Inert Gas & Winemaking

A MoreManual!™ by Shea A.J. Comfort
www.MoreWineMaking.com
1-800-823-0010

The Importance of Inert Gas

During aging, if a wine is not protected from both microbial spoilage and oxygen at all times it is likely to spoil. Protecting wine usually involves maintaining proper SO_2 levels and keeping containers full. Additionally, purging your headspaces with inert gas to effectively remove the oxygen greatly increases the amount of protection. When it comes to using SO_2, the benefits are widely understood and in-depth information describing its usage is readily available in most winemaking literature. Yet, often when these texts refer to purging with inert gas they fail to explain the actual, step-by-step techniques needed to do so. It is important be aware that creating an effective blanket of gas to protect your wine requires more than just shooting some Argon into the headspace of your vessel until it feels right. In fact there is a bit more to it! The goal of this manual is to help you understand the techniques needed to successfully purge headspaces with inert gas, so that your wine will actually be protected. Let's start by first looking at the importance of protecting your wine from oxygen exposure, and then we will take a look at the specific gas purging techniques needed to do so.

The Need to Control Oxygen Exposure:

Any space in a carboy, tank or barrel that is not occupied by liquid is filled with gas. The air around us is actually a mixture of gases, roughly 20% of which is oxygen.

A continuous exposure to oxygen is great for people, but not for storing most wines! This is because when wine is exposed to oxygen a series of chemical changes takes place. If oxygen exposure is not controlled and extends over time, then the resulting changes often result in undesirable flaws such as: browning, loss of freshness, sherry-like aromas and flavors, and volatile acidity production ("VA" or vinegar). Since these unwanted reactions happen as a result of oxygen exposure, wines which exhibit these defects are described as oxidized. One of the key points to properly aging/storing wine is learning how to limit a wine's exposure to oxygen so that it won't become oxidized. This could easily be achieved by filling the storage vessel with the wine to the rim and therefore eliminating any headspace (as is the case when filling/topping-up barrels), but as we shall see in the next section this may not always be practical.

Expansion & Contraction — The Need For Headspaces:

Unless you are in a situation with a guarantee of temperature stability, as with a glycol-jacketed tank, or a temperature-controlled storage area, tanks and carboys should have a small headspace kept at the top (note that barrels should not have any space in them when filled/topped). This headspace is needed because it helps to compensate for the expansion and contraction of the liquid due to ambient temperature changes (remember things expand when heated and contract when cooled). Since gas compresses more readily than liquid, no significant additional pressure is exerted on the storage vessel if a little space is maintained at the top. This is why you see a ¼" space below a cork in a finished bottle of wine, and also why it is recommended to leave a 1" gap below the stopper in a sealed carboy. If the headspace is not present, as the temperature rises and the wine expands, the resulting pressure will not be mitigated by the gas' ability to compress and the full force of the liquid will push up against the lid/bung. Depending on how extreme the shift in temperature is and the volume of the wine, this pressure can be enough to either bow the lids of tanks outward and/or push bungs out entirely.

> **Note:** *The opposite happens when the wine cools; bung/lids are pulled inward as the liquid contracts.*

While it may seem like an extreme result, this can and does happen! And if it does, besides creating a loss of wine and a mess, your wine has now become exposed to the elements and potential spoilage. Therefore, if the wine will be exposed to any temperature variances during its aging/storage it is best to leave headspace at the top of your vessels to prevent this scenario from happening.

Making Headspaces Safe:

Thinking back to the first section of this paper, we can see that this poses a problem: how do you create a space for expansion and contraction while avoiding any negative