

# NeoFox Phase Measurement System

## Benchtop and Handheld Electronics for Your Optical O<sub>2</sub> Sensor



For oxygen sensing, the NeoFox<sup>®</sup> Phase Measurement System is our most popular fluorescence-based optical sensing system. Because of NeoFox's unique ability to improve overall system stability and make calibration easier for a wide variety of oxygen sensing setups, it is the choice for measuring fluorescence lifetime, phase and intensity. Plus, NeoFox is brilliantly suited for applications where sensitivity to drift and system stability are critical.

The NeoFox uses LED excitation and photodiode detection with filter-based wavelength selection for easy experimental setup and control. Because the unit is self-contained, it is invariant to fiber bending and stray light, and has a wide dynamic range of optical intensity as well as low optical and electronic crosstalk, and low drift and phase noise.

NeoFox is available in two popular models: NeoFox Benchtop and NeoFox Sport for handheld measurements. Both deliver outstanding response times and work with our proprietary sol-gel coating that can be applied to patches or probes. NeoFox kits are also available.

NeoFox Specifications		
	Benchtop Item Code: NEOFOX	Portable/Handheld Item Code: NEOFOX-SPORT
Dimension:	107.95 mm x 63.5 mm x 38.1 mm	327.6 mm x 190.5 mm x 66.5 mm
Weight:	642 g	928 g
Principle:	Photoluminescence quenching using a ruthenium compound; sensor measures O <sub>2</sub> partial pressure	Photoluminescence quenching using a ruthenium compound; sensor measures O <sub>2</sub> partial pressure
Parameters measured:	Luminescence phase shift, AC luminescence intensity, temperature (via optional external thermistors) and pressure (via onboard pressure transducer)	Luminescence phase shift, AC luminescence intensity, temperature (via optional external thermistors) and pressure (via onboard pressure transducer)
Sensor coating formulations (sol gel-embedded dyes):	General purpose (FOXY), high-sensitivity (FOSPOR) and hydrocarbon-ready (HIOXY)	General purpose (FOXY), high-sensitivity (FOSPOR) and hydrocarbon-ready (HIOXY)
Media:	Gases and liquids	Gases and liquids
Computer interface:	PC	PC for full range of functions No PC for limited range of functions, displayed on unit itself; also, calibration file shipped on SD card
Operating systems:	Windows 2000/XP (32-bit); also, Windows 7 (32-bit)	Windows 2000/XP (32-bit); also, Windows 7 (32-bit)
Power input:	5VDC, 500 mA steady state	5VDC, 500 mA steady state
Communications:	USB, analog out	USB, analog out



### NeoFox Viewer Software

NeoFox Viewer is the Windows-based software that allows you to collect, manage and analyze data with your NeoFox or NeoFox Sport phase measurement system. This nimble software also makes it simple to configure your NeoFox and update firmware when necessary. Use NeoFox Viewer to get the most out of your NeoFox and to ensure reliability through each measurement.

You can download a free copy of NeoFox Viewer at [www.oceanoptics.com](http://www.oceanoptics.com).

# NeoFox Probe and Patch-Based Systems

## Full System Performance Specifications



One of the biggest advantages our fiber optic oxygen sensors offer compared with electrodes and other optical sensors is the range of available sampling options. In the table below we've compiled performance data for NeoFox-based systems used with our two primary sampling choices: oxygen probes and patches. Please note that some performance parameters vary according to the sensor format and coating formulation used.

Also, we've included information on sterilization options below but direct you to pages 172-173 for a more detailed explanation of probe care and maintenance.

One other item of interest: The specifications for O<sub>2</sub>% and dissolved oxygen range are given for conditions at 1 ATM (atmosphere). At 1 ATM (typical conditions on Earth), we breathe many molecules such as nitrogