Oak Barrel Care Guide

A MoreManual!™ By Shea A.J. Comfort
www.MoreWine.com
1-800-823-0010

Congratulations on your new winery purchase and welcome to the world of oak barrel ageing! Your home winery is now part of an age-old tradition which truly does add depth and character to the wines produced in this method. The following are some guidelines and considerations that you'll want to keep in mind as you start to incorporate barrels into your winemaking.

New barrel

When you get a new barrel, you should make sure that the workmanship is good and that there are no obvious flaws in its construction. Take a small flashlight and inspect the interior of the barrel for dirt or debris. A new barrel should be sweet smelling (with no mustiness or vinegar smell) and should only require a swelling period with water before it can be filled with wine.

Preparing the barrel for use:

A barrel that is new, or that has been stored dry, will need to be swelled with water to seal itself before you can put wine in it. There are two basic approaches: the cold water soak, and the hot water soak.

The cold water soak involves filling the barrel 1/3 full with cold water and letting it stand for 3-4 hours. Then you fill it to 2/3's full and let it stand for another 3-4 hours. Finally, you top it up and keep it topped-up until the barrel stops seeping and seals itself. You then drain the barrel and fill it with wine. This process usually takes about 2 days, but with older barrels may last a little longer. However, if your barrel is still seeping after the fifth day, then you should probably have it replaced. Brand new barrels which seep for more than two days are likely to continue to have issues – if this is the case then you should contact either the retailer of the barrel or the cooperage directly.

The hot water soak involves filling the barrel with 1/10th its volume of hot water (i.e.: 6 gallons for a 60 gallon barrel). You insert the bung and slosh the water around so that it comes into contact with all of the interior surfaces of the barrel. You then stand the barrel on its end and fill the head area (on the outside of the barrel) with hot water and let it stand for at least 30 minutes. This is repeated for the other side. You then turn the barrel bung-side down, drain it out and let it cool. You should fill it with cool water to test that it has properly sealed before using it. If it seeps a little, just let the water sit in it until the barrel seals itself.

**One thing to note is that whichever method you use to swell your barrel, you should never allow the same water stand in the barrel for more than 3 days. If the soaking period will exceed 3 days, you should drain the barrel and refill it with fresh water. This is to prevent bacteria and microbes that could begin to form in your barrel.*

MoreWine's Suggestions

New Barrels: We have found that the best way to rehydrate barrels is via the hot water method followed by a complete fill. When the barrels are brand new and have recently been received from the cooper the practice of using hot water can often be sufficient on its own. However it is wise to follow the hot water method by filling the barrel with cold water and allowing it to stand for over 24 hours. This ensures there are no slow leaks.

Used Barrels: If you are rehydrating Recooped, Refurbished, or dry used barrels we have found the hot water method is a necessity. Often you will need to leave the hot water in for a longer period of time, up to several hours, or to repeat until the barrel swells. Then fill the barrel up with cold water and allow it to stand for up to 3 days. If the barrel is still leaking after 3 days then drain and refill.

Important! *Never fill a barrel with wine if it is still seeping water!*

Cleaning a barrel

The best way we've found to clean out a barrel is a simple several-rinse cycle. A barrel washing tool (*WE492*) is a very handy tool for this process and is highly recommended. Barrels should always be washed immediately after wine is transferred out of them to prevent the growth of spoilage organisms. Wash the barrel out with hot water until all the deposits from the wine have dissolved and run out of it; don't be shy about repeating the procedure several times if necessary. If you have the hot water resources you can fill the barrel with hot water and let it sit overnight. This can help dissolve the tartrate deposits.

In most cases, by using proper maintenance and storage techniques you can avoid the need to use any harsh chemicals. The reason that you want to avoid using them is because they will strip out the oak extract from the barrel, as well as possibly damaging the barrel itself. Some examples of this are that soap will soften the wood of a barrel, while soda ash and other chemicals will leach out the oak flavor. Therefore, unless you can detect a problem, either by smell or by sight, you should only use water to clean out a barrel.

If possible avoid the presence of chlorine in your rinse water by

filtering with an in-line carbon water filter. The chlorine can be used in the production of 2, 4, 6-trichloroanisole (TCA, or cork-taint) by some molds. These molds can be present in cardboard paper products and wood sources found in the winery, such as shipping pallets, wooden barrel supports and the barrels themselves. Thus TCA issues are not always caused by the cork you use.

