



Sensors for the Food & Beverage Industries



- Packaging control & material research
- Product safety
- Quality assurance & shelf life determination
- Measurement in headspace and liquids
- Micro-invasive or even contactless measurements
- Sensor solutions for in-process control



O₂

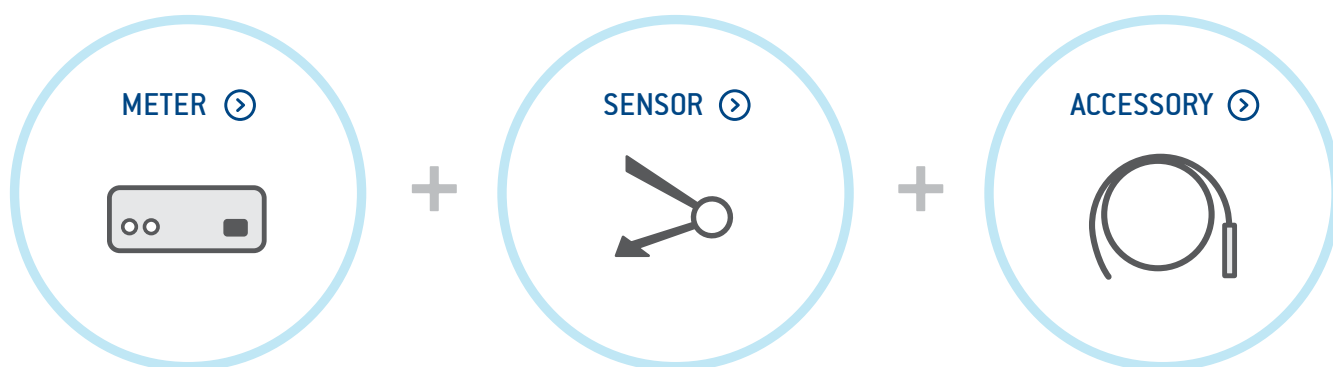
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Contact us and we find your customized solution!

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Functional Principle



We bring to light what's inside...



Products Made in Germany

PreSens offers a broad range of sensor systems for end users in Bioprocess Control, Biological & Environmental Research, the Food & Beverage industry as well as other industrial applications.

We offer systems for

- Oxygen measurement in gases and liquids
- Non-invasive online pH, CO₂ and oxygen measurement
- Oxygen and pH sensors for single-use bioreactors
- Microsensors pH, oxygen and CO₂
- Process control in shake flasks incl. biomass monitoring
- Low-maintenance DO measurement for fermentation and bioreactor systems
- Online oxygen and pH measurement in disposables like multiwell plates and plastic bags
- Imaging solutions for 2D-mapping of oxygen-, pH-, and CO₂-distribution

Our product range is constantly expanding.

Company Profile

Based on research activities started in the 1980's PreSens Precision Sensing GmbH was founded in 1997 as a spin-off from the University of Regensburg, Germany.

The company combines long-time experiences of different researchers in the fields of electronic engineering and sensor development. Right from the beginning, microsensor systems were sold to customers in life sciences. Already in its first decade of operation PreSens became one of the leading companies in the field of chemical optical sensor technology. Together with its partners it offers full service in Europe, America and Asia.

Service

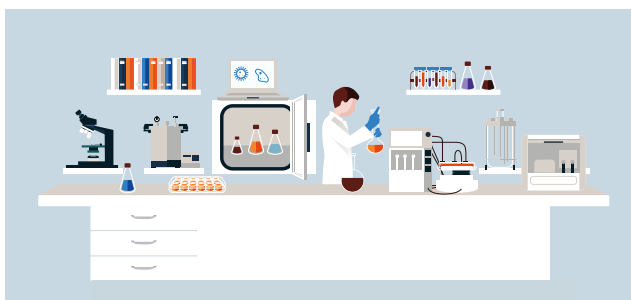
Furthermore, we are developers and manufacturers of optoelectronic OEM sensor components for companies in the field of medical equipment and process control.



Quality Management
ISO 9001
ISO 13485
Voluntary participation in regular monitoring

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...and work for the following industries.



