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## ORBISPHERE 510 Air calculation used to minimize can corrosion

- Easy to use - just place a shaken bottle or can on the platform and pierce, no special operator skills needed
- Fast and accurate - proven Orbisphere sensor technology performs complete package analysis in minutes

### Application description

Aluminum can manufacturers require bottlers to limit the "Air" content in beverages in order to minimize corrosion. Pinholes in the polymer can-lining will cause products with acidic or isotonic properties to leak due to oxidation of the raw metal. The specification from various can manufacturers is for the "Air" content to be less than 2.0 mL.

Work is ongoing to persuade the International Society of Beverage Technologists to adopt Total Package Oxygen determination as the industry standard.

The most widely used method to determine "Air" content is the Zahm & Nagel caustic shakeout. In this procedure, the headspace gas in the package is released into a caustic solution that chemically combines with CO<sub>2</sub> leaving a bubble that is deemed as "Air". In facilities where N<sub>2</sub> is used instead of CO<sub>2</sub> as the seamer cover-gas, a direct dissolved oxygen measurement must be used to quantify the corrosion potential of the package.

The common assumption is that the "Air" is an 80/20 ratio of N<sub>2</sub>/O<sub>2</sub>. Some soft drink manufacturers assume that the dissolved oxygen measurement is like O<sub>2</sub> in air and that the total gas concentration will be five times the O<sub>2</sub> content. Others have devised their own models, upon study of the partitioning between O<sub>2</sub>/N<sub>2</sub> during the filling process, and have derived their own scalar not based on the 80/20 relationship between the gas volumes.

### Case study

A customer that uses N<sub>2</sub> as a cover-gas for the can seamer has developed a calculation that takes a dissolved oxygen measurement and converts the reading into "Air". This calculation was developed for two reasons:

1. This bottler is converting their filling systems to nitrogen over pressure on the filler bowls and seamer cover-gas. This changes the 80/20-air assumption in the headspace to an unknown value. Measuring oxygen and back calculating to air was their way of meeting the can manufacturer's specifications.
2. Measuring oxygen and then calculating air, allows them to remove the potential dangers inherent in the caustic method.

## Conclusion

Most bottlers still use the Zahm shakeout method. Bottlers want an automated solution that does not require instrument technicians to write down measurement values from either the Zahm or an O<sub>2</sub> analysis. Having the 510 with an “Air” calculator minimizes errors and fraudulent data entry by allowing the data to be automatically fed to the bottler’s quality tracking software.

Recommended systems components

Model	Description
510/A00/T1C00000	ORBISPHERE 510 oxygen (EC) instrument, portable, 85-264 VAC, three 0/4-20mA analog outputs, RS485
29972	Beverage package sampler for carbonated liquids without suspended particles
A1100-S00	Electro-Chemical oxygen sensor, Stainless Steel, Maximum pressure 100 bar, with Smart capability
32816	Reciprocating shaker (280 cycles per second)