

Barrel Basics



HOMEBREWING.COM

BARREL BASICS

CONTENTS

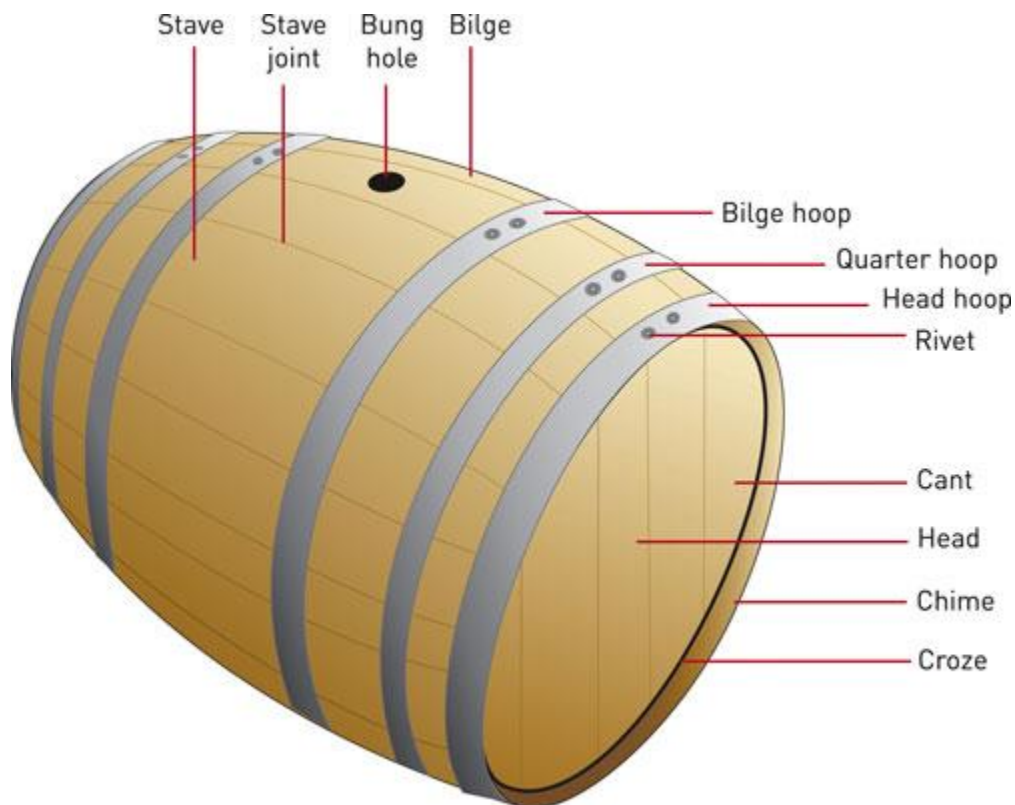
Barrel Anatomy	3
Wood Types	4
Preparation for Use	5
Fermenting in Barrels.....	6
Aging in Barrels	7
Cleaning & Storing	8
Barrel Souring	9

BARREL ANATOMY

There are a few parts that make up a wooden barrel. The wood slats (staves) are cut to specific shapes in order for the wood worker (cooper) to be able to form the barrel's shape. The staves are put on their ends in a temporary hoop and toasted over a burning bucket of wood.

The wood is heat steamed by applying water to the interior and exterior then bent slowly until it reaches the desired shape. Barrel caps (heads) are assembled using staves and cut into their circular shape. The heads and riveted metal ring (hoops) are then put into place with special coopering tools. Finally a hole is drilled in a strong stave for a cork (bung).

The wood chosen for making barrels must be mature, straight and knot-free. Woods low in sap are also ideal. White oak is traditionally used due to its pliability and tight grain composition.



Once the barrels have been assembled, the cooper will sand, plane and polish the exterior. The barrels are filled with water to check for leaks and after passing inspection the barrels are ready for brewers and wine makers.