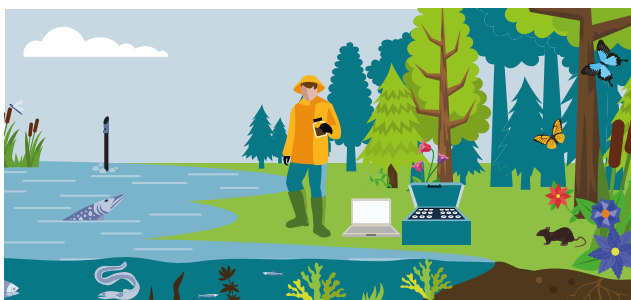
Biotech & Pharma

Our Biotech & Pharma business field helps pharmaceutical companies such as Roche and DSM to improve their bioprocess development with PreSens sensors. With two decades of customer feedback our product development provides efficient solutions for your needs.



Food & Beverage

A cooperation with the market leader for beverage filling systems, Kronen AG, Neutraubling, triggered our Food & Beverage business field in the late 1990's. PreSens supplies sensors for checking the oxygen-tightness of packaging and special systems for determining the penetrability of oxygen in PET bottles at companies such as Nestlé, Heineken or Danisco.



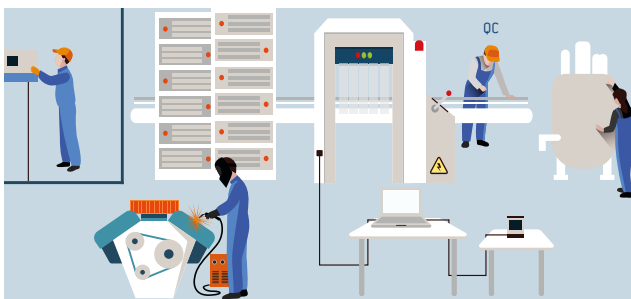
Biology & Environmental

Our worldwide customer base in biological & environmental research has now grown to hundreds of users coming from the University of Alaska in Anchorage to the University of Wellington in New Zealand. For more than two decades we have delivered special sensor systems for various applications such as respirometry, or environmental monitoring.



Medical Research & Life Sciences

Our most recent business field arose from a cooperation with renowned medical technology manufacturers from the medical devices sector. PreSens supplies OEM parts, which are integrated into more complex medical systems. Microsensors, sensor spots, and imaging systems are applied in tissue engineering, microfluidics, and many other medical research fields.



Industry & Technical Applications

Robust probes with excellent long-term stability or sensors for contactless measurement find use in technical or industrial applications. Specially designed flow-through connectors for integration in pipes are already applied to monitor the oxygen content in liquids or gases. We work together with integrators to design OEM sensor components and with our solution, they can be sure to meet the requirements for their risk assessment as an integrator.



SENSORS

Sensor Solutions

Production, Packaging & Quality Control with Optical Sensors

A cooperation with the market leader for beverage filling systems, Krones AG, Neutraubling, triggered our Food & Beverage business field in the late 1990's. PreSens supplies sensors for checking the air-tightness of packaging and a special system for determining the penetrability of oxygen in PET bottles at companies such as Nestlé, Heineken or Danisco. Reliable results can be obtained in an easy, time-saving way and can help to ensure the filling quality and long-term storage stability of your products.

- Minimally invasive or even non-invasive & non-destructive measurement
- One calibration for a multitude of sensors
- Oxygen measurements in headspace & liquid
- Integration into the production chain
- Sensor solutions for oxygen ingress measurement
- Easy quality checks and air-tightness assessment

Examples for Applications



Packaging Development: Contactless & Non-Destructive Determination of Oxygen Ingress in Food Packaging

Oxygen inside packaging can lead to oxidative deterioration of foods or beverages. The amount of tolerable oxygen inside packaging can differ greatly according to the packed product. PreSens oxygen sensors help finding the right packaging material for your product. Materials with different oxygen permeability or the tightness of closures can easily be determined in contactless measurements with oxygen sensor spots. Even smallest oxygen traces can be detected.



Quality Control: Oxygen Determination in Headspace & the Product

Unwanted oxygen taken up during production or the filling process can shorten the shelf life of certain products. PreSens offers several sensor solutions for measurements in the final product under real conditions. The oxygen content in the headspace of packages as well as in the product itself can easily be determined in micro-invasive or even contactless measurements. This way the quality of the final packed or bottled product and a long shelf life can be assured.



