



## HOW TO INSPECT AND MAINTAIN OAK BARRELS

Barrels are important tools for winemaking that can be used for different purposes, including fermentation, aging and storage. Nowadays, we can find barrels made of different oak species, toasted in different levels and different sizes. However, no matter which type is chosen, purchasing barrels is a significant investment for wineries. For that reason, to ensure their quality and make the most of it during their full life span, it's crucial to inspect and maintain the barrels properly. Not only do they decrease their lifespan, but the barrels that are not maintained properly can also lead to loss of wine, microbial contamination, cross-contamination within the winery and undesirable sensory attributes that can cause wine defects.

### Inspection at the arrival of barrels to the cellar

It's an exciting part of winemaking when the ordered barrels arrive at the cellar. Before moving forward and filling them immediately, make a thorough inspection, regardless of if they are new or used barrels. For the new barrels, follow the directions provided by the manufacturer. The following four steps can guide on how to inspect the barrels upon their arrival to the winery:

1. First, check the exterior of the barrel. A barrel that passes the exterior examination will have the following characteristics:
  - There is no physical damage caused during delivery.
  - The surface of the oak is clean and uniform.
  - There is no bowing in any area, especially in the head parts.
  - There are no gaps between the staves, nor any cracking on the staves.
  - The hoops are evenly spaced and properly fastened.
  - The bunghole is tapered and not damaged.
2. Second, visually check the interior of the barrel. For this, use a flashlight or any other convenient light source through the bunghole. A barrel that passes the interior visual examination will have the following characteristics:
  - The oak is in good condition, without any mould, especially important for the used barrels.
  - There are no gaps between the staves.
  - The toasting level of the barrel is uniform inside, meaning there aren't any spots excessively charred from over-toasting.

3. Third, make an olfactory examination by checking the smell of the interior of the barrel. Most barrels are treated with sulphur dioxide while they are empty. Make sure that you are not inhaling right after the bung was removed. Wave your hand from the end of the bunghole through your nose, allowing the air to come through gently. Smell the air to check if there is a pronounced sulphur smell. If that's the case, leave the barrel without bung for a while before moving forward with the olfactory examination. Place your nose on top of the bunghole and gently sniff. A barrel that passes the olfactory examination will have the following characteristics:
  - The inside of the new barrels smells like wood with toasty aromas.
  - There are no undesirable aromas, such as mouldy aromas, wet earth, plastic taint, barnyard, etc.
4. Finally, test the barrels for any leakages. There are different techniques to test for leaks, such as filling them entirely with water, using an air compressor or vacuum with hot water. Traditionally, this test is done by filling the barrels entirely with water. However, being sustainable in the wine industry is now more important than ever, it's possible to choose one of the latter methods to decrease water usage.

## Swelling Barrels Before Using

Many winemakers prefer to swell the barrels with water before, although some may prefer filling the barrels directly with wine, as dilution of the wine through water used when swelling is a concern.

Cold or hot water is used to wet the inside of the barrel by rotation and kept for a period of time in each head. The time of keeping the water during application is longer while using cold water. Some procedures ask for an acidified SO<sub>2</sub> water solution to avoid any microbial contamination through water, especially for longer treatments with cold water.

- Water quality has the utmost importance while treating barrels. The water used in barrel treatments should be chlorine-free.

## Storing barrels

Barrels can be used immediately after purchase or stored for a while before filling.

- If it's a new barrel, store it with its plastic packaging in a clean and humidity-controlled area.
- If it's a used barrel, choose dry or wet storage options.
  - » **Dry storage:** For storing the barrels dry, all the water inside is drained and left until inside walls are dried. The barrels are then stored by burning sulphur disks inside or filling with the gas form of SO<sub>2</sub>.
  - » **Wet storage:** For storing the barrels wet, they are partially filled with an acidified SO<sub>2</sub> solution.
- Both storage techniques have advantages and disadvantages. Dry storage may lead to drying the wood and further leakage problems. Wet storage may lead to decreasing desirable oak aromas and increase water waste in the cellar.
- After storage of the barrels, whether wet or dry, rinse and clean any residual SO<sub>2</sub> or acid before filling them again.

## Cleaning barrels after racking

As in the case of all containers in the winery, the cleanliness and hygiene of the barrels is very important. As soon as a barrel is emptied of wine, it must be cleaned thoroughly before it's refilled or stored. Cleaning involves taking out the deposits, such as gross sediments, tartrate and colour coating from the barrel. It can be done with mechanical or chemical actions. Traditionally the resistant tartrate and colour coating were removed by rolling a stainless-steel chain inside the barrel. Currently, high-pressure water jets can be used for both cold and hot water to clean the barrels. Automated barrel-washing equipment is also available in the market.

- It's more difficult to clean and/or sanitize a barrel with established tartrate deposits since these deposits act as a barrier between wood and cleaning or sanitizing agents. Therefore, it's important to remove them regularly.
- Please keep in mind that cleaning does not provide sanitization.
- Remember to clean and sanitize the bungs regularly.
- Any amount of cleaning or rinsing water left in the barrel can rapidly become stagnant or putrid.
- If the barrels will not be refilled immediately with wine, consider sanitizing and refer to dry or wet storage options.

## Sanitizing barrels

Sanitization involves reducing the microbial content in a barrel to acceptable levels. There are different methods of sanitizing barrels, including physical or chemical methods. Apart from conventional methods such as using chemicals, hot water or steam injection, there are new approaches such as using ozone and high-power ultrasound. Other novel approaches are also being researched, such as microwave and UV radiation. Finally, there are barrel rejuvenation methods that involve removing a layer from the inner surface of the barrels.

While choosing a suitable method for barrel sanitizing, consider if the method is efficient for the bacteria and yeast that are concerned and that it doesn't have any negative effect on the wood, including its integrity or volatiles. Winemakers are able to create their protocols by combining different cleaning and sanitizing methods that work best in their own cellar and barrel conditions.

- The barrels can be contaminated with different yeasts, including *Saccharomyces* and *non-Saccharomyces* yeasts, such as *Brettanomyces*, as well as bacteria, such as lactic or acetic bacteria.
- Sanitizing a wood barrel is a difficult task, as some yeast and bacteria can survive in the depth of the wood pores.

## References and Further Reading

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## More questions?

Contact Neslihan Ivit,  
Winemaking & Innovation Specialist

nivit@perennia.ca  
902-300-3652