***Important:** if the barrel was stored and sulfur was burned in it, then you must make sure that if you have removed any residual sulfur pieces that may have remained in the barrel after the treatment. Otherwise, it is likely that you'll run into hydrogen sulfide issues during barrel fermentation.*

Storing a barrel

If you rack out of a barrel and you will not be putting wine back into it within the next couple of hours, then you will need to prepare it to be stored correctly. Rinse the barrel with hot water then drain it, and allow it to dry completely.

***Important** to note that the barrel must be drained dry and have no pools of standing water in it before you burn the sulfur. This is because if the barrel is wet, then the SO_2 will hydrate, and you will get sulfurous acid that could lend a bad taste to the wine, as well as lead to possible spoilage problems.*

Once the barrel is dry, you will need to take steps in order to keep spoilage organisms from being able to contaminate the barrel during its storage. Remember that when wine is present in a barrel, you are constantly maintaining 25-50ppm of free SO_2, and this not only protects the wine, it also protects the barrel. When you store a barrel dry, you no longer have this constant source of protection and so you will need to add it directly to the dry barrel itself. The best way to do this is to burn a sulfur stick (or pastille, a small disc) in it. This is done by lighting the sulfur, putting it into a flameproof holder (*WE701*) and lowering it into the barrel. The barrel is then closed up (most sulfur burners have a built in bung) to allow the gas and smoke to fill the inside of the barrel It is important that the burning sulfur be suspended in the middle of the barrel as it burns so that you do not burn the interior surface of the wood. This sulfur burning treatment will need to be repeated roughly every six weeks and should be maintained so that you are able to smell the presence of sulfur in the barrel at all times.

The standard dosage of sulfur is roughly 1/3 of a Sulfur Stick (*WE705*) per 60 gallon barrel - roughly a 1" x 2-3" piece or a 5 gram pastille. If you are treating a 30 gallon barrel, then just break the standard dosage amount in half and save the unused portion for future treatments. We also sell Sulfur Discs (*WE702,WE703*) sized exactly for 30 or 60 gallon barrels. Elemental sulfur remains inert forever until it burns, so you don't have to worry about it going bad over time.

If you are storing your barrel out of a cellar or someplace where it is dry (maybe you live in an arid climate?...), then every two months you should partially fill the barrel with 100°F water and roll the barrel around until the water's temperature falls to 70°F. Empty the barrel and then rinse again with cold water. Drain it again and allow the barrel to dry, then burn your sulfur in it as usual. This procedure keeps the barrel from drying out, which could leave cracks between the staves and allow rapid dissipation of your SO_2 gas, allowing spoilage organisms to enter the barrel during the storage period.

Finally, an important reminder: SO_2 is a very harsh chemical and you need to respect it. You will want to avoid breathing its fumes and you must work in a well-ventilated area when using it. You may choose to use gloves when handling it.

Storage Solution:

It should be noted that it is possible to store a barrel using a storage solution instead of burning sulfur in it. The pros of using it are that you can go longer in between treatment periods. However, this convenience comes at a price, and it should be noted that you will strip out the oak flavor from your barrel if you use a storage solution. Also, the storage solution slowly loses its capacity for protecting the barrel over time, and it is difficult to determine when it needs replacing. Finally, as the solution slowly evaporates out of the barrel, which it will, there will be some area of the barrel left moist and unprotected by the solution – ripe conditions for microbial spoilage. Here at *MoreWine!*, we strongly recommend storing barrels dry – the solution should only be used as a last resort if for some reason you won't be able to burn sulfur in the barrel every six weeks.

If you do decide to use a storage solution, then here's how you do it:

- Fill the barrel 2/3's full of cool water.
- Then, calculate the amount of chemicals needed: For every **liter** of barrel volume, you will need to add *1 gram of citric acid* and *2 grams of SO_2*. Mix this solution in a separate container with a small quantity of hot water so that everything becomes completely dissolved into the liquid. **Beware of the fumes and work in a well ventilated area.*
- Add the solution to the barrel, roll the barrel to mix, and top it up the rest of the way and insert the bung.

You will need to top up the barrel with more of the holding solution every 4 - 6 weeks, but the barrel can be stored like this indefinitely.

SPOILAGE PROBLEMS

In general, if you take care of your barrel (maintain 25-50ppm of SO_2 when there is wine in it, and burn sulfur in it when it is empty) then you should not have problems. However, there are certain spoilage problems that exist when using barrels and you should be aware of them so that you can recognize and hopefully prevent them happening to you. This, of course, will also help you in evaluating a used barrel.