Material Research: Oxygen Transmission Rate of Synthetic Materials

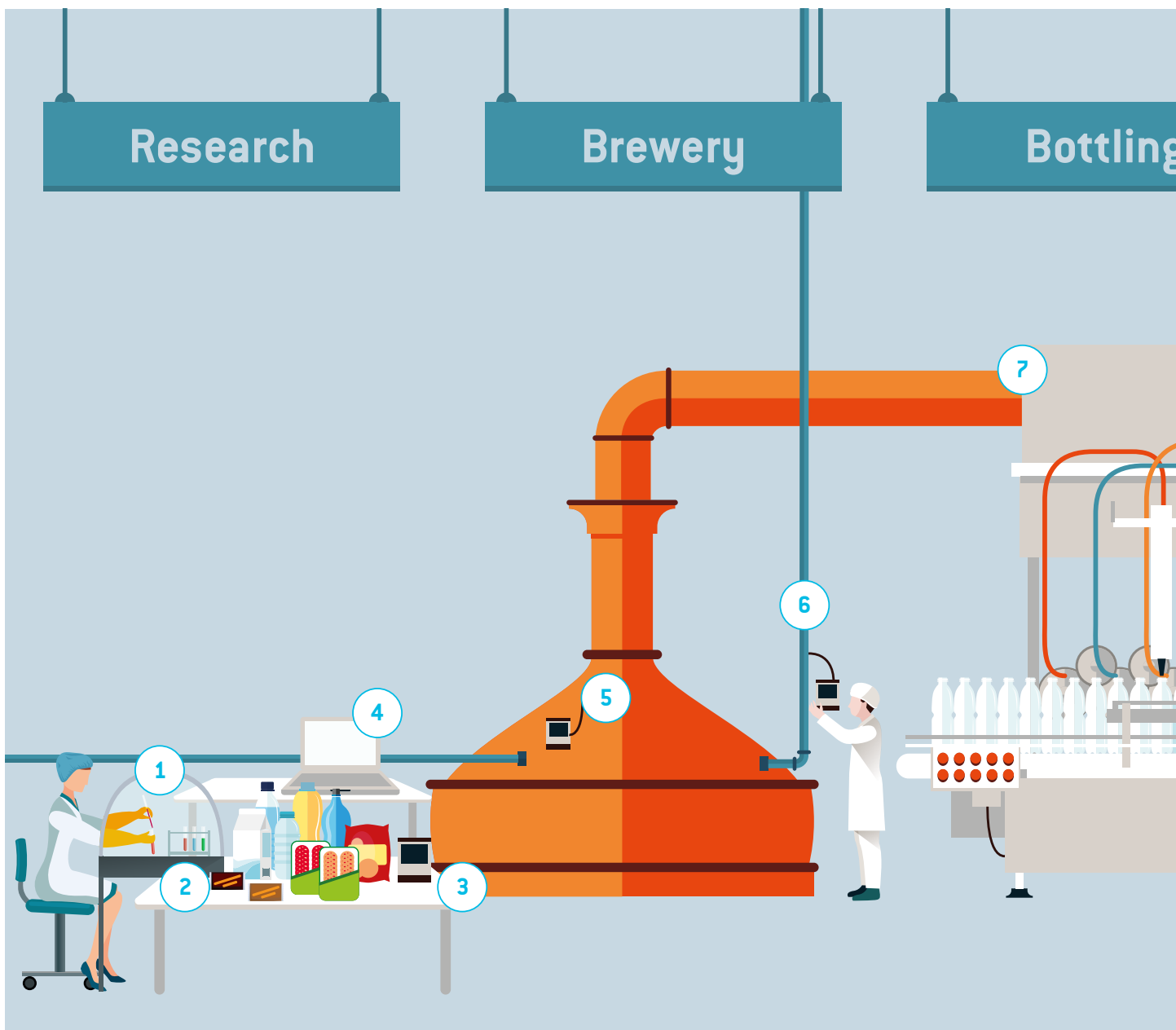
In cooperation with the Fraunhofer Institute for Process Engineering and Packaging in Freising, Germany, PreSens has developed an extremely leak tight measurement cell for testing different material films. An oxygen meter and sensors with a measurement range from 1 ppb to 100 % oxygen allow investigating perforated or high-barrier materials on their oxygen transmission rate. Even the effect of different coatings on the oxygen barrier properties can be analyzed with this easy-to-handle measurement tool.



