

## Media Release

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## Dichroic Filters for Optical Oxygen Sensing

### **Strong interest in optical oxygen sensors from ventilator manufacturers due to COVID-19 supply shortages**

During the 2020 COVID-19 pandemic a severe shortage of medical ventilators led many companies to start designing and manufacturing their own, providing much needed relief to hospitals around the globe. Due to these extraordinary circumstances Optics Balzers has seen an increased demand in dichroic color filters and mirrors, as these are used for measuring oxygen levels in medical ventilators.

In ventilators sensors are used to control and monitor the oxygen level of a Coronavirus patient. The sensors measure both the oxygen concentration in the gas being given to the patient as well as in the exhaled air. This oxygen measurement is conducted using medically approved electro-galvanic sensors. These relatively low cost, disposable electro-galvanic sensors reliably measure oxygen levels from 0 to 100% but must be replaced every few months.

Due to the high demand and short supply of these disposable electro-galvanic sensors, ventilator manufacturers were forced to look into alternative, non-FDA-approved optical oxygen sensors. The sensing element in optical oxygen sensors is an oxygen-sensitive fluorophore which emits fluorescence in the presence of oxygen molecules. The oxygen is measured by comparing the excitation light from a light source to the emitted light by the fluorophore. The rate at which this fluorescence decays is inversely proportional to the amount of oxygen present, thereby enabling the accurate measurement of oxygen levels.

Optics Balzers' dichroic color filters and mirrors are ideally suited to separating the excitation and emission wavelengths of optical oxygen sensors, as well as providing robust measurement results with good signal-to-noise ratios.

For many of the commercially available oxygen-sensitive fluorophores (those consisting of a ruthenium or platinum porphyrin complex), Optics Balzers has suitable dichroic filter designs. These cover specific wavelengths and can efficiently separate excitation from emission wavelengths. Our environmentally stable and shift-free dichroic filters provide excellent performance thanks to their high transmission values.

While optical oxygen sensors are not yet approved for use in medical ventilators, optical sensing does provide a wide range of benefits for medical use. They address some of the shortcomings inherent in electro-galvanic sensors including: short lifespan, the need to compensate for pressure dependent and thermally induced measurement errors, unintended cross-sensitivity to other gases, and the risk of poisoning due to poor maintenance.

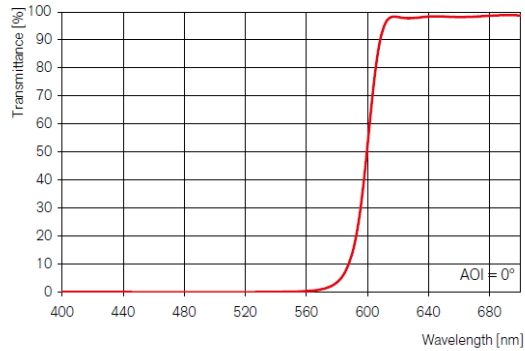
Although optical oxygen sensing has not yet been utilized in medical applications, it is a state-of-the-art, long-established analysis technique used in chemical laboratories, especially when measuring dissolved oxygen in liquids. Typical industrial applications include, among others, beer brewing. When it comes to water monitoring, fermentation process control in bioreactors, and oxygen sensing, Optics Balzers' dichroic filters have proven to be more than up to the task.



*Fig: Dichroic Filters by Optics Balzers*

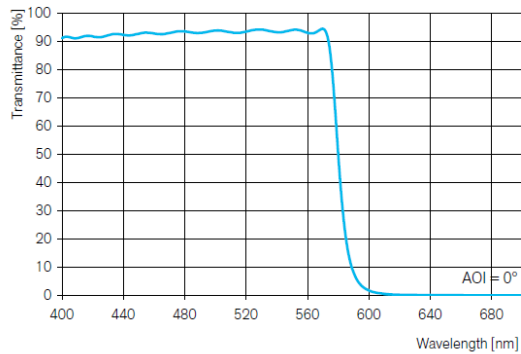
**DT-Red**

Principle curve



**DT-Cyan**

Principle curve



*Fig: Example Filters Curve for Oxygen Sensing*

Optics Balzers (located in the Principality of Liechtenstein) has been the preferred partner for providing innovative optical coatings and solutions for more than 70 years. Together with its subsidiaries in Jena (Germany) and Penang (Malaysia), Optics Balzers is a global leader in the supply of optical coatings and components. The Liechtenstein-based high-tech company focuses on selected markets such as Life Science, Industry, Consumer, Lighting, Space und Automotive. The products and services offered range from optical coatings and glass processing, patterning and bonding technologies to the manufacture of complete optical subassemblies and are acknowledged as being unique worldwide.

Additional information: [www.opticsbalzers.com](http://www.opticsbalzers.com)