Steam Beer, and the newly defined West Coast Amber and West Coast Wheat. Microbreweries are also producing some new mutations of old beers, like America Brown, and American reinterpretations of all the old English styles, as well as some wacky seasonal beers like Raspberry Rye, Blackberry Porter, and Ginger-Nutmeg Ale. Chalk it up to

good old American ingenuity and creativity, as well as some very motivated brewers and far-sighted owners and investors.

HOW TO TASTE BEER

First, relax and **SMELL** the beer. Many aromas disappear quickly into the air. Your sense of smell is about 10,000 times more sensitive than your sense of taste.

Aroma (pre-fermentation smells) will consist of sweet, grain-like aromas from the malted barley, and herbal, floral, spicy, or earthy aromas from the hops.

Bouquet (post-fermentation smells) will consist of fruity (apple, berry, citrus, banana) aromas and esters (green leaves, cloves) generally found in ales, and sulfury aromas generally found in lagers.

LOOK at the beer. It may or may not be clear. Most beers are traditionally served clear, with the exception of some wheat beers and darker beers. The bubbles should be tiny. If they are too large, they will give the beer a sharp carbon dioxide bite. The head should be somewhat creamy-looking. If the glass is clean, you will see a lace-like formation on the inside of the glass as you drink the beer. This is desirable and is called Belgian Lace.

TASTE the beer. Roll the beer around all parts of your mouth. There should be distinct sweet and bitter flavors, but they should not fight. Is the body or mouth-feel (thickness) appropriate to the beer style?: Gold beers are generally light-bodied, and black beers are generally full-bodied. Is the malt character appropriate?: Gold beers are generally light-flavored, and darker beers are generally strong-flavored with caramel and coffee or toast-type flavors. (Often dark beers taste like coffee because the barley is roasted, just like coffee beans are roasted.) Does the aftertaste scare you away, or invite you to have another sip?

ENJOY the beer. No matter how you taste beer, be sure to enjoy it! Beer is not meant to be analyzed too closely, it is meant to be consumed. The beer should be secondary to your meal or conversation. If the beer keeps interrupting, either you love it or you hate it. Each of our beers is not meant to be loved by everybody. You will have your own favorite. That is what makes American Flatbread-Burlington Hearth fun!

BEER JUDGING & PROFESSIONAL SENSORY EVALUATION

Perhaps you are interested in learning more about beer through tasting it. There is such a thing as a professional beer taster, although it is a volunteer job. Paul is a certified homebrew judge through the Beer Judge Certification Program, having taken and passed the BJCP exam. See www.bjcp.org for more info. In the meantime, try your hand at a rudimentary example:

SAMPLE BEER SENSORY EVALUATION SHEET

Beer Name _____	Bubble size _____
Style _____	Flavor _____
Aroma _____	Aftertaste _____
Color _____	Defect characteristics _____
Clarity _____	Overall Impression _____

IF YOUR CUSTOMER HAS A QUESTION

If you can't answer a customer's beer question, please talk to a brewer or manager so that you, and our customers, are well informed! Here are some suggestions on how you can expand your knowledge of beer and brewing:

AMERICAN FLATBREAD-BURLINGTON HEARTH'S WEBSITES

Did you know that American Flatbread-Burlington Hearth has a website? www.burlingtonhearth.com. Did you know all of our menus are listed on www.burlingtonhearth.com, ready to print? Please tell your customers if they ask!

Also, our friend Teri who visited in May 2008 put loads of technical brewing up on Steelhead Brewery's website, a place she used to work. www.steelheadbrewery.com. On the main menu, click on the "How We Brew" button. Here's an example of what you'll find there:

[Introduction to Brewpub Brewing & Packaging](#)
[Raw Materials of Beer](#)
[New Vocabulary Words](#)
[How It Works](#)

Click on these PDF files to see diagrams showing how beer is brewed:

[Fermentation Simplified & Typical Brewpub Tank Layout](#)
[Simplified Fermentation Process Flow](#)
[Detailed Fermentation Process Flow](#)
[Brewpub Packaging Process Flow](#)

OTHER INTERNET RESOURCES

www.realbeer.com
www.probrewer.com
www.oregonbeer.org
www.beertown.org

www.greatamericanbeerfestival.com

www.allaboutbeer.com

www.beerhunter.com

www.ratebeer.com (Be sure to give American Flatbread-Burlington Hearth's beers high scores!)

BIBLIOGRAPHY

Check your local library for books on beer, beer brewing, beer history, and cooking with beer. There are several homebrewing magazines as well (*Zymurgy*, *Brew Your Own*). Below is a list of some books you might use to expand your knowledge of beer history, styles, and brewing:

New World Guide to Beer, by Michael Jackson

Michael Jackson's Beer Companion, by Michael Jackson

The Complete Homebrewer, by Charlie Papazian

An Analysis of Brewing Techniques, by George & Laurie Fix

Essentials of Beer Style, by Fred Eckhardt

Brewing, by Michael Lewis & Tom Young

BREW YOUR OWN

Look for a local homebrew supply store, under "Beer and Wine Making Supplies" in the yellow pages. Join the local home brew club: Ask the local homebrew shop about local clubs.

Warning: Learning a little about brewing will cause you to want to learn more! Search www.google.com or visit your local homebrew supply shop for more information. This is just the tip of the iceberg.

NEW VOCABULARY

The following words are used in this information sheet. Take some time to quiz yourself on their meanings. If you can't remember, go back and review now. This exercise will help you prepare for the final quiz.

Kettle	Bouquet	Yeast	Barrel
Cask	Beer Engine	Ale	Hops
Styles	Belgian Lace	Dry-hopped	Lager
Hot Liquor Back	Brewpub	Malt	Mash Tun
Fermenter	Microbrewery	Barley	Unitank
Serving Tank		Heat Exchanger	Aroma
Half-Barrel Keg		Barrel	Sixtel/Log
Walk-in		Firkin	

SAVE THIS INFORMATION SHEET!

This sheet is yours to keep. You will want it for reference. Your 29-question quiz is next! It represents questions a customer may ask you. Any time you want to retake the quiz to test yourself, just ask.

- The Brewers