In-Process Control: Fast Assessment of Oxygen Levels during Production

PreSens offers engineering services, to provide sensor solutions for in-process measurements, according to your needs. Several specially designed measurement systems for breweries are already available. Flow-through cells with integrated sensors that can be installed in steel pipes, or robust probes for in-line measurement that stand CIP, SIP and autoclaving are combined with portable oxygen meters and allow easy checks at different stages of production. In case you are looking for a different solution for in-process control, do not hesitate to contact us!

Sensor Solutions for Food & Beverage Industries



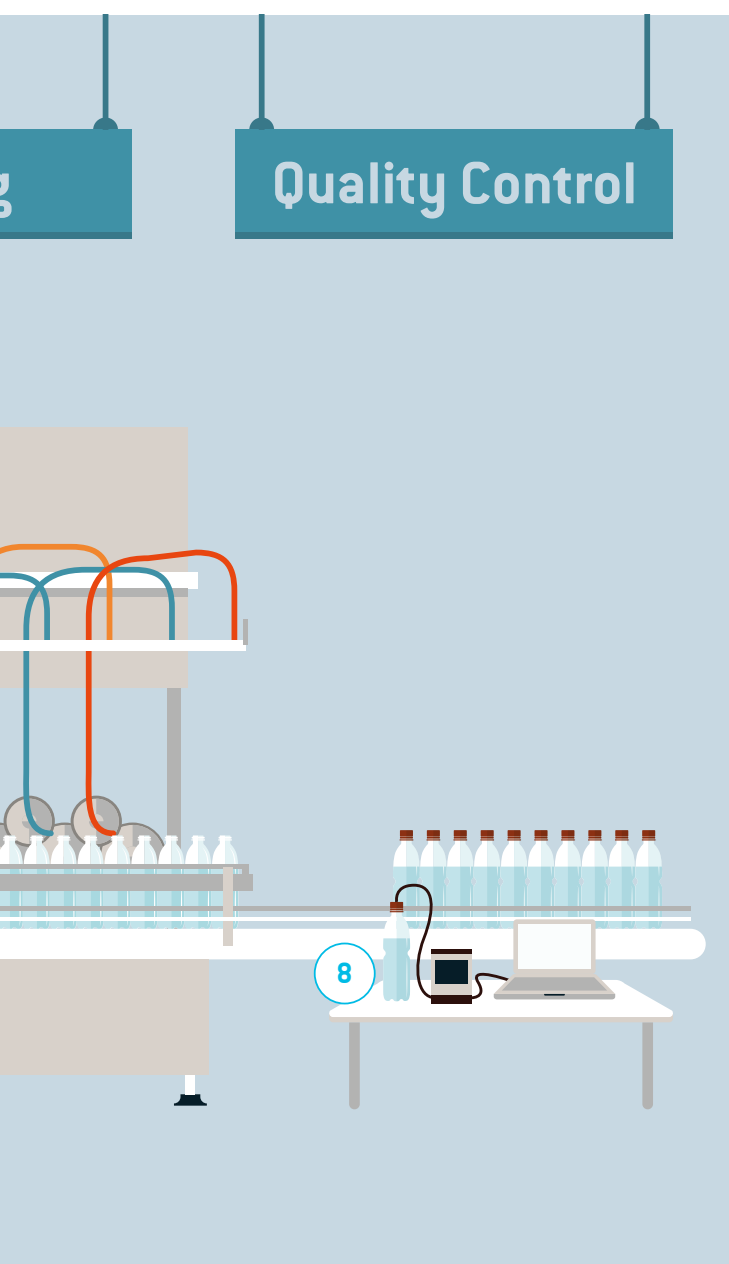
Contact us and we find your customized solution!

OEM Solutions for you



PreSens offers customized sensor technology solutions. Right from the beginning PreSens can be your partner while finding new approaches: from specifications to implementation up to production of your tool.

