Beverage Package Analyzer

Series 3625

Configured system

$CO_2 \cdot O_2 \cdot N_2$

02 = 28.72 PPB
CO2 = 3.10 G/L
The ultimate Quality Control tool for final packages, filler diagnostics, and R&D studies of packaging material.

**Efficient tool for final package QC.**
Perform routine analyses to check the quality of your production in the main lab or during auto control procedures. Suitable for carbonated or non-carbonated beverages containing oxygen sensitive materials such as aroma substances, coloring agents, and vitamins (A, C, and E).

**Diagnose and identify problems such as air ingress and filler head difficulties.**
Identify how the filler performs in different situations (line starts and shut downs) and specify preventive actions. The Package Analyzer quickly checks each filler head.

**Ideal for R&D studies of package material permeability and the effect on flavor compounds.**
In one operation analyze gas diffusion into packages using conventional package barrier materials, active oxygen scavengers, and different bottle closures (crowns and caps with passive or active O2 scavengers).

**Easy to use:*** Just place a shaken bottle or can on the platform and pierce. No special operator skills needed.

**High analysis result repeatability:**
The influence of the operator is reduced in such operations as sample flow and package shaking.

**Sensitive and accurate:** Proven Orbi-sphere sensor technology performs complete package analysis to within ±2 ppb O2, ±0.006 v/v CO2, and ±0.3 ppm N2.

**Comprehensive data management:**
With the Orbipack software you can visualize, manage, and export up to 30 parameters for each package analysis. Quality parameters and alarms can also be set for up to 500 different package types.

**Communicate with other types of software:** The Dynamic Data Exchange (DDE) interface automatically sends results to other applications such as LIMS, SPC, or MS Office.

**Password protected:** User set up has 4 levels to restrict access to sensitive analyzer configurations.

**Why choose the Package Analyzer?**

- It measures real CO2 not total gas pressure. Since there is always dissolved air in the product, determination of CO2 by traditional total pressure methods will result in an over-estimation. The Package Analyzer uses a selective and patented method, not influenced by the presence of air, for measuring only dissolved CO2.

- It measures the Total Package Oxygen (TPO). Monitoring the TPO provides a valuable tool to ensure constant quality, to minimize foaming, and to increase filler speed, as well as identifying the effect of air on carbonation.

- It compares real CO2 with traditional CO2 measurement methods. The Package Analyzer incorporates a total gas pressure sensor which measures this parameter to be compared with your QC “temperature/pressure” method. The Package Analyzer is uniquely qualified to address this issue.
Benefits of Orbisphere's patented technology for the measurement of real CO₂:

When measuring CO₂ with traditional total “temperature/pressure” measurement methods, pressures of all gases present, including air (O₂ and N₂), are added together. If only CO₂ is present, this method will provide an accurate result. However, in soft drinks, where air content can be very high, the consequence of adding all these elements will be an over-estimation of CO₂, which is not present in this quantity. The error magnitude depends on the oxygen concentration and corresponds to 0.1 v/v for each dissolved ppm of O₂. (See effect of air in the diagram to the right.)

Because CO₂ is the only gas that contributes to the fizzy effect in soft drinks, “low carbonation” customer complaints can be attributed directly to the error generated by the traditional method. By accurately and selectively measuring this gas, rather than the total pressure, you ensure continued customer satisfaction.

Example

What is the consequence of having 2 ppm dissolved O₂ in the product and measuring the CO₂ with manometric method?

1. Measuring the CO₂ with traditional total “temperature/pressure” gives 4 v/v and shows that we are within specification.

2. However when a measuring method selective for CO₂ is used, the result is 3.8 v/v, thus 0.2 v/v CO₂ less than the total pressure method.

Explanation: The extra 0.2 v/v CO₂ is due to air partial pressure in the sample that contributes to the total “temperature/pressure” method.

Conclusion: The product is not within specifications!
The Package Gas Analyzer System accurately measures and calculates the following parameters:

- Dissolved O2, CO2, and N2
- Headspace O2, CO2, and N2
- Total O2, CO2, and N2
- Headspace volume
- Package pressure
- Package temperature

**How it works**

The piercing of the package triggers the automatic sequence of headspace parameter measurements, which takes about 30 seconds.

In the next sequence, the operator pulls down the sampling tube to start the liquid analysis. At the end of this process, data are sent to the PC via the RS 232 interface.

**The Piercing Unit**

This unit includes sensors for measuring O2, CO2 or N2, temperature, and pressure.

A forcing and purge gas is required to push the sample out of the package and through micro-volume flow chambers. Through precise timing and sampling, only a 150 ml/minute of sample flow is required.

