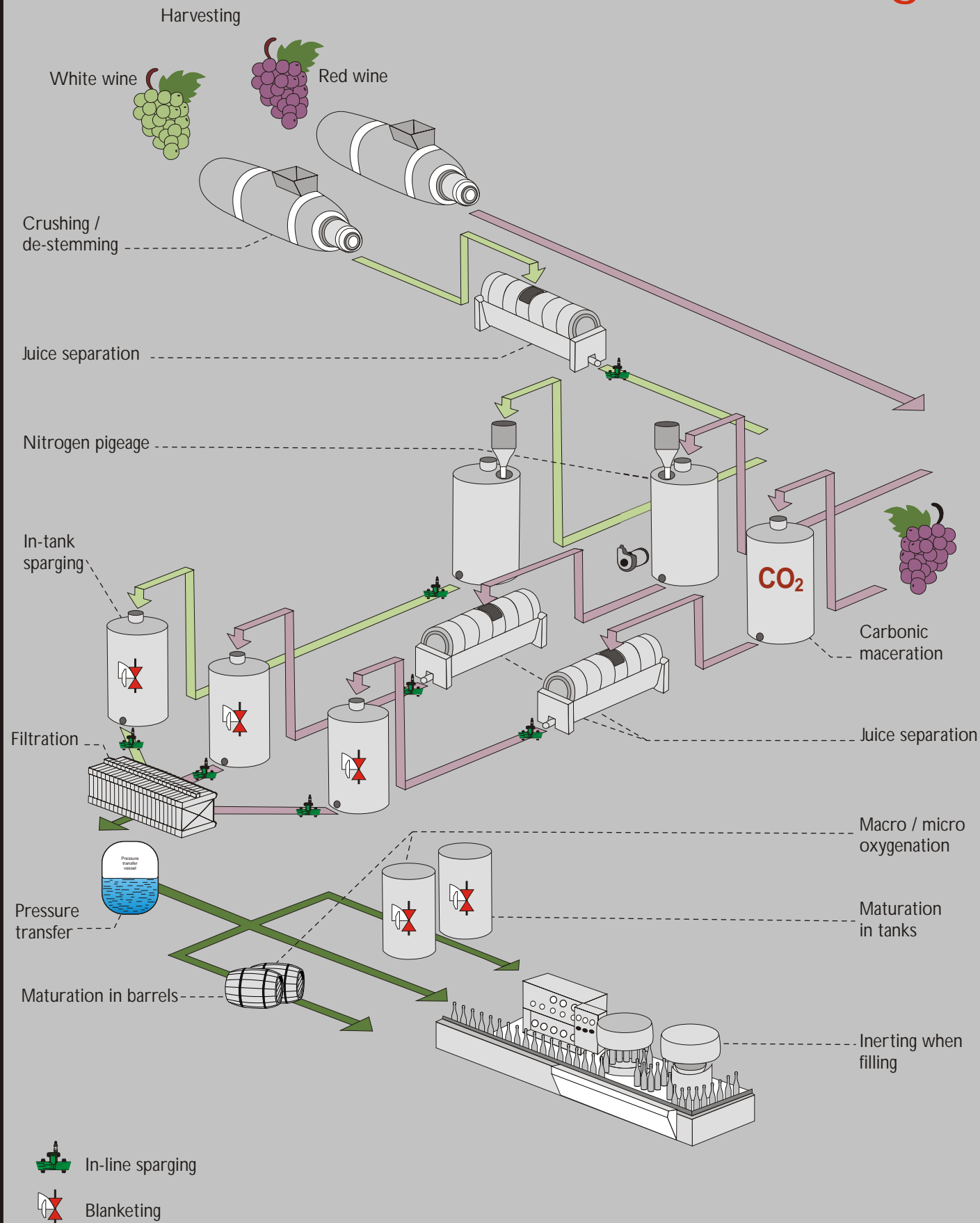


# Gas solutions in wine making



**VINTAGE**  
Solutions with Character



Characterised by excellence, maturity and enduring appeal. Afrox is committed to partnering our wine industry clients with innovative gas solutions that will produce world class wines - with an appeal reminiscent of the great winemakers of the past. That's Vintage.

## Wine technology gas applications

The highest quality fine wines are achieved by using Afrox's Vintage Solutions to minimise oxygen exposure, from harvesting of grapes in the vineyard, right through the winemaking process and down the line to bottling and sealing of the finished product.