Don't hesitate to ask for your individual solution:
engineering@presens.de



- 1 **Oxygen-Sensitive Caps + Fibox 4**
for oxygen ingress measurement in PET bottles
- 2 **pH Sensor Spots + pH-1 mini**
for screening and monitoring acid production in dairy starter cultures
- 3 **O₂ Sensor Spots + Fibox 4**
for packaging development and air-tightness tests
- 4 **PreSens Measurement Studio Software**
for easy measurement control of multiple connected oxygen meters
- 5 **Oxygen Probe for In-line Measurement OIM + Fibox 3 LCD trace**
for measurements in the production chain, the probe stands temperatures of more than 130 °C and more than 1.5 atm
- 6 **Oxygen Probe Integrated in a Metal Flow-Through Cell FTM**
can be integrated in steel pipes and easily be read out with one of our portable oxygen meters
- 7 **Varivent Valve with Integrated Oxygen Sensor OIM-Var**
allow in-line measurements in breweries
- 8 **O₂ Sensor Spots, O₂ Microsensors + Microx 4 trace**
for oxygen measurements in packed or bottled products, measurement in headspace & liquid

FEATURED SYSTEMS



Fibox 4 trace + POF + Permeation Cell

The Fibox 4 trace can be used with sensors covering a measurement range from 1 ppb up to 100 % oxygen. These sensors can be integrated in the permeation cell and are read out through an optical window via polymer optical fiber (POF). With this system the oxygen transmission rate through low- and high-barrier material films can be determined.



Microx 4 + Needle-type Oxygen Microsensor NFSG

This portable oxygen meter combined with a needle-type microsensor offers easy assessment of the oxygen content inside packaging. The needle-type sensor can be pierced through the packaging material and measurements in smallest headspace volumes can be performed.



Fibox 3 LCD trace + Oxygen Probe for In-Line Measurement OIM

The Fibox 3 LCD trace oxygen meter can be combined with the Oxygen Probe for In-Line Measurement OIM. The probe is available for measurements in different oxygen ranges, stands autoclaving, SIP & CIP. The probe can be inserted into ports or openings. The system is ideally suited for trace oxygen measurements in glove boxes.



Fibox 3 LCD trace + Varivent Valve OIM-Var

The solution for oxygen measurements in breweries: The Oxygen Probe integrated in a Varivent Valve OIM-Var can be installed in steel pipes. They are read out with the oxygen meter Fibox 3 LCD trace.



Fibox 4 + POF + Oxygen Sensor Spot

Oxygen sensor spots can be integrated in transparent glass or plastic vessels and are then read out contactless via polymer optical fiber (POF). The portable oxygen meter Fibox 4 allows quick and easy quality checks in most different packaging.



Fibox 4 + POF + Oxygen-Sensitive Cap OSC

The Oxygen-Sensitive Cap OSC – a leak-tight closure with integrated oxygen sensor – is used to determine oxygen ingress in colored bottles. It is compatible with the bottle thread and can be screwed on. The integrated oxygen sensor is read out via polymer optical fiber (POF) with the Fibox 4 oxygen meter.



Fibox 4 + Oxygen Probe integrated in Metal Flow-Through Cell FTM

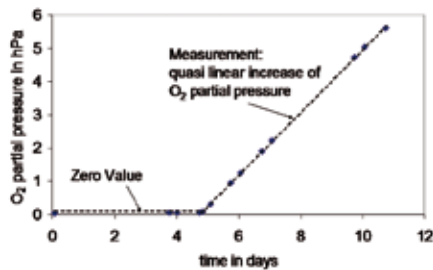
The alternative solution for oxygen measurements in breweries: The Oxygen Probe integrated in a Metal Flow-Through cell FTM can also be installed in steel pipes. They are read out with the portable oxygen meter Fibox 4.



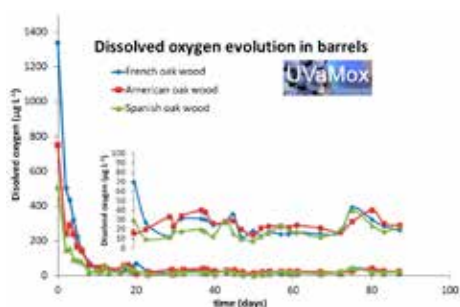
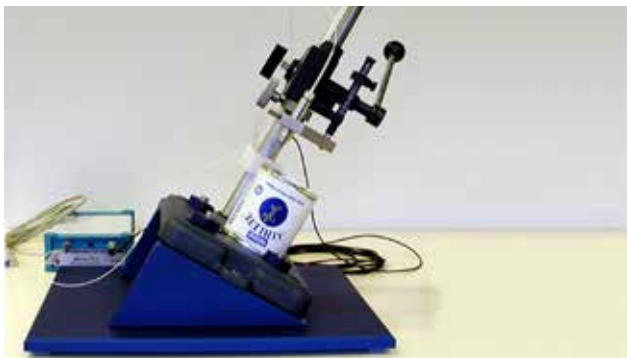
pH-1 mini + POF + pH Sensor Spots

The pH Sensor Spots allow contactless measurement in any transparent vessel. They are read out from the outside with the pH-1 mini via polymer optical fiber (POF). It is an easy-to-handle system for fast screenings or quality checks.