WOOD TYPES

French Oak • American Oak • Hungarian Oak • Slavonian Oak • Canadian Oak

The use of oak plays a significant role in beer making and can have a profound effect on the resulting beer, affecting the color, flavor and mouth feel of the beer. Oak can come into contact with beer in the form of a barrel during the fermentation or aging periods. It can be introduced to the beer in the form of free-floating oak chips or as wood staves (or sticks) added to beer in a fermentation vessel like a plastic bucket or glass carboy. The use of oak barrels can impart other qualities to beer through the processes of evaporation and low level exposure to oxygen.

American oak tends to be more intensely flavored than French oak with more sweet and vanilla overtones due to the American oak having two to four times as many lactones. Brewers choose American oak typically for its aromatic sweetness along with a nice vanilla component. French oak also has an aromatic sweetness along with a nice vanilla component, along with cinnamon and allspice characters. Besides being derived from different species, a major difference between American and French oak comes from the preparation of the wood. The tighter grain and less watertight nature of French oak can oblige coopers to split the wood along the grain. The wood is then aged or "seasoned" for 24 to 36 months in the open air, in a so-called wood-yard.

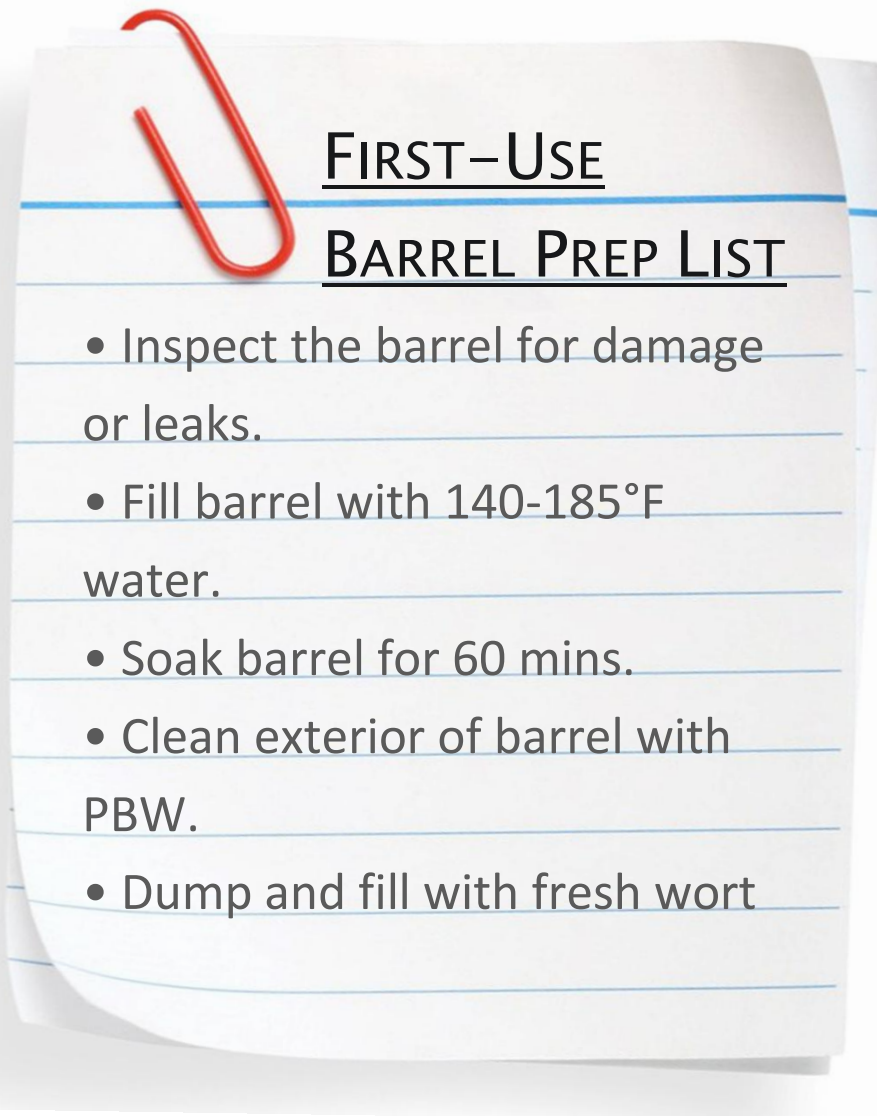
Even though American coopers may use a kiln-dry method to season the wood, almost all others will season American oak in exactly the same way as French. Open air seasoning has the advantage of leaching undesirable chemical components and bitter tannins, mellowing the oak in a manner that kiln-dry methods are incapable of replicating. Even though sun, rain, and wind may suffice in most cases to season oak, in dryer climates coopers - such as Tonelería Nacional - apply up to 2000 mm (80 inches) of water a year to their wood stacks in order to facilitate the seasoning process.