Mold:

If a barrel has or develops a moldy, mushroom-like taste or

odor, then the barrel should no longer be used. However, if the odor/taste is not too strong you may be able to save it by treating it with sodium carbonate or sodium percarbonate (see below for details).

If you start to see mold on the outside of the barrel - especially around the bung area - then you will need to clean it off before it becomes a bigger problem. As long as you take care of it early on, it should not affect the wine inside the barrel. To do this:

- Make a solution of SO_2 and citric acid in water (3 tablespoons of each in 1 gallon of water)
- Using a natural or plastic fiber brush, scrub the problem area with some of the solution.
- ***Important:*** *do not get the citric acid/ SO_2 solution on the metal hoops as it will corrode them if left there. If you spill some, be sure to immediately rinse the hoop with water. Also, you do not want to get any of the citric acid/ SO_2 solution into the wine, so when treating the bung area make sure that the bung is tightly sealed and that the solution has completely dried before removing it.*

Besides the local treatment, you should also try to address the causation of the issue to prevent it from recurring. For example, if the mold is forming on a single barrel with a seepage problem, then this is not too big of a concern as it can be localized to an individual barrel. However, if a larger percent of the barrels have problems because the cellar is too humid (i.e., above 75% humidity), then this should be addressed.

Acetobacter, Wild Yeasts & Malolactic Bacteria:

Generally speaking, acetobacter (vinegar bacteria), wild yeasts, and lactic acid bacteria can all infect a barrel and spoil the wine. However, proper SO_2 management throughout the entire winemaking process can easily control all of these potential issues.

Treatment of spoilage problems:

Treating a barrel for spoilage problems is a two-step process. First, you use a solution of sodium carbonate (or sodium percarbonate) then you neutralize it with a citric acid wash. ***Note:** When you treat a barrel in this manner, you will be stripping some of the oak flavor from the wood.*

The following is a guideline for treating a spoiled barrel:

- Depending on the severity of the problem, you will use between 1 to 3* grams of per liter of barrel volume. Mix this with some water in a separate container until it becomes completely dissolved. ***Note:** Never use more than 3 grams per liter of sodium carbonate or sodium percarbonate as you can start to attack and breakdown the wood of the barrel itself.*
- Fill the barrel to 2/3 capacity with water.
- Add the solution to the barrel, roll the barrel to mix the solution in thoroughly and then top it up.
- Allow the barrel to soak overnight, but no longer than 24 hrs.

Once the barrel has been treated, you will need to neutralize the alkaline residue:

- In a separate container, make a solution of citric acid at a rate of between .5 and 1 gram per liter of barrel volume. Make sure that the crystals get completely dissolved into the solution.
- Fill the barrel with the solution and top it up. Allow it to sit over night.
- Drain the barrel and clean it out completely. ***Note:** Be sure to get all of the alkaline residue out of the barrel. While it is not toxic at these low levels, it will adversely affect the flavor of any wine that gets put into the barrel.*
- Let the barrel dry completely then fill it with wine or burn some sulfur in it if it is being put up for storage.

USING A BARREL

Storing and ageing wine in an oak barrel will impart both flavors from the wood as well as improved body and structure to the wine. New barrels will generally continue to give flavor for 3-4 years, after which they will become "neutral." Neutral barrels do not impart much tannin or flavor, but can still be used to store wine and improve it's quality through microoxygenation and the concentration of flavors that occurs as some of the water content of the wine evaporates out of the barrel. The structuring of the wine takes place through polymerization of the tannin molecules, and will continue to occur as long as the wine is in the barrel. The goal of the winemaker is to leave the wine in contact with the wood for enough time for this to have a good, positive impact on the wine, usually 12-24 months. The barrel will impart its flavor and structure more strongly and at a faster rate earlier in its life. This means that the amount of time that the wine can stay in the barrel before the oak influence becomes too strong will gradually increase over time. The barrel can then be used for longer on its second and third uses. European oaks tend to release their tannins and flavors more slowly than American oaks do.