Featured Applications



C. Huber, S. Sängeraub
& K. Müller, Cooperation:
PreSens, Fraunhofer
Institute for Process
Engineering and
Packaging, and TU
Munich, DE



M. del Alamo &
I. Nevares,
UVaMOX, ES

Oxygen Transmission Rate Measurements in Material Research

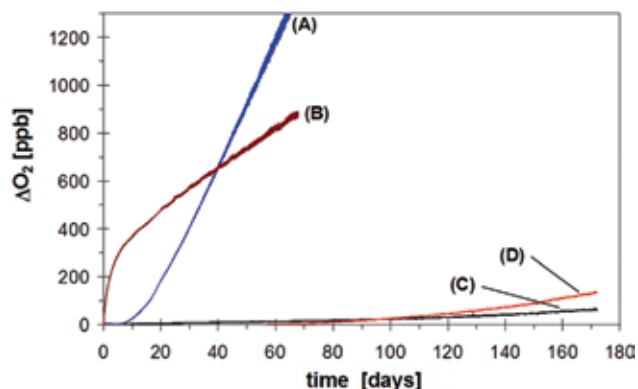
In cooperation with the Fraunhofer Institute PreSens developed a new measurement system for testing synthetic materials on oxygen permeability. Unlike the currently used systems with electrochemical or barometrical sensors it is designed for optical measurement. The Fibox 4 trace together with chemical optical sensors for different measurement ranges were applied to detect trace oxygen concentrations. The sensor type PSt9 – with an improved limit of detection of 0.5 ppmv O_2 – together with the measurement cells is the solution for easy, cost effective permeation measurements in high barrier materials.

Oxygen Measurement in Cans

The shelf life of many foods is enhanced by packing under reduced oxygen levels. Using PreSens oxygen microsensors it is possible to measure the oxygen concentration in a micro-invasive way. As seen in the adjacent picture a piercing device was used to measure both headspace and liquid with the same microsensor connected to the Microx TX 3.

Dissolved Oxygen Measurements in Wine

Micro-oxygenation processes happening while storing wine in barrels give quality red wines the necessary final trait. Dissolved oxygen (DO) levels reached during the usual storage months are so low that the requirements on measurement systems become very high. There are measurement systems with detection limits in ppb range ($\mu g/L$) based on electrochemical probes, but they consume oxygen during the measuring process which is a problem as carrying out a dynamic measurement, i. e. in a fluid in motion, becomes necessary. Measurement of DO in wine flow has several disadvantages that can be solved but at the expenses of time and money. The optical measurement system Fibox 3 LCD trace allows to deal with the need of measurement in systems with low volume, at different atmospheric pressures, and the advantage of carrying it out in a contactless way.



Oxygen Ingress Measurements in Different PET Bottles

Oxygen causes chemical processes decreasing the shelf life and flavor quality of beverages. In order to improve the oxygen barrier properties of PET bottles tests were conducted using the Fibox 3 LCD trace oxygen meter and PreSens trace oxygen sensors.

As can be seen in the figure, coated PET bottles (B) already have less oxygen ingress than untreated bottles (A). If the bottle material additionally contains oxygen scavengers (C + D), oxygen ingress can be reduced significantly. The shelf life of a product filled in this bottle will be prolonged decisively.



pH Monitoring in Dairy Starter Cultures

Acid production during milk fermentation can be used to characterize and test the activity of starter cultures. PreSens pH Sensor Spots are an easy-to-use and fast method to screen inoculum cultures and control the quality of raw materials. The spots are integrated in transparent culture vessels. The decrease in pH value caused by acid production can be monitored in real-time. Different activity as well as fermentation characteristics can be clearly determined.