Since French oak must be split, only 20 to 25% of the tree can be utilized; American oak may be serrated, which makes it at least twice as economical. It has more pronounced oxidation and a quicker release of aromas, which makes this the wood of choice for shorter maturations - six to ten months. An American oak with a medium-plus toast is typically the best of all worlds in dealing with toast levels, as it brings out the qualities you would normally find in a heavier toast, without diminishing the vanilla and other softer flavors.

French oak, on the other hand, generates sweet spicy and confectionary flavor compounds like (custard, butterscotch, milk chocolate). Hungarian oaks are said to provide a high amount of vanillin properties, along with roasted coffee and bittersweet chocolate characters.

PREPARATION FOR USE

Barrels are an ideal breeding ground for wild yeast and bugs (bacteria), so when a used liquor or wine barrel arrives at your doorstep you need to flash sanitize it with hot water to keep the microorganisms under control. The hot water bath will kill off some surface bacteria and wild yeast, but not those found deep in the porous wood. You don't want to get rid of all of them anyway.



Dry Barrels

If your barrel is dried out or leaking you can submerge the barrel in water for 24 hours and the wood should swell back up. Ratchet straps can come in handy for holding together loose staves and heads during the re-swelling process.

FERMENTING IN BARRELS

Once the wort has been inoculated in the barrel it is best to keep it fitted with an airlock or barrel blowoff assembly. Beer fermenting in wooden barrels gets very active causing high Krausens and some beer will go through the air lock or blowoff and beer will be lost. You will need to top off the barrels after the initial round of fermentation to reduce exposure to airborne contaminants and oxygen in the barrel headspace. It helps to brew an additional round of wort for topping barrels off.

Barrels can be fermented in a large range of temperatures. You can cold ferment (lager) barreled beer or ferment barreled beer at high temperatures (ale). Most beers are fermented at cellaring temperatures, but this is not necessary for all styles.

Sampling

As your beer ferments you most definitely will want to taste how it is coming along. Resist the urge to open the bung and pull a sample with your thief. This only opens the barrel up to oxygen (which causes oxidation in beer)

Use a stainless steel nail in the barrel head to create a sampling port. (Pre-drill the hole before filling, so you don't split the wood.)

Drill a hole using a 7/64" drill bit on the bottom of the barrel head (6 o' clock position). Have two sizes of stainless steel nails on hand from McMaster-Carr.

- 1-½" 4d smooth common nail – 316 stainless steel #97990A502
- 2" 6d smooth common nail - 316 stainless steel #97990A504

Use the smaller nail, but keep the larger one around just in case a hole gets bored out too large.



AGING IN BARRELS

After primary and secondary fermentations have finished, depending on the style, it is time to barrel age your beer. Beer can be aged for varying times depending on the beer style and maturation period needed. The longer the beer is in the barrel the more sour it will become. As the brewer, you can age anywhere from two weeks to many years. The smaller homebrew style barrels tend to impart oak flavor much quicker due to the surface ratio, so a few weeks to a month is usually enough.