### Harvesting

Before the winemaking process even begins, oxidation is kept at bay by chilling the grapes as soon as they have been harvested, with Afrox's patented carbon dioxide SnowShooting® system or by applying cryogenic liquid nitrogen at the winery. This chilling process reduces the rate of chemical degradation significantly before crushing.

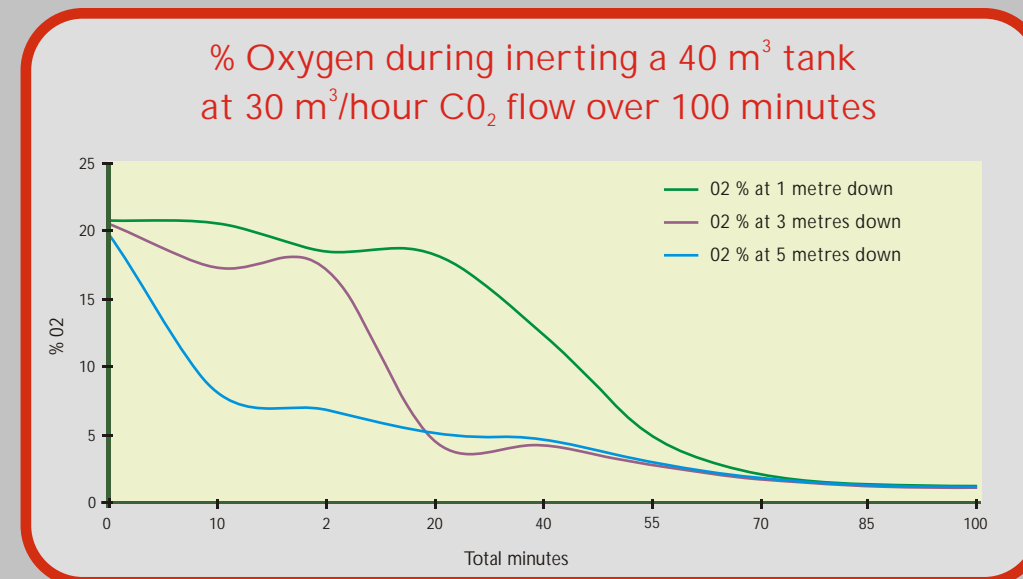


### Crushing, de-stemming and juice separation

During this phase, SnowShooting® is not only an ideal blanketing medium to displace oxygen, but also serves to chill the substrate, slowing down chemical reaction rates. This inert carbon dioxide atmosphere or the alternative, a liquid nitrogen atmosphere minimises exposure to oxygen and chills the substrate during the crushing process. Liquefied gas is recommended in this stage of winemaking and can be piped directly into the press.

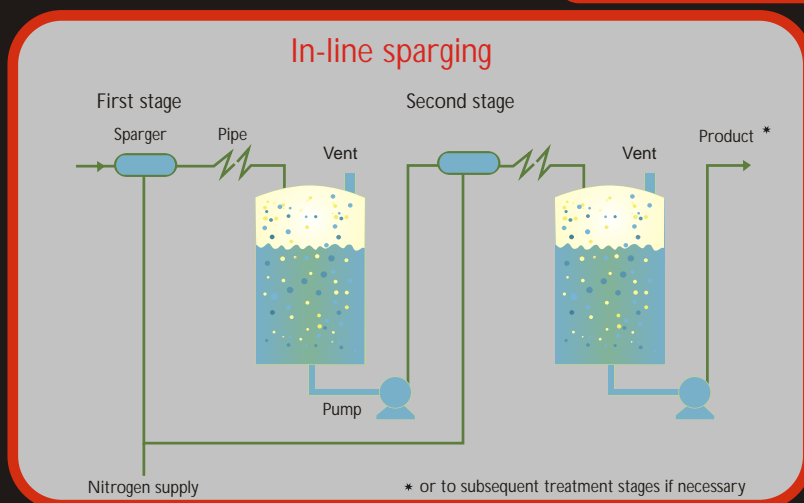
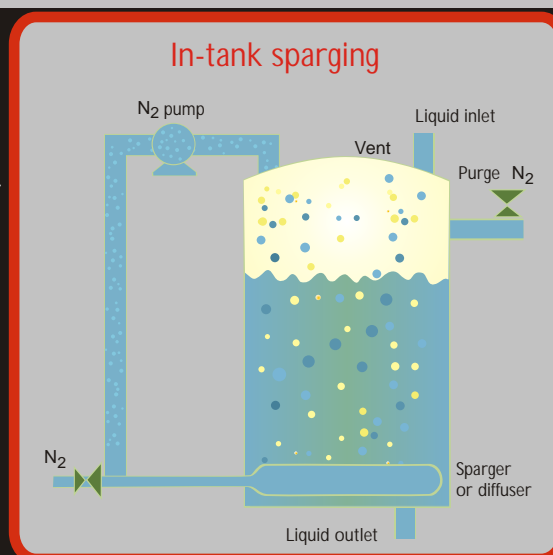
## Blanketing or inerting and carbonic maceration

