HACH ULTRA

EXCELLENCE IN PROCESS ANALYTICS

Application Note

Beverage No. 05

CO_2 measurement in the winery laboratory and in the cellar

- Portable 3658 instrument - up to 40 hours of independent operation in the cellar, isolated from mains supply
- No reagents - safe and easy operation
- Fast method - temperature compensated analysis provides readings in two minutes or less
- Unmatched ease of operation - no sample preparation or wine transfer from the initial location
- Universal method for all wine - covers the entire range of wines: still, fizzy wines and Champagnes
- Selective measurement - no influence of color or interference from other dissolved gases or compounds
- Wide analysis range - highly sensitive, from 0.01 g/kg up to 12 g/kg
- Long lasting calibration - the calibration lasts for more than one month (in gas or liquid phase)
- Dual use - In the cellar, directly from a line, a tank, or a barrel, or with an optional piercer for lab analysis
- Non-destructive method - the sample can be used for other analyses
- Small wine sample (150 mL)
- Minimal flow requirement
- Can be connected after an Orbisphere 3650 oxygen analyzer

Why CO_2 in wine?

CO_2 is generated during two main wine making steps: the alcoholic and, to a lesser extent, during the malolactic fermentation.

From slightly prickly all the way up to bursting with foam, the concentration of CO_2 generates different fizzy effects and definitions in white wine: perlant (just a hint of carbonation), petillant (less than 2 bars), cremants (2 to 4 bars), sparkling, mousseux (5 to 6 bars).

The CO_2 effect is quite different from the classical perception of olfaction and taste since it has an essential role in the dynamic of wine tasting. In red wine, because of the heat and manipulation in the mouth, microscopic bubbles are generated, which allows the perception of aromas when they are in gaseous phase.

In white wine, carbon dioxide combines well with the acidity, reviving its freshness.

But low levels of carbonation cannot be quantified by wine tasting. For this reason it is necessary to know the exact amount of CO_2 in the wine.

To reach the desired value, the quantity of dissolved CO_2 has to be decreased occasionally by several techniques; a slow temperature increase will reduce CO_2 solubility and release the undesired excess.

Racking also decreases the CO_2 content and will additionally aerate the wine for several purposes (inhibition of malolactic bacteria, etc).

Finally, the wine can be sparged in the tank with nitrogen, to get rid of excess CO_2.

Where to measure?

In the lab

The Orbisphere 3658 is used in combination with a wine sampler. This device performs quick and simple sampling from bottles. The closure is pierced and wine is expelled without loss of CO_2 by means of an inert gas (nitrogen).

After piercing the package, the liquid flows into the flow chamber of the 3658 where the CO_2 is measured.

No matter what the CO_2 concentration, after less than one minute, the analyzer gives the CO_2 content. Data can be transferred to any external data application using the software included.

This software is also used to configure the system according to your application (units, measurement ranges, etc).

When not in use, the analyzer activates a standby mode that allows a quick recovery (less than one minute) for the next analysis after minutes, hours, or days, without additional calibration.

In the cellar

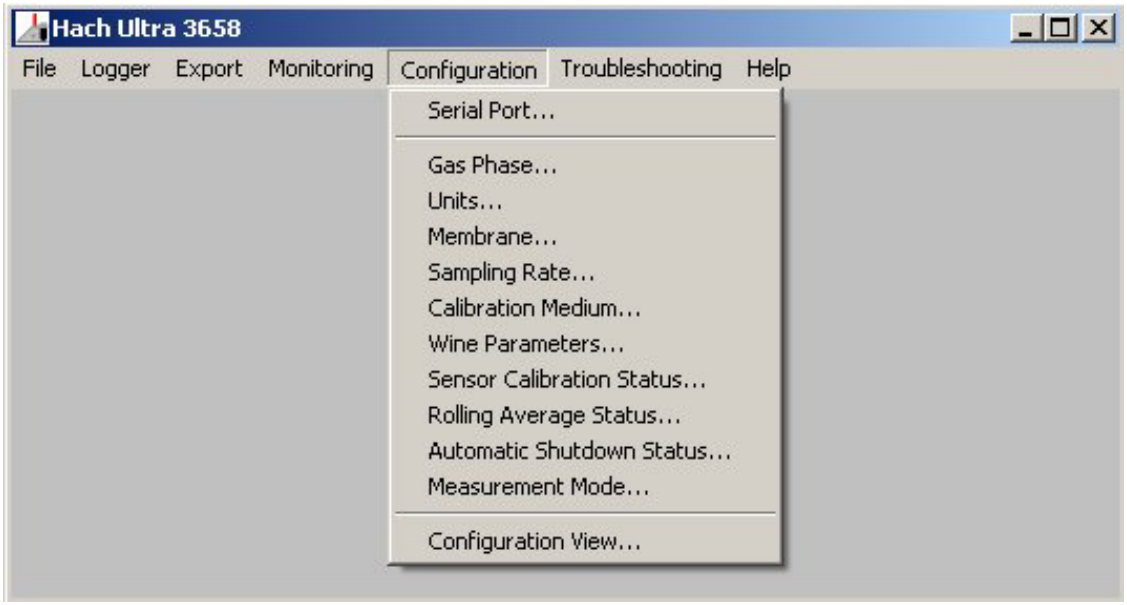
Just take the 3658 along with you to the cellar as the analyzer can work as a stand-alone. CO_2 can be measured at any location (tank, barrel, etc) and temperature.

Connect the analyzer to a sample valve and adjust the flow. In less than 2 minutes you get the result that can be stored in the memory (up to 500 measurements).

If you would like to follow up the process long term, start the 3658 Windows software and configure the analyzer in automatic data logging mode.

At your specified time interval, CO_2 concentration, temperature and time are stored in the analyzer memory. You can display the data on a graph for a visualization of the CO_2 content evolution during the wine making process.

Using the Hach Ultra 3658 software, you can download the stored data and export it into your quality or process data system.



Recommended systems components

Model	Description
3658/418	Portable CO_2 analyzer, sensor model 31478, RS232 (serial) output.
29972	Beverage package sampler for carbonated liquids without suspended particles.
29973	Piercing head for liquids without suspended particles.