

# Specifications

## TRACE Oxygen Sensors

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### 1 TRACE OXYGEN 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 the following trace range sensors: minisensors (item no.: **TROXR430, TROXB430, TROXF1100**), robust probes (item no.: **TROXROB3, TROXROB10**), sensor spots/foils (item no.: **TROXSP5, TROXSP5-ADH, TROXSP5-ADH-STER, TROXFOIL**), and flow-through cells (item no.: **TROXFTC, TROXFTC2, TROXFLOW**).

#### 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>	<b>% O<sub>2</sub> gas</b>	<b>hPa</b>
Optimum	0-10% O <sub>2</sub>	0-100 hPa
Maximum (not specified)	0-21% O <sub>2</sub>	0-210 hPa
<b>Accuracy</b>	typically 2% of reading, but not better than 0.01% O <sub>2</sub>	
<b>Resolution</b>	0.002% O <sub>2</sub> at 0.2% O <sub>2</sub>	0.02 hPa at 2 hPa
<b>Detection Limit</b>	0.005% O <sub>2</sub>	0.05 hPa

## 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  $\mu\text{mol/L}$ ,  $\text{mg/L}$  (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> 0-50% a.s. 0-100% a.s	<b>mg/L (ppm)</b> 0-4.5 mg/L 0-9 mg/L
<b>Accuracy</b>	typically 2% of reading, but not better than 0.01% O <sub>2</sub>	
<b>Resolution</b>	0.01% air saturation at 1% a.s.	0.001 mg/L at 0.1 mg/L
<b>Detection Limit</b>	0.02% air saturation	0.002 mg/L

## 1.3 General Characteristics

<b>Calibration Modes</b>	0% O <sub>2</sub> calibration obligatory
<b>Temperature Range</b>	0°C (32°F) to 50°C (122°F)
<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.

## 1.4 Sensor Type Specific Characteristics

<b>Response Time (t90) ‡</b>	<b>Minisensors</b>	<b>TROXFTC/ TROXFTC2</b>	<b>TROXFLOW</b>	<b>TROXROB/ TROXSP5(ADH)</b>
Gas (standard) Water (standard) Water (>10mL/min) Water (>10mL/min)	<2 sec <15 sec	<1 sec <9 sec	<10 sec  <20 sec <30 sec	<3 sec <20 sec
<b>Minimum Lifetime data points</b>	1 mio.	10 mio.	10 mio.	10 mio. / 20 mio.
<b>Flow-Through Cells Tubing Connectors (Luer-Lock)</b>	ID tubing 1.6 or 2.4 mm (item no. <b>TROXFTC</b> ) ID tubing 3.2 or 4.0 mm (item no. <b>TROXFTC2</b> ) ID tubing 3.2 or 4.8 mm (item no. <b>TROXFLOW</b> )			
<b>TROXFLOW Materials of FLOW cell (apart from sensing layer)</b>	Polycarbonat and Polyamid			
<b>Recommended flow rate for liquids</b>	10-100 mL/min (item no. <b>TROXFTC</b> ) 20-500 mL/min (item no. <b>TROXFTC2</b> ) 1-500 mL/min (item no. <b>TROXFLOW</b> )			

‡ 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>

## 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 <sup>4</sup>			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

<sup>4</sup> pH 2-9 for **TROXSP5-ADH** & **TROXSP5-ADH-STER**

### 3 CLEANING, STERILIZATION, STORAGE

<b>Cleaning</b>	3% H <sub>2</sub> O <sub>2</sub> , Soap solution, short-term Ethanol
<b>Sterilization</b>	<b>Minisensors &amp; robust probes:</b> short-term 70% ethanol, short-term 70% isopropanol, ethylene oxide (EtO, EO) sterilization (details on request) <b>TROXFLOW:</b> delivered pre-sterilized with 25kGy beta-radiation, short-term 70% Ethanol and 70% Isopropanol treatment is possible <b>TROXSP5 (-ADH):</b> autoclavable few cycles at 121°C for 15 min with special precautions (details on request), ethylene oxide (EtO, EO) sterilization (details on request)
<b>Storage</b>	>3 years in darkness at room temperature

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