



## MoreWine's Oak Barrel Care Guide



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 put your wine through this wonderful process.

### 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, and examine the toast on the inside of the staves. The toast should be even throughout the interior surface, and lack excessive or large blisters which can trap wine deposits after cleaning. Some degree of minor blistering is normal. Additionally, 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 - also known as the "French Method."

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 "French Method" involves filling the barrel with 1/10<sup>th</sup> 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 15 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 2 days. If the soaking period will exceed 2 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.*

In general, if your barrel is brand new or was stored dry for a long period of time, you probably should use the cold soak method. However, if your barrel was recently in use and it was stored in a cellar with the proper humidity, then you can probably get by with using the hot water method.

### **Cleaning a barrel:**

The best way we've found to clean out a barrel is a simple several-rinse cycle. A barrel washing stand (WE499) 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. The barrel should then be rinsed with cold water to counteract any stave swelling that may have occurred as well as to prevent spoilage organisms from taking advantage of a warm, moist environment. 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.

*\*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.*

Also, it is worth the reminder to avoid the presence of chlorine in the winery. You should avoid using it as a cleaning agent and filter any city or chlorinated water, as 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 the woods of a winery, such as racking and barrels, in addition to being present in cork. Chlorine is also damaging to stainless steel.

### **Storing a barrel:**

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

*\*It is 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<sub>2</sub> 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'll need 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 25-30ppm of free SO<sub>2</sub>, 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 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 stick 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. 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<sub>2</sub> gas, allowing spoilage organisms to enter the barrel during the storage period.

Finally, an important reminder: SO<sub>2</sub> 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<sub>2</sub>. 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 25-30ppm of SO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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. *\*It should be noted that 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. *\*Never use more than 3 grams per liter of sodium carbonate or sodium percarbonate as you can start to attack and break-down 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 hours.

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.  
*\*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 any structure or flavor, but can still be used to store wine and improve it’s quality through 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 6-9 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. Note that European oaks tend to release their flavors more slowly than American oaks do.

This is why new barrels are often first used to barrel ferment a white wine. White wines are generally less oaked than reds, and can pick up all the influence that they need from a new barrel in the relatively short time it takes to complete alcoholic fermentation. The barrel can then be used for longer on its second and third uses, which is more ideally suited to the longer ageing period appropriate for a red wine to achieve its maximum flavor and depth.

The above example is only a guideline based on the fact that the first and second batches of wine in a new barrel will achieve a higher tannin content in a shorter amount of time (without allowing for much of a chance for polymerization), while the third and fourth batches will yield the best quality due to the increased time provided to achieve the optimum level of tannins and oak flavor because, as noted above, more time in the barrel allows for better polymerization of the tannins in the wine.

It is important to note that the amount of time a wine spends in a barrel before it needs to be racked out will also vary according to the size of the barrel in addition to the style of the wine 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 unit volume of the wine, and the bigger the barrel, the less wine you have in contact with the wood. This means that your wine will spend less time in a smaller barrel than it would have to 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. To this end, you should also be aware that the oak flavor will diminish a fair amount during the first year. 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, and unfortunately (or not, since you get to make more wine!) the only real way to learn this is through experimentation. It should also be noted that there are many sound, medium and full bodied wines which are left in barrels for extended periods of time – sometimes 24 or 36 months – to integrate the oak flavors. Here at MoreWine, we oak our house Cabernet Sauvignon for 24 months in 60 gal barrels. It is likely that we would achieve the same result in approximately 9 months of ageing in a 30 gallon barrel.

Finally, it is considered good practice to 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. 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 per week during the first month, and then once a month 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 every have the same potential problems with spoilage organisms that a wooden bung could have. MoreWine's breathable silicone bungs also allow for gas escape in the event that the wine in the barrel expands in volume due to a rise in temperature, without allowing for any gas flow back into the barrel.

-You should rack roughly every three months (less, if the wine has been filtered). Wash out any deposits with hot water, rinse with cold water and re-fill the barrel.

-The level of free SO<sub>2</sub> 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 a level of 25-30ppm at all times during barrel ageing. To this end, it is advisable to invest in an aeration/oxidation set-up to measure the level of free SO<sub>2</sub> of the wine in the barrel. The other 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<sub>2</sub> of wine ageing in a barrel at least four times a year.

*\*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 25-30ppm of free SO<sub>2</sub>, at normal cellar temperature (55F), and at the proper humidity (65%-75%) at all times.

The SO<sub>2</sub> 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, you should never wrap the head of the barrel as this can trap in too much moisture and promote spoilage organisms.