It takes at least six months for the Brett (wild yeast) to show any signs of the work it has been doing, and Lacto & Pedio (bacteria) are not much faster, depending on the strain.

Common Beer Styles for Barrel Aging

Pale Ale

Blonde Ale

Double India Pale Ale

Imperial Porter

Imperial Stout

Barley wine

Strong Ale

Belgian Quad

Belgian Tripel

Belgian Dubbel

Grand Cru

Imperial Brown

Imperial Pumpkin

Lambic Gueuze

Saison/Farmhouse

Imperial Red Ale

Winter Warmer

Holiday/Spiced Ale

Doppelbock

Berliner Weisse

CLEANING & STORING

Once you have transferred the beer out of the barrel it is time for cleaning. The best way to keep a barrel clean is to always have it filled with beer. It is a good idea to plan your barrel aged beer program schedule so you always have a new beer ready to fill the barrel as soon as you empty it.

Flush the barrel with warm water to remove the left over trub and fill immediately with a new beer. Flushing the barrel with hot water should kill off a good portion of the microbial flora that coats barrel walls and outer barrel surfaces.

Storage

If you do not have a new beer ready to fill the barrel then you should fill the barrel with hot water and let it soak for an hour. Dump the water, cap (bung) and store in a cool dark place.

If you have the ability, inject a CO2 blanket into the barrel to retard microbial growth. As barrels breathe the CO2 will dissipate, so repeat as necessary during long storage sessions.

Most professional brewers do not recommend storing empty barrels. It is just a matter of time before the barrels dry out or become overrun with wild yeast or bacteria. Some pro brewers use a hot steam system to sanitize their barrels, but this is not very practical on the homebrew scale.

Do not store barrels filled with water for an extended period of time. This is a breeding ground for barrel bacteria like Acetobacter. We recommend not using chemicals for storage purposes.



BARREL SOURING

Unlike traditional beer-brewing, which is done in a sterile environment to guard against the intrusion of wild yeast, sour beers are made in wooden barrels that allow wild yeast strains or bacteria into the brew. Traditionally, Belgian brewers allowed wild yeast to enter the brew naturally through the barrels – an unpredictable process that many modern brewers avoid. The most common microbes (referred to as “bugs”) used are **Lactobacillus**, **Brettanomyces**, and **Pediococcus**.

It is not recommended to use lactic acid for tartness in your barrel aged beer. Natural tartness can be achieved using Lacto and Pedio correctly. Some homebrewers achieve a tart flavor from fruit additions – most commonly cherries (to produce kriek) or raspberries (to produce framboise) – during the aging process, to cause a secondary fermentation.

Barrels are a great place to experiment with sour beers using fruits like cherries, peaches, plums, apricots, strawberries, blackberries and raspberries. The combination of toasted oak, fruit and sour/tart can create some truly unique homebrews.

Blending

Make a little extra homebrew and be ready to blend your sour beers with a similar beer fermented with standard brewing yeast (*saccharomyces cerevisiae*). Because of the uncertainty involved in using wild yeast and souring bacteria, the sour beer brewing process is extremely unpredictable. Having a base beer for blending helps you temper some of the extreme characteristics in a beer like sourness, bitterness or alcohol level.

Keep the beer away from O₂ as much as you can when you’re blending — keep the oxygen exposure to a minimum. The barrel beer takes months to ferment and can take years to mature. Blending beer is an art form and takes a brewer a lifetime to master.

Separate Equipment

Remember that any piece of equipment that comes in contact with your sour beer should be isolated from any “clean” brewing in the future. Brett, Lacto and Pedio are very resilient and are difficult to completely sanitize off equipment. If you don’t do this you may end up with every beer you make being a sour beer.

Isolate plastic transfer hoses, airlocks, bungs, connectors, glass/plastic carboys, transfer gaskets and siphons. Basically any soft rubbers should not be used again for clean brewing in the future.