

## Temperature and wine storage: an introduction by **Jamie Goode**.

How do you store your wine at home? It all used to be a lot simpler in the good old days, when the sorts of people who'd be drinking fine wine would all have underground cellars in their homes. It is the relative constancy of the underground environment as much as the ambient temperature that key to its suitability. By happy coincidence, the temperature of the typical underground cellar is pretty much ideal for storing all types of wine, hovering at around 10–12 °C, perhaps with a gentle seasonal variation of a few degrees, but without any big temperature swings—for example a shift from 20 °C during the daytime to 10 °C at night—or high peaks that might damage wine.

These days, relatively few homes have cellars, and even in those that do, the cellar is sometimes rendered unsuitable for wine storage by the installation of a heat source such as a boiler. This leaves many wine lovers with some tricky decisions about how to store their wines. We know that wine ages well in underground cellars, but what we'd really like to know is exactly how sensitive wine is to changes in temperature, and, in particular, warmer temperatures. What conditions are acceptable for wine storage, both in the short term and over a longer period?

There are relatively few scientific studies on this subject. In 1996, a team of French researchers at Inter Rhône Technical Services looked at the effect of four different storage conditions on four reds and one rosé wine, designed to simulate conditions in a cellar, on display on shelves and during shipping. Bottles were sampled at regular intervals over a two year period by chemical and sensory analysis. The wines kept at a constant low temperature (14 °C) with the bottle lying down performed much better than the other three.

In 2010, a more detailed study took place in collaboration between University of California Davis and Murdoch University in Western Australia. Four white wines and four red wines were exposed to four different conditions, including 20°C, 40°C, and alternating 20 and 40°C, as well as putting some of the wines into the boot (trunk) of a car for three weeks! After this abuse, the 32 wines were evaluated using sensory and chemical analysis. These results showed that the wines stored at higher temperatures had been significantly affected, with loss of fruit characters and more flavours associated with old wines, which were totally out of place in such young bottles.

We can also use the long-term experience of many people in the wine trade to try to understand the sorts of conditions suitable for wine storage. It's fairly clear that, over periods of weeks or months, high temperatures (20 °C and above) can be detrimental to wine quality. There are two reasons for this. First of all, chemical reactions take place much faster at higher temperature. Typically, with a 10 °C rise, the rate of reactions double, so the wine will age much faster. If this were all that happened, it wouldn't be so bad, because we could drink age worthy wines younger, but it isn't: as well as the chemical reactions speeding up with rising temperatures, reactions occur that simply wouldn't at lower temperatures, and they are undesirable.

Fluctuating temperatures are also bad. This is because as the wine warms it expands, and as it cools it contracts. The headspace of the wine is therefore pressurized and depressurized in cycles that can result in venting, where air enters the bottle. A good quality, intact cork should prevent this, but if there are any imperfections in the cork or it is extremely old, this is a potential risk. It is not known how screwcaps would cope with these shifts. If it was a problem for wine to be kept at less than perfect temperatures over the short term, wine shops and wine departments in luxury stores, would soon go out of business.

Although it's hard to be absolutely certain, in the absence of proper scientific studies, there are some things we can say about acceptable storage for wines. The first is that wine is quite fragile, but perhaps not as fragile as some people think. If you have a few cases stored at home—say, under the stairs—they'll likely be fine in the short-term (a year or two), as long as we don't have an unusually hot English summer where the ambient temperature in the home climbs into the high 20s and even the 30s for a prolonged period.

If there's a power cut and your wine storage solution is not ideal for a few hours, or even a few days, the wine should be absolutely fine.

Second, it seems to be the high temperatures that are really bad for wine. Anything over 30 °C for more than a few hours is worrisome. This is why long-term storage of wine at ambient temperatures is a big risk. One summer like 2003, and your wine will likely be irrevocably damaged. It is also why the transport of wine is so risky. If a wine is left dockside in a container in summer, or is transported by lorry without temperature control in a hot climate, it could be ruined with no visible sign of the damage that has taken place: you don't have to get to the peaks where the corks are pushed out by the expanding wine for damage to have taken place. For this reason, knowing the provenance of wine bought from a merchant or at auction is critical.

On the basis of this, what would my recommendations be? It's clear that for wine, intended to be aged over a number of years, some sort of temperature controlled storage is needed. For many, this will involve professional storage off-site. But even if you take this option you will need to store wine at home for the time it takes you to get through a few cases once they are delivered, and this could be over quite a long period. If you haven't got a suitable underground cellar, then it's possible to construct a temperature-controlled wine room using a combination of barrier membranes, insulated walls and a conditioning unit. An alternative would be to buy a wine cabinet, of which the market leaders are EuroCave. While these are not inexpensive, one should compare the cost to the value of the contents being stored. These type of storage units are the most affordable and simplest way of ensuring that your wine is kept in ideal conditions.

If you buy wine from a reputable source, and ensure that it's kept away from heat and rapid fluctuations in temperature, then this will give you peace of mind that you're going to be experiencing those bottles at their optimum when you come to open them.

About the author:

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He won the 2007 Glenfiddich Wine Writer of the year award, and contributes regularly to a range of publications including The Wine Opus, World of Fine Wine, Wine Business International, Wines and Vines, Hong Kong Tatler, Sommelier Journal and Decanter. His first book, Wine Science, won the Glenfiddich Award for Drinks Book in 2006. Jamie has also made numerous presentations, conducted many international tastings and is an established wine judge (panel chair for the International Wine Challenge, among others). His second book also published in 2006 is titled Wine Bottle Closures.

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26<sup>th</sup> July 2011

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