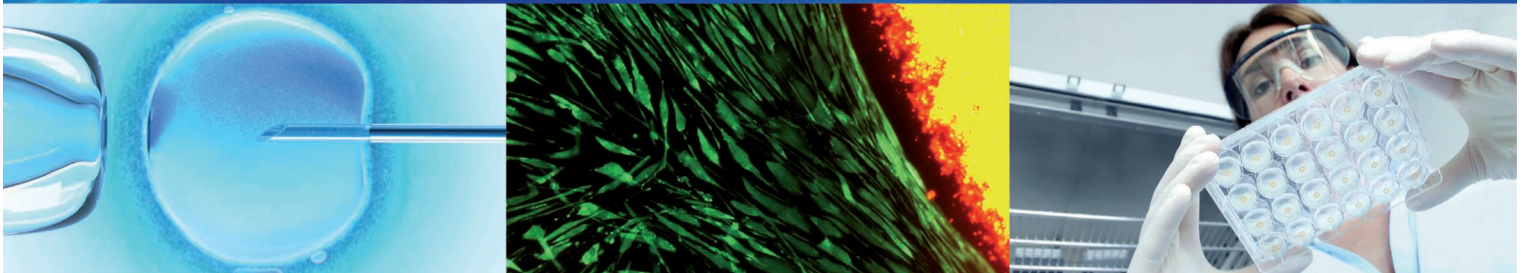


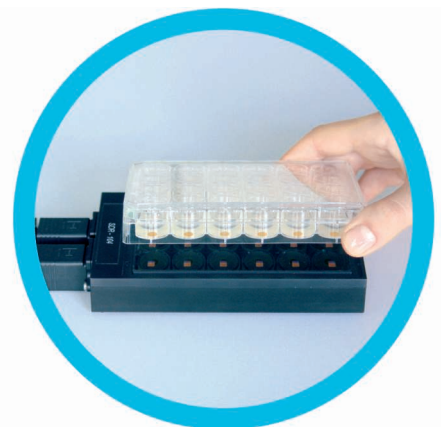
SDR SensorDish Reader

O₂ pH



Non-invasive online culture monitoring of oxygen and pH

- Measurement under real conditions in incubator atmosphere
- Ready-to-use
- For 24- and 6-well multidishes



SDR SensorDish Reader



The SDR SensorDish® Reader is a small 24-channel reader for non-invasive detection of oxygen and pH in multidishes (SensorDishes®). These contain a sensor spot at the bottom of each well. They are read out non-invasively through the transparent bottom. SensorDishes® for oxygen (OxoDish®) and pH (HydroDish®) are available in the 24-well and 6-well format. Read out of oxygen sensors integrated in glass vessels for respiration monitoring is also possible. The SensorDish® Reader can be used in incubators and on shakers and is thus the ideal tool for cell cultivation.

Features

- Parallel online monitoring in disposable 24- or 6-well plates
- Non-invasive & non-destructive measurement
- HydroDish® for pH detection with up to ± 0.05 pH resolution
- OxoDish® for DO detection with $\pm 2\%$ air saturation resolution
- Pre-calibrated
- For use in incubators and on shakers
- Optional extension for monitoring of up to 240 samples

Software

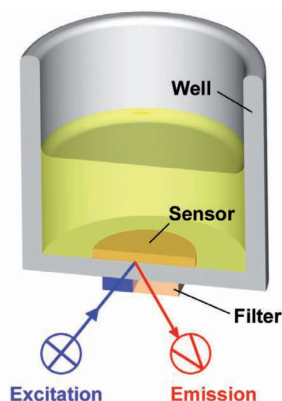
Up to 10 SDRs are controlled by the user-friendly software. Oxygen and pH kinetics are visualized in real-time during the entire cultivation. Features like different graphical representations, optical display of deviations from the set point, trend analysis and other mathematical calculations are integrated. Calibration data are uploaded conveniently from a file. Measured data can be exported to Excel® or ASCII for further evaluation.

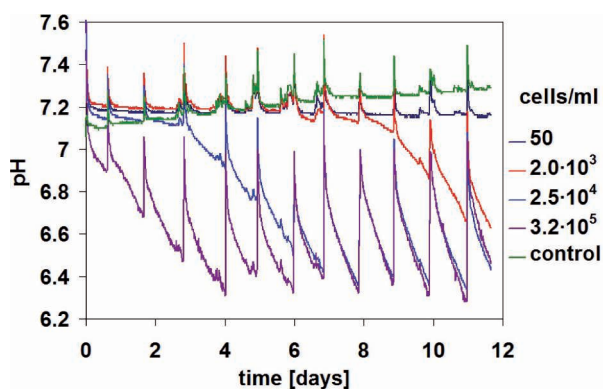
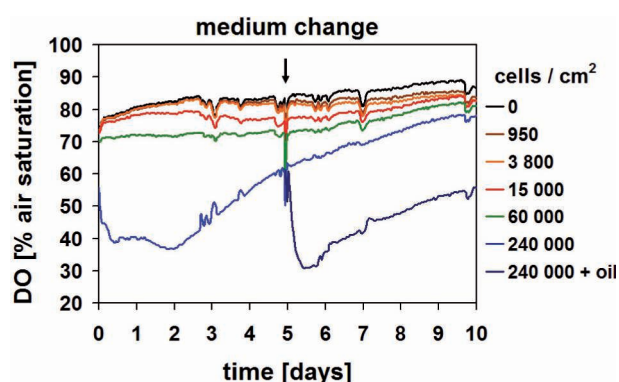
Benefits

- Improved process monitoring and security
- Systematic optimization of culture parameters
- Enhanced culture quality and efficiency
- Real-time data acquisition indicates necessary medium changes instantly
- Easy scale-up for parallel processing of up to 240 samples

The Smart Measurement Method

A sensor spot is fixed at the bottom of each well of the multidish. The sensor spot contains a luminescent dye. It is excited by the SensorDish® Reader placed below the multidish, and its luminescence lifetime is detected non-invasively through the transparent bottom. The luminescence lifetime of the dye depends on the oxygen partial pressure (OxoDish®) and the pH of the sample (HydroDish®), respectively. It is converted to oxygen and pH values by the software without plate calibration by the user.





