



Oxygen Measurement in Bottles - Headspace and Dissolved in Liquid



Real-time measurement of headspace or dissolved oxygen in bottles and/or the liquid

Measurement of oxygen permeation into bottles can be time consuming and complicated using traditional methods and instruments. These instruments are very expensive and can only be used to measure oxygen permeation for a small number of bottles.

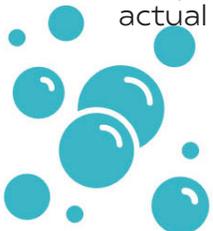
During the measurement-process (which can take several days) the instrument is occupied and cannot be used for other tests. To make oxygen permeation measurements using this type of instrument zero oxygen gas (nitrogen) has to be constantly flown through the bottle.

The OxySense uses non-invasive oxygen measurement technology to determine oxygen permeation into bottles over time. These instruments can be used with unlimited number of bottles to determine the oxygen permeation in each of them. It does not use nitrogen continuously and the permeation rates measured represent actual conditions for bottles on the shelf.

The bottles can be empty or filled with product. They can also be tested with the closure attached.

Advantages of OxySense System

- Measure headspace and/or dissolved oxygen
- Non-consuming sensor
- Ideal for long or short term shelf life studies
- Bottles can be empty or filled with product
- Does not need nitrogen
- Results = actual conditions
- Unlimited number of studies at the same time





OXYGEN PERMEATION MEASUREMENTS USING THE OXYSENSE INSTRUMENTS

Equipment required:
Supply of nitrogen, valve assembly, OxyDots and an OxySense Oxygen Analyzer 5350i or the OxySense Oxygen Analyzer 325i.



METHOD:

- Attach OxyDot to the inside of each bottle
- Dots can be affixed in the headspace (bottle neck) and/or attached to the middle of the bottle for measurements in the liquid (dissolved oxygen)

BOTTLES WITH PRODUCT:

- The bottles can then be filled with product and capped. The bottles are now ready for oxygen measurement.

BOTTLES WITHOUT PRODUCT:

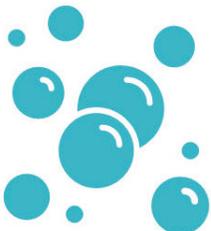
- To test bottles without product, attach a valve assembly with an air tight seal to the top of the bottle (see image) or use an alternative method of purging the bottle. Purge the bottle with nitrogen to ensure there is no oxygen in the bottle
- The purging process can be monitored using the OxySense instruments
- Once zero oxygen concentration has been achieved, close valves on the valve assembly



After purging the oxygen concentration within the bottle can be monitored over time

MEASUREMENT SETUP:

- To make measurements, align the fiber optic pen with the OxyDot (from outside the bottle) making sure that the tip of the pen is almost making contact with the bottle
- Adjust the signal level on the OxySense software by using the up/down arrows (bottom left corner) so that the green bar is at the 0 level
- Then press the capture button to obtain the oxygen concentration within the bottle. The oxygen concentration can be measured repeatedly over any period of time



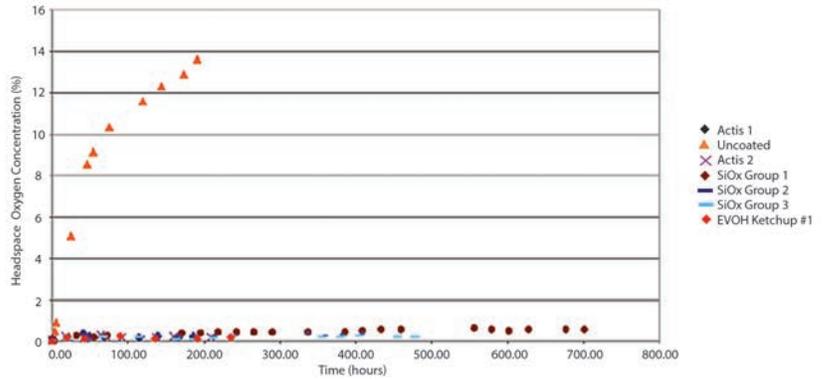


DATA OBTAINED CAN BE PLOTTED AND THE PERMEATION RATE CALCULATED



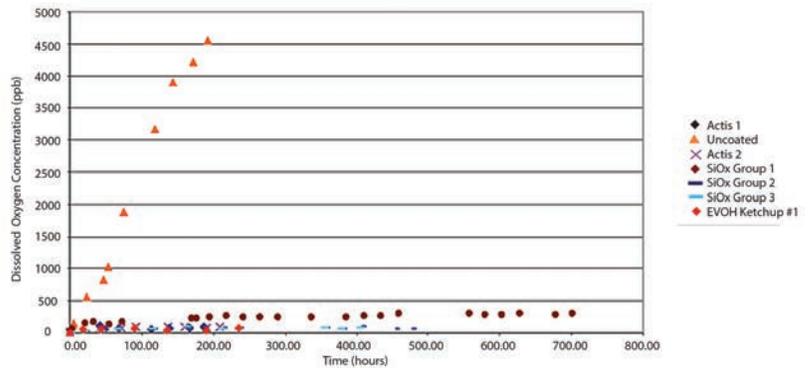
RESULTS HEADSPACE

Oxygen permeation into PET bottles with different barriers (headspace) measured over 700 hours



RESULTS DISSOLVED

Oxygen permeation into PET bottles with different barriers (dissolved in liquid) measured over 700 hours



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