

OXYGEN PICK-UP DURING BOTTLING UNDERSTANDING ITS IMPORTANCE

The total concentration of oxygen in a packaged wine is commonly referred to as the total package oxygen (TPO) and this is quantified immediately after packaging. For standard glass 750 mL bottles, there are two potential sources of oxygen:

1. the dissolved oxygen (DO) in the wine when the bottle is filled
2. the oxygen present in the headspace (HO) when the closure is applied which also includes the “piston effect” resulted from air displacement when the closure is inserted into the bottleneck.

Additional oxygen is introduced into the bottle after packaging from oxygen encapsulated in the closure and oxygen that diffuses through the closure during wine ageing. However, very often the oxygen introduced by the bottling can be more important than those associated to the cork stoppers. Therefore, mastering the amounts of oxygen at bottling it will be key to optimize the wine quality and its self-life.

The Bottling TPO is essentially dependent on the wine preparation and bottling practices.

The concentration of DO present in wine at bottling can be influenced by the preparation techniques used, filtration processes and method of transfer to the filler bowl. During filling, DO can increase due to poor inert gas cover and pre-fill bottle purging, low filling temperatures and line stoppages. Dissolved oxygen concentrations can be reduced below 0.5 mg/L prior to filling by sparging with an inert gas (Nitrogen, argon or carbon dioxide).

Headspace oxygen (HO) is predominantly determined by the efficiency of the inert gas flushing applied to the empty bottles before filling and to the headspace in the bottle after filling. It is important that seals on individual filling heads and pumps are functioning correctly and do not allow the ingress of air. Most modern bottling lines can achieve displacement of approximately 60-80% of the oxygen from the headspace, resulting in reasonably low HO values of around 0.8-1.5 mg/L. The total amount of oxygen present in the headspace is governed by the ullage volume (the space between the upper surface of the wine and the closure).

According to the AWRI, mastering level of the bottling operation can be assessed by the TPO:

<1.5 mg/L	Best practice
1.5-2.5 mg/L	Acceptable
>3 mg/L	Requires improvement
>4 mg/L	Poor practice

Given the importance of TPO and its pivotal role in shaping wine's sensory profile and shelf-life, Amorim Cork South Africa, is now offering oxygen management audits to its clients. To guarantee a proper oxygen management is key to have the appropriated tools to measure and control oxygen. Amorim Cork South Africa is equipped with PreSens analysers that allow to measurement of total amount of oxygen present in a bottle at bottling or even picked up during the different stages of the winemaking process.

In addition, Amorim Cork South Africa has also a portfolio of cork stoppers featuring different oxygen ingress properties which are tailored to fulfill the needs of different wine styles and shelf-life. Along with oxygen management, Amorim Cork South Africa will work closely with wine producers in the selection of the cork stoppers with the most appropriate oxygen properties which will minimize the risk of reduction or premature oxidation, allowing optimal expression of the wine's properties.