Examples for Meters, Sensors & Accessories

Meters



Fibox 4 & Fibox 4 trace

Portable oxygen meters for use with oxygen sensor spots, flow-through cells and dipping probes; Fibox 4 trace is compatible with sensors for measurement ranges from 1 ppb to 100 % oxygen



Microx 4 & Micox 4 trace

Portable oxygen meters for use with oxygen microsensors, sensor spots, flow-through cells and dipping probes



Fibox 3 LCD trace

Oxygen meter with LCD display and an analogue interface of 4 – 20 mA for use with oxygen sensor spots, flow-through cells and dipping probes



pH-1 mini

Fiber optic pH meter for use with pH sensor spots and flow-through cells

Sensors



O₂ Sensor Spots SP-PSt3/PSt6/PSt7/PSt8/PSt9

Versatile, small oxygen sensors for measurement in different oxygen ranges from 1 ppb to 100 % oxygen



Self-adhesive O₂ Sensors SP-PSt3-SA

Easy integration into transparent vessels, for contactless measurement in normal oxygen range (0 – 100 % O₂ / 0 – 45 mg/L)



pH Sensor Spots SP-HP5

Versatile, small pH sensors for integration into transparent vessels



Self-adhesive pH Sensors SP-HP5-SA

Easy integration into transparent vessels, for contactless pH monitoring



Oxygen-Sensitive Caps OSC-PSt3/PSt6

Transparent closures with integrated oxygen sensors, for contactless oxygen ingress measurement in non-transparent bottles



Needle-type Oxygen Micro-sensor with Fixed Sensor Tip NFSG-PSt7/PSt8

For measurement inside packaging (0 – 100 % O_2 / 0 – 45 mg/L or 0 – 10% O_2 / 0 – 4.5 mg/L) with Microx 4 or Microx 4 trace oxygen meters



Oxygen Probe for In-Line Measurement OIM-PSt3/PSt6

Robust probe for production processes with excellent long-term stability (0 – 100 % O_2 / 0 – 45 mg/L, or 0 – 5 % O_2 / 0 – 2 mg/L, or 0 – 200 ppm oxygen)



Oxygen Probe Integrated in Metal Flow-Through Cell FTM-PSt3/PSt6/PSt9

Flow-through cell with integrated oxygen sensor for installation in steel pipes (0 – 100 % O_2 / 0 – 45 mg/L or 0 – 5 % O_2 / 0 – 2 mg/L, or 0 – 200 ppm oxygen)



Oxygen Probe Integrated in Vari-vent Valve (OIM-PSt3/PSt6-Var)

Varivent valve for installation in breweries, online monitoring in normal and trace oxygen ranges (0 – 100 % O_2 / 0 – 45 mg/L, or 0 – 5 % O_2 / 0 – 2 mg/L)

Accessories



Permeation Measurement Cell

Leak tight measurement cell with two chambers that can individually be flooded with gas, for investigating oxygen permeability of synthetic material films



Polymer Optical Fiber POF

Serves as versatile connection from meter to sensor, available in different lengths



Adapter for Round Containers ARC

Used for round containers with a diameter of 2.5 to 20 cm (1 – 8 inches) to connect the POF



Stick-On Adapter SOA

Glued onto planar containers to connect the POF



Integration Set Sensor Spots IS-SP

Vacuum tweezers for easy integration of self-adhesive sensor spots



Discover the complete PreSens portfolio



**Optical Oxygen
Sensors & Meters**



**Optical pH
Sensors & Meters**



**Optical CO₂
Sensors & Meters**



**Optical Sensor
Systems**



**VisiSens™
Imaging Systems**



**OEM Solutions &
Engineering**

Products



**Biology &
Environmental**



**Industry &
Technical**



**Biotech &
Pharma**



**Medical &
Life Science**



**Food &
Beverage**

Industries

Bring to light
what's inside.

**PreSens comes from
PRECISION SENSING
and offers:**

- precise and simple measurement of O₂, pH, CO₂ and biomass
- systems for Pharma, Biotech, Food & Beverage, Biological & Environmental Research, Technical or Industrial Applications and Medical Research
- sensors thinner than a hair, non-invasive and online
- optimum advice and support
- more than 1,000 items in stock
- prompt delivery worldwide

PreSens Precision Sensing GmbH reserves the right to make changes in specifications and features shown herein, or discontinue the products described at any time without notice or obligation. Contact info@presens.de for the most current information.

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