**The Indicating Instrument**

The instrument automatically controls all intermediate routines and measurements and prompts the operator as needed.

While a typical operation does not require any hands-on, the device provides you with a capability to perform operations such as sensor calibration or system function control.

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<td>3625/5110</td>
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The OrbiPack Software

The Windows based Orbipack software is a key part of the whole system. Whenever you need to run routine analyses or perform specific investigations, the Orbipack software is fully configurable to suit your needs.

Customize...

In the Package Setup menu, package information and High and Low limits for 22 parameters for up to 500 different package types are set.

With the powerful Formula Editor you can define up to 5 different mathematical relationships.

User-specific CO2 solubility tables can be used.

Specific parameters can be defined for Quality Control.
Visualize...
The main Windows menu shows data of the last 25 package analyses. A process bar shows analyzer operation prompts, guiding you through each step. Red data indicate out-of-spec data.

Define how you want to see the results. Decide which data and units will appear from a total of 17 defined by the software and 5 user-configured formulas. Then easily visualize your data for both x and y axes in a customizable graph.

Analyze...
You can easily apply basic statistics on more than 22 measured and calculated parameters for quick analysis of your data.

Communicate...
Dynamic Data Exchange (DDE) is a form of interprocess PC communication that uses shared memory to exchange data between applications. Communicate with your Laboratory Information Management Systems software (LIMS) or with Statistical Process Control (SPC) applications.

Calibrate...
The Calibration Management menu allows you to define a maintenance schedule for the main 6 sensors, with date of calibration and operator’s name, and reminds you when a calibration needs to be performed. Calibration data are password protected.
General Technical Data

Measurement range
- \( O_2 \): 0.001–20 mg/l
- \( CO_2 \): 0.01–5 v/v, or 0.02–10 g/l
- \( N_2 \): 0.3–100 ppm, or 0.25–80 ml/l

Repeatability, all models (at 25 ±5°C)
- \( O_2 \): ±2 ppb
- \( N_2 \): ±0.3 ppm, or 0.25 ml/l
- \( CO_2 \): ±1%, or 0.022 v/v, or 0.044 g/kg

Model 3625/5110
- \( CO_2 \): ±1%, or 0.006 v/v, or 0.012 g/kg
- \( N_2 \): ±1 ppm

Display units
- Dissolved \( O_2 \): ppb or ppm
- Dissolved \( CO_2 \): v/v or g/kg
- Dissolved \( N_2 \): ppm or ml/l
- Pressure: bar, psia, or psig
- Temperature: °F or °C

Operating limits
- \( O_2, CO_2, N_2 \) sensors: 0 to 50°C, t° compensated range,
- Pressure sensor: 0 to 4.5 bar
- Headspace pressure: 0.02–5.5 bar absolute
- Instrument: 0 to 45°C, ambient temperature

Maximum package height
- 365 mm

System Configuration

Power requirements
- 115/230 VAC ±10%, 50/60 Hz, max. 30 VA consumption

Space & utility requirements
- Desk space of approximately 1 m², \( N_2 \) or \( CO_2 \) gas cylinder, sink for sample liquid disposal

Enclosure protection
- Instrument: IP65 / NEMA 4
- Piercer: IP44
- Sensors: IP68 / NEMA 4P

CE certification
- Electromagnetic compatibility standards: EN 50081-1, EN 50081-2 and EN 50082-1
- EN 61010-1

Security standard
- Model 3625/4110 (\( O_2 / CO_2 \))
- Model 3625/5110 (\( O_2 / N_2 \))
- Model 29995 (glass and PET bottles, cans and thin-walled cans)
- Model 31110
- Model 31450 (\( CO_2 \))
- Model 31550 (\( N_2 \))
- OrbiPack model 32694.E

Indicating instrument
- Model 3625/4110
- Model 3625/5110
- Model 29995
- Model 31110
- Model 31450
- Model 31550
- OrbiPack model 32694.E

Piercing unit
- Model 32114
- Model 32113

O2 sensor
- Model 32114
- Model 32113

CO2 or N2 sensor
- Model 32114
- Model 32113

PC program
- OrbiPack model 32694.E

Variants
- 32114: Metal cap and can piercing assembly
- 32113: PET bottle piercing assembly

Metal cap and can piercing assembly 32114. With piercing knife 32106A and positioning device 32108.

Metal cap and can piercing assembly 32114. Configured here for cans.

PET bottle piercing assembly 32113. Includes the piercing knife 32111A and the adjustable positioning fork 32112.

In the interest of continued product development, Orbisphere reserves the right to make improvements to this literature and/or the products it describes, without notice or obligation.