Examples for Applications

More Security at Hypoxic Stem Cell Cultivation

The influence of medium change on dissolved oxygen (DO) at cultivation of human embryonic stem cells (hESC) was investigated at different oxygen tensions in the incubator atmosphere. Samples with full medium change using non-precubated medium showed a DO increase of 20 - 60 % air saturation. Other than expected, even half medium change with pre-incubated medium resulted in a notable DO increase of 10 - 30 % air saturation. The SensorDish® Reader can be used in hypoxia incubators, but also in small hypoxia chambers (see picture).

Barbara Ley, Prof. Oliver Brüstle, Life & Brain GmbH, Bonn, Germany

Oxygen and pH Monitoring in Tissue Engineering

Human chondrocytes with different start concentrations were cultivated in OxoDish® and HydroDish®. At medium change after 5 days, some samples with the highest cell concentration were covered with paraffin oil. Oxygen kinetics show a dynamic equilibrium between oxygen ingress and consumption. Oxygen increased after 5 days due to reduced metabolism and, for the highest cell concentration, after 2 days due to cell redifferentiation. The oil cover led to a temporary oxygen decrease due to a changed equilibrium. pH changes were detected for even lower start cell concentrations.

Dr. Andreas Thomsen, CellGenix GmbH, Freiburg, Germany

Process Monitoring in Suspension-Adapted CHO Cell Cultures

Oxygen and pH kinetics of suspension-adapted CHO cells at different start concentrations were monitored. The kinetics correlated well with the initial cell concentrations. pH values decreased only to a minimum of 6.3 due to daily media change. Samples with the lowest cell concentration did not show any pH change due to lack of cell growth. The oxygen uptake rate increased at each medium change. For the highest initial cell concentration it decreased at the end of the cultivation due to forming of aggregates. The results were confirmed by microscopic investigation.

Dr. Harry Abts, Celonic GmbH, Jülich, Germany, BioProcess Int., Jan 2008: 64-66

Real-time Monitoring of the Respiration of Marine Zooplankton

Oxygen consumption of 3 - 4 copepod nauplii per sample was monitored in air-tight glass vials for 6 h. The nauplii were offered phytoplankton at environmental concentrations. Feeding and faecal pellet production rates were estimated simultaneously. The respiration rates were linear and steady, thus revealing that the nauplii were neither influenced by the vessel walls nor by diminishing of food. The respiration rate was compared to literature values of other species. The higher oxygen consumption of the nauplii was presumably due to constant feeding.

Dr. Marion Köster, Ernst-Moritz-Arndt-Universität Greifswald, Germany, Mar Ecol Prog Ser 353: 157-164 (2008)

	pH	Dissolved Oxygen	
Specifications			
Measurement range	6.0 – 8.5	0 – 250 % air saturation	
Resolution*	± 0.05 pH at pH = 7	± 2 % air saturation at 100 % air saturation	
Precision*	± 0.2 pH at pH = 7 [Sensor batch calibration] ± 0.1 pH at pH = 7 [Sensor spot calibration]	± 5 % air saturation at 100 % air saturation	
Drift*	< 0.1 pH within one week (sampling interval 10 min.)	< 1 % air saturation within one week (sampling interval 10 min.)	
Measurement temperature range	15 – 45 °C	15 – 45 °C	
Response time* (t ₉₀)	< 30 sec.	< 30 sec.	
Properties			
Compatibility	Aqueous solutions, ethanol, methanol (max. 10 % V/V), pH 2 – 10		
Cross-sensitivity	Reduced to ionic strength (salinity); high concentration of small fluorescent molecules in the visible range can interfere		
Calibration	HydroDishes and OxoDishes are factory-calibrated		
Device			
	SensorDish® Reader	Splitter	Power adapter
Type	SDR v3 or higher	SP1.1 or higher	Mascot 9920
Cleaning	Ethanol (moist cloth)		
Input	18 – 24 V DC 150 mA	18 – 24 V DC 1.5 A	100 – 240 V AC 50-60Hz max. 0.9 A
Weight	380 g	240 g	
Dimensions	16.3 cm x 8.9 cm x 2.2 cm	12.4 cm x 8.0 cm x 4.5 cm	
Protection category	IP 64**	IP 20	IP 20
	! WATERPROOF !	! NOT WATERPROOF !	! NOT WATERPROOF !
Certification	CE Category B	CE Category B	CE Category B, EN60950, UL2601-1

* in physiological solutions

** only with connected RJ-45 cable and end cap



Technical data can change without prior notice.

Bring to light what's inside. Ask our experts:

PreSens Precision Sensing GmbH
 Josef-Engert-Str. 11
 93053 Regensburg, Germany

Phone +49 941 94272100
 Fax +49 941 94272111
 info@PreSens.de

www.PreSens.de