Measure O_2 and CO_2 from the same package

- Universal method for all products - covers the entire range of beverages: still, carbonated and Champagne
- Quick and easy operation for non-skilled operators
- Two measurements from one package means less product loss
- Flexible system enables each analyzer to also be used for tank measurements
- O_2 system calibrates easily in air
- CO_2 selective measurement - no influence of color or interference from other dissolved gases or compounds

Background

The oxygen and carbon dioxide content in wine and malt beverages can affect the sensory quality of the product. Oxygen can lead to oxidative off-flavors and incorrect CO_2 concentrations effect feel and taste in the mouth. Since measuring both can often be necessary, it is advantageous to measure CO_2 and O_2 from the same package.

One simple way to do this is by using the Orbisphere Portable CO_2 and O_2 analyzers, which can be joined in series with a package-piercing device. This application note describes how to best use this instrumentation for fast, easy and accurate analysis in the user's facility. Minimum set-up and training is needed to make reliable measurements.

Application description

The complete measurement system from Hach Ultra consists of one Orbisphere package sampler (model no. 29972), one portable oxygen analyzer (model no. 3650/113) and one portable carbon dioxide analyzer (model no. 3658/418). These are plumbed in series as shown in the installation diagram on the next page. An AC/DC power supply is used for each portable analyzer to ensure uninterrupted power.

To measure O_2 and CO_2 from the same wine bottle, the cork or stelvin must first be removed. For still wines, there is no risk of air exchange between the bottle and ambient air if the package is handled gently and not agitated. For sparkling wines, chilling the bottles below 11°C can minimize CO_2 gas release.

The open bottle should then be presented to a package sampler, which uses a tapered rubber stopper to properly seal the bottle. Nitrogen forcing-gas is used to push the product past both sensors for measurement. For still and sparkling wine, nitrogen-forcing gas is set to 2 and 5 bar, respectively.
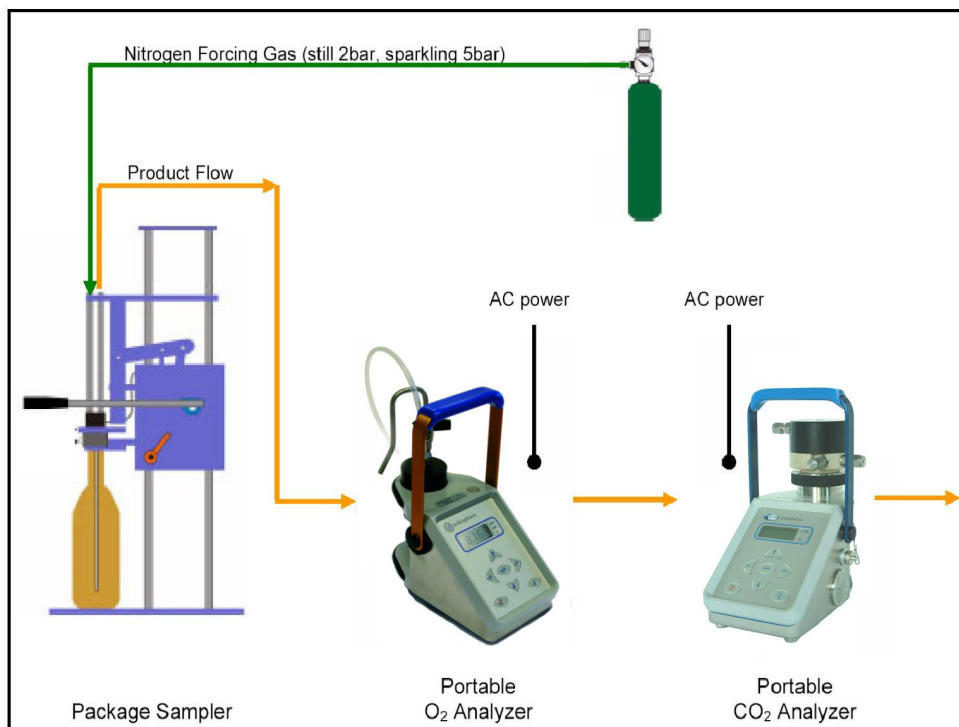
Expected O_2 and CO_2 results are shown below.

Typical O_2 levels:

Still	0.10 – 2.0 ppm
Sparkling	0.05 – 0.80 ppm

Typical CO_2 levels:

Still White	0.20 – 1.2 g/L
Still Red	0.020 – 0.50 g/L
Sparkling	9.5 – 10.5 g/L

Installation diagram

Recommended systems components

Model	Description
29972	Beverage package sampler for carbonated liquids without suspended particles.
3658/418	Portable CO_2 analyzer, sensor model 31478, RS232 (serial) output.
3650/113	Portable O_2 analyzer, electrochemical sensor, RS232 (serial) output.