It is important to note that the amount of time a wine spends in a barrel before it needs to be racked out will vary according to the size of the barrel, the style of the wine being made and the age of the barrel itself. This is directly related to the ratio of surface area of wood to volume of wine. In other words, the smaller the barrel, the more wood you will have in contact with a given volume of the wine. Conversely, the bigger the barrel, the less wine you have in contact with the wood. This means that your wine will require less time in a smaller barrel than it would in a bigger one to achieve the same level of extraction from the wood.

Ultimately the factor that should decide when you transfer the wine out of a barrel will be how it tastes. However, be aware that the oak flavor will diminish a fair amount during the first year. Knowing this should help you in deciding when to rack

out of a barrel and help you control how much oak character you eventually wind up with in your finished wine. It takes a couple of seasons to get the gist of how this works because the only real way to learn this is through careful experimentation over time using your wine and your barrels in your cellar (i.e.: making more wine!). In our own winery, www.olinwines.com, we've found that oaking our house Cabernet Sauvignon for around 24 months in 60 gal barrels is ideal. However, for our wines in 30 gallon barrels, we've found 12 months is best.

Finally, you can save out a portion of the wine which does not see any oak (in a glass carboy or stainless tank) to be used to blend back into the finished wine. The non-oaked wine will not have the same complexity or structure, but there will be a nice clear fruit quality to it that can be useful to push the fruit-foreward aspect of the wine. While it's true that "You can always add more oak, but you can't take it out," you can, in fact, blend it down!

Things to keep in mind when using a barrel:

- Taste often, especially when using a new barrel. You'll be surprised how fast oak flavor will build up in a wine. This is one reason why it is important that wine ageing in a barrel should be kept at a constant temperature: so that the extraction can be kept to an even rate. If your cellar heats up in the summer, then you will get a quicker extraction of oak flavor than if it was kept at a constant temperature. Keep this in mind and adjust the frequency of your tasting accordingly.
- Be sure to always keep the barrel topped-up. A new barrel will absorb quite a bit of wine in the beginning. A good general guideline would be to top up once every 2 weeks during the first month, and then once every 2-3 months after that. This will of course vary according to barrel size and cellar conditions (temperature and humidity). It is a good idea to use a silicone bung, as it gives a tighter seal, is easier to clean, and won't ever have the same potential problems with spoilage organisms that a wooden bung could have. If you are going to be fermenting in your barrel, *MoreWine!'s* breathable silicone bungs are great because they allow gas (CO_2) to escape without allowing for any undesirable oxygen flow back into the barrel.
- The level of free SO_2 will fall much faster for wine in a barrel than it does when it's in glass or stainless steel, due to consumption of oxygen that permeates across the barrel wall. You will want to maintain an appropriate level of free SO_2 at all times during barrel ageing. Refer to our Red & White Winemaking and Sulfite Management Manuals for a chart to determine the correct free SO_2 level for your wine. To this end, it is advisable to invest in a automatic Hanna Titrator (*MT680*) (best) or aeration/oxidation set-up (*MT130, MT140*)(good) to measure the level of free SO_2 of the wine in the barrel. The other inexpensive, commonly found tests out there that are based on the Ripper Method are not accurate enough and usually give readings that are too high, thus causing you to maintain sulfite levels that would be too low. You should check the level of free SO_2 of wine ageing in a barrel at least four times a year (preferably at each top-up). Complete information on Sulfite Management can be found in *MoreWine!*'s Red & White Winemaking and Sulfite Management Manuals (available for free on our website).

  ***Remember:** If you will be doing a barrel fermentation and sulfur was burned in the barrel during its storage, always be sure to rinse out all of the sulfur deposits or you will have hydrogen sulfide problems.*

What are the ideal conditions for barrel storage?

- In general, the best way to store a barrel is for it to remain full of wine with 25-60ppm of free SO_2 (depending on the pH of your wine), at normal cellar temperature (55F), and at the proper humidity (65%-75%) at all times. The SO_2 protects the barrel (and the wine) from spoilage organisms.
- A cellar temperature around 55F is ideal because it maintains the proper rate of ageing for the wine.
- Humidity at around 65%-75% is ideal because if the percentage is lower then the wine will evaporate out of the barrel too quickly, and if it is higher then this starts to promote the growth of spoilage organisms. One technique you can use if you have a less than ideal level of humidity is to wrap the main body of your barrel with plastic wrap to reduce the rate of evaporation. However, be prepared to remove the plastic wrap immediately if you see any mold growth or discoloration on the wood. Finally, you should never wrap the head of the barrel as this can trap in too much moisture and promote spoilage organisms and rot.