

# Specifications

## OPTICAL OXYGEN MICROSENSORS

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### 1 SENSOR SPECIFICATIONS

**Only valid in water/gas (typ. air components) for 2-point calibrated sensors at 20°C, 1013mbar absolute pressure, using default measuring parameters/modes!**

Specifications are valid for retractable needle-type microsensors (item no.: **OXR50**), fixed needle-type microsensors (item no.: **OXF50**) and bare fiber microsensors (item no.: **OXB50**), including the following options: optical isolation (-**OI**), high speed (-**HS**), ultra-high speed (-**UHS**).

#### 1.1 Gas Phase: partial pressure pO<sub>2</sub> (hPa), volume percent pV (% O<sub>2</sub> gas)

For a calibrated sensor, the partial oxygen pressure pO<sub>2</sub> in units of hPa (equivalent to mbar) is the fundamental oxygen unit measured by the oxygen meter (in gas and water phase).

Specifications		
<b>Measuring Range</b> Optimum Maximum (not specified)	<b>% O<sub>2</sub> gas</b> 0-50% O <sub>2</sub> 0-100% O <sub>2</sub>	<b>hPa</b> 0-500 hPa 0-1000 hPa
<b>Accuracy *</b> at 1% O <sub>2</sub> /10 hPa at 20% O <sub>2</sub> /200 hPa	±0.02% O <sub>2</sub> ±0.2% O <sub>2</sub>	±0.2 hPa ±2 hPa
<b>Resolution</b> at 1% O <sub>2</sub> /10 hPa at 20% O <sub>2</sub> /200 hPa	0.01% O <sub>2</sub> 0.05% O <sub>2</sub>	0.1 hPa 0.5 hPa
<b>Detection Limit</b>	0.02% O <sub>2</sub>	0.2 hPa

\* The absolute accuracy of full range sensors depends on the calibration mode. For 1-point calibrated sensors these values increase due to a decreasing accuracy. More details on request.

## 1.2 Dissolved Oxygen: % air saturation, $\mu\text{mol/L}$ , $\text{mg/L}$ = $\text{ppm}$ , $\text{mL/L}$

Oxygen dissolved in water can be expressed in % air saturation and in concentration units like  $\mu\text{mol/L}$ ,  $\text{mg/L}$  ( $\text{ppm}$ ), and  $\text{mL/L}$ . For details on calculation of dissolved oxygen units from partial pressure readings (interpolation formula based on temperature, atmospheric pressure and salinity), please see the respective sensor/oxygen meter manuals.

Specifications		
<b>Measuring Range</b> Optimum Maximum (not specified)	<b>% air saturation (a.s.)</b> 0-250% a.s. 0-500% a.s.	<b>mg/L (ppm)</b> 0-22 mg/L 0-44 mg/L
<b>Accuracy *</b> at 5% a.s./0.44 mg/L at 95% a.s./8.8 mg/L	$\pm 0.1\%$ a.s. $\pm 1\%$ a.s.	$\pm 0.01$ mg/L $\pm 0.1$ mg/L
<b>Resolution</b> at 5% a.s./0.44 mg/L at 95% a.s./8.8 mg/L	0.05% a.s. 0.25% a.s.	0.005 mg/L 0.025 mg/L
<b>Detection Limit</b>	0.1% a.s.	0.01 mg/L

\* The absolute accuracy of the full range sensors depends on the calibration mode. For 1-point calibrated sensors these values increase due to a decreasing accuracy. More details on request.