Carbon dioxide gas is used to purge tanks before the carbonic maceration process begins. Because of its density and laying effect, carbon dioxide is also widely used for ullage blanketing, while its high solubility delivers a perfect effervescence to both white and red wines. Carbon dioxide snow from SnowShooting®, carbon dioxide pellets or dry ice can also be floated on the mirror of the wine to form an inert buffer to displace oxygen as the level of wine rises. Alternatively, carbon dioxide or nitrogen gas or gas mixtures can be used to pre-purge or blanket the tank. Nitrogen gas, because of its inertness, can be used in a convenient and novel way in nitrogen pigeage (turning the cap to drown aerobic bacteria and encourage cuvaison).



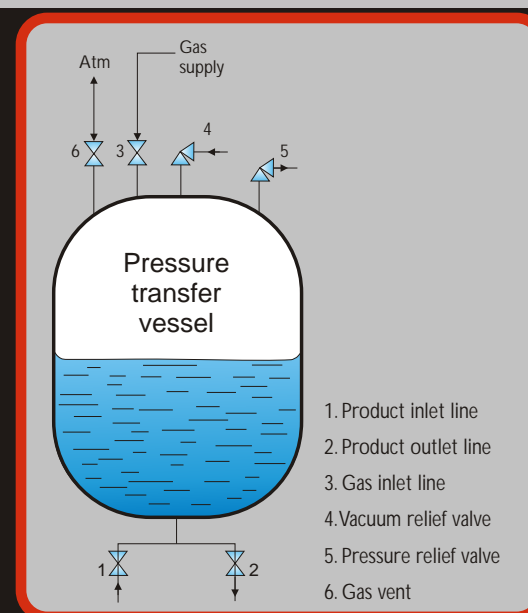
### In-line and in-tank sparging

The ingress of oxygen while transferring the substrate down the production line is an unavoidable threat to the quality of the end product. Afrox's solution is to introduce small bubbles of nitrogen gas or a mixture of carbon dioxide and nitrogen gas at several key points in the process, to release dissolved or entrained oxygen. Diffusing nitrogen or a nitrogen/carbon dioxide gas mix as a sparging or de-sorption agent into wine or must, reduces dissolved oxygen levels and limits the degeneration of wine quality. Argon, an expensive inert gas, is less commonly used in this process.



### Pressure transfer

To avoid oxidation when wine is being pumped from vessel to vessel during the production process, Afrox recommends using nitrogen gas as the transferal vehicle by means of a transfer tank omitting a sparging operation.



### Maturation and storage

Oxidation remains a threat during this phase, as temperature and atmospheric changes affect the volume of the tank ullage. Nitrogen gas or a mixture of carbon dioxide and nitrogen or argon ensure that the ullage can breathe, compensating for such fluctuations. In a tank management system Afrox offers a choice between:

- a gas bleeding system
- a gas demand system or
- a gas timed purge system.

In macro/micro oxygenation, very small amounts of oxygen are bubbled through red wine in tanks at a controlled rate after the malolactic fermentation stage or even during the maturation stage. This colour-stabilises the wine, ensures more body as a result of the softer and richer tannins and facilitates aroma integration and lowering of reductive flavours. Oxygen is introduced via a sparger at a rate of one to ten millilitres per litre, per month.

### Filling

To eliminate oxidation during filling, fillers should run on counter-pressure with nitrogen, or carbon dioxide/ nitrogen gas mixes and by pre-purging filling lines. Bottles can be inerted by pre- or post-fill purging with nitrogen, by using Afrox's liquid nitrogen droplet dispensing system or by using carbon dioxide/nitrogen gas mixes.