

Wine corks

Bottling Recommendations



1. 1. The Cork Closure.

An incomparable product.

Cork is one of the most appreciated natural products. For three centuries cork has established a relationship with wine that has guaranteed it a remarkable place in the universe of cultural references. Recent market studies carried out in the United Kingdom, Australia and United States demonstrated that over 76% of the consumers in these key markets prefer wines sealed with a cork closure and that the type of closure used is an important factor when consumers choose their bottle of wine.

The Unique Characteristics of the Cork Closure

The natural properties of cork offer the wine industry a closure with incomparable characteristics. The main properties of cork are:

- **Lightness.** It weighs only 0.16 grams per cubical centimetre. A cork contains approximately 89.7% of a gas similar to air.
- **Flexibility, elasticity and compressibility.** These properties are due to the 750,000,000 cells (40,000,000 cells/cm³) that compose a cork closure.

These cells are watertight with a gaseous mixture in the centre core, similar to air, allowing the cork stopper to be easily compressed when inserted into the bottleneck. Once decompressed, the cork stopper can recover its initial size, demonstrating its perfect suitability to the bottleneck. This elasticity is also dynamic throughout time, allowing for glass expansion and contraction caused by temperature variations during storage, thereby assuring the complete sealing of the bottle at all times.

- **Impermeable to liquids and virtually all gases,** thanks to the suberina and ceróides that are present in the cells.
- **Resistant to wear and tear.** Due to its specific chemical and structural composition, cork presents a high resistance to humidity and oxidation.
- **Recyclable, renewable and reusable.** Cork can be recycled by grinding. The resulting granules can be used in other products, for example wall panels, shoe soles, fishing floats, etc. Recycled cork is not used in the production of cork stoppers. The industrial use of cork guarantees the sustainability of the “montados”, thereby contributing to maintaining nature’s balance and its associated ecosystems.



2. Cork Closure Storage

If possible, cork stoppers must be used as soon as they are received.

Long periods of storage must be avoided. The recommended period of storage is of up to 6 months under normal storage conditions.

Packing must only be opened when the closures are going to be used.

Generally, cork stoppers are packed in bags containing sulphur dioxide SO_2 which acts as an antioxidant and antiseptic for their preservation.

Those cork stoppers that are not used must be repacked in bags containing SO_2 .

Cork stoppers storage must be done:

In dry and cold places, with a stable temperature range from 15°C (59F) and 20°C (68F), and a relative humidity of 40% to 70%.

In odours and mould free places which are far from any kind of fuel, or chemical products such as cleaning products or paint.

Premises where there are no chloride treated woods, such as recently built ceiling structures.

It is essential to realize about the importance of these rules in order for the cork closures to have their original properties when actual bottling is made preserving them from contamination.

3. Bottling, Transporting and Storing Wine

- By taking advantage of cork's compressibility, the bottling machine should gently compress the cork closure and gently insert it into the bottleneck.

- The correct compression is 1.5 to 2 mm less than the diameter of the bottleneck. A cork closure with a diameter of 24 mm should be compressed to 16.5 mm for it to correctly enter an 18.5 mm diameter bottleneck.

- Cork closure compression must never be greater than 33% of its diameter or this can damage cork's internal structure, compromising its elasticity and consequently the correct bottle sealing ability. Hence, for a cork closure with a diameter of 24 mm, the maximum compression is 8 mm.

- Due to its elasticity, cork recovers its volume within the first five to ten minutes after it has been bottled, adapting itself to the irregularities of the



bottleneck and exerting a uniform force throughout the glass surface. Therefore bottles should remain vertical and should not be laid in a horizontal position immediately after corking.

It is possible to maximize the recovery properties of the cork within the bottle by ensuring adequate line speed prior packing. This is done by prolonging the circulation time of the bottle on the conveyor belt. All that is needed is the addition of carpet sections to the conveyor belt, which goes from the bottling to the labelling machines, organizing them in a pressed S shape in order to save space.

Bottled wine, except in rare cases, is not immune to environmental temperature variations during its transportation and even when it is in the distributors' warehouse.

These temperature variations are responsible for:

- Variation in the bottleneck diameter due to the natural contraction and expansion of glass.
- Variation in the wine volume. As an indication, wine expands on average about 0.2 ml per degree Celsius with temperature increase, which consequently increases the bottle pressure. Although the variations in the bottleneck diameter can be naturally compensated by the excellent elastic properties of cork, the same cannot be said in relation to the variation in the wine volume and consequently internal bottle pressure.

To avoid this problem, the following recommendations should be observed when bottling wine:

1. The temperature in the bottling hall should be between 15° and 20° Celsius (59F to 68F) when wine is bottled.

2. The bottling machine should be calibrated to allow a minimum headspace of 15 mm between the surface of the wine and the cork stopper (values for 750 ml bottles). This headspace is essential in allowing wine expansion without leakage, in the event of an increase in temperature during transportation or storage. Before the choice of bottle is made, the length of the cork closure and the fill height of the wine in the bottle must be determined to ensure there is sufficient headspace and the product conforms to the Weights and Measures legislation in the country in which it is going to be sold.

59°F 68°F



Min 15 mm

3. To minimize the effect of alterations in the internal bottle pressure that can lead to wine leakage, it is advisable that the wine should be filled into



the bottle under vacuum or spurge with an inert gas. These steps will improve wine protection from premature oxidation and microbial reactions.

4. It is necessary to frequently control the internal bottle pressure in wines that have just come off the bottling line to see if the vacuum system is functioning correctly. The internal bottle pressure, in the case of still wines, must be close to zero.

5. In extreme conditions, high internal bottle pressures prevent the cork from adapting to the bore of the bottleneck, forcing the wine to be expelled from the bottle, until the internal pressure is once again balanced. In this case, a continuous wine leakage does not occur, but only an expulsion of a few millilitres, until the internal pressure is re-established. Such problem is caused by excessive internal bottle pressure and not by a cork closure fault. Occasionally if wine is expelled because of a built up of pressure within the bottle, usually through wine expansion caused by a rise in temperature, the cork's sealing capacity is permanently damaged and the bottle will continue to leak after the pressure has equalized, although at a very slow rate.

Other facts to take into account in the bottling process

The premises where this process is carried out should:

- Be free of insects, especially *lepidopterous*.
- Be properly ventilated, through ventilation ducts and extractor fans.
- Be at a constant ambient temperature of 15°C to 20°C (59F-68F).

Bottles must be removed from the pallets when the bottling process is about to start. They must be well washed and **dried** before the process starts. (Almost all bottling machines do this automatically).

The pallets with full bottles on them must be kept in a cellar with stable temperatures and a dry atmosphere, with no mould and no chloride based products treated woods. The pallets must have, in between each row of bottles, sheets of a material other than card board, wood or a derivative of the last two.

The cork stoppers must never get onto contact with the wine or water before corking of the bottle.



The inner side of the neck of the bottle must be cleaned and dried, otherwise a very thin film of liquid which would difficult the expansion of the cork, and decrease its adherence to the glass of the bottle.

3. Maintenance of the bottling equipment

Good bottling machine maintenance is essential to achieve the best performance of the cork stoppers and therefore assure a long wine life.

Some recommendations on this matter are presented bellow:



Maintain the corks feeding channels very clean, as well as any other mechanisms of the bottling machine. Make sure the **piston and the centring cone are well aligned**; check also its conservation state. This step is essential for a correct insertion of the cork in the bottle neck.



Check frequently the level of wearing of the compressive gags, since a small defect can scratch the cork sides, which in turn can cause wine leaks or air filtrations.



The bottling machine must work smoothly, especially during compression of the cork stopper, but also rapidly when inserting the cork.

Maintain every surface that will make contact with the corks free of chloride based products.

Before starting with the bottling process, the whole machine must go under a sterilization process.