## 1.3 General Characteristics

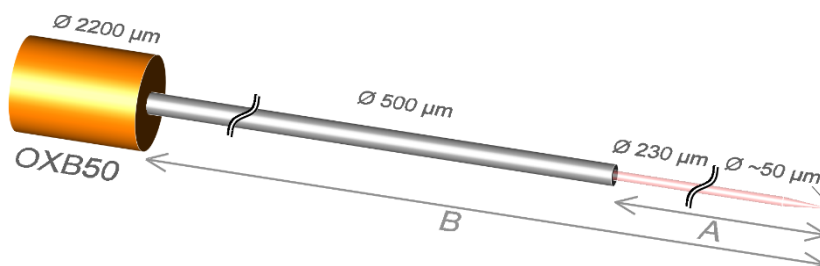
<b>Response Time (t90) ‡</b> Gas Water	<b>standard</b> <1 sec <2 sec	<b>with -OI</b> <2 sec <3 sec	<b>with -HS</b> <0.8 sec <0.8 sec	<b>with -UHS</b> <0.3 sec <0.3 sec
<b>Temperature Range</b>	specified: 0°C (32°F) to 50°C (122°F) not specified: -20°C (-4°F) to 70°C (158°F)			
<b>Minimum Lifetime</b> data points	<b>standard / -OI</b> 1,000,000	<b>-HS</b> <1,000,000	<b>-UHS</b> <<1,000,000	
<b>Calibration Modes</b>	1-point and 2-point calibration; obligatory to calibrate in gas ( <i>water</i> ) calibration standards for measurements in gas ( <i>water</i> ) samples			
<b>Sensor Dimensions: OXR/OXF50</b> Length without cable (ca.) Shaft diameter (ca.)	<b>OXR50</b> 230 mm 8 mm		<b>OXF50</b> 190 mm 8 mm	

<b>Needle Dimensions: OXR/OXF50</b> Length Diameter	<b>OXR50</b> 40 mm 0.5 mm	<b>OXF50</b> 40 mm 0.5 mm
<b>Fiber and Sensor Tip: OXR/OXF50</b> Fiber & tip diameter Sensor tip position (rel. to needle)	<b>OXR50</b> 230 $\mu\text{m}$ , 50-70 $\mu\text{m}$ (tip) -6/0/+6/+12 mm	<b>OXF50</b> 230 $\mu\text{m}$ , 50-70 $\mu\text{m}$ (tip) ca. 6 mm (fixed)
<b>Sensor Dimensions: OXB50</b> Fiber & tip diameter Tip geometry Stripping lengths	230 $\mu\text{m}$ , 50-70 $\mu\text{m}$ (tip) see image and text below A = 20mm, B = 100mm (other stripping lengths optional on request)	
<b>Cable length</b>	ca. 2 m or ca. 4 m (custom versions up to ca. 20 m)	
<b>Application Areas</b>	Laboratory, industry, research. <b>NOT</b> for medical or any safety-critical application. <b>NOT</b> for application in humans. <b>NOT</b> for application in food intended for human consumption.	

‡ Typical response times for 90% signal change. For liquids: measured for the transition from air into a stirred solution of 1% Na<sub>2</sub>SO<sub>3</sub>

### Tip Geometry: OXB50

True to scale drawings with outer jacket (brown), plastic coating (grey), optical fiber (pink) and oxygen sensitive REDFLASH indicator (green).



## 2 APPLICABILITY AND CROSS-SENSITIVITY

	Applicability	Cross-Sensitivity	NO Cross-Sensitivity
Water/Aqueous solutions	X		
Gas Phase (typ. air components)	X		
Ethanol <sup>1,2</sup>	short-term only		
Methanol <sup>1,2</sup>	short-term only		
Isopropanol <sup>1,2</sup>	short-term only		
Other organic solvents <sup>3</sup>		X	
Chlorine gas (Cl <sub>2</sub> ), NO <sub>2</sub> gas, bleach		X	
pH 1-14			X
CO <sub>2</sub>			X
CH <sub>4</sub>			X
H <sub>2</sub> S			X
Any ionic species			X

<sup>1</sup> Not applicable for sensors with optical isolation (-OI).

<sup>2</sup> Only diluted and after conditioning- contact [info@pyroscience.com](mailto:info@pyroscience.com) for more information.

<sup>3</sup> Includes liquid solvents and solvent vapors

## 3 CLEANING, STERILIZATION, STORAGE

<b>Cleaning</b>	3% H <sub>2</sub> O <sub>2</sub> , soap solution, short-term ethanol
<b>Sterilization</b>	short-term 70% ethanol*, short-term 70% isopropanol*, ethylene oxide (EtO, EO) sterilization (details on request)
<b>Storage</b>	>3 years in darkness at room temperature

\* Not applicable for sensors with optical isolation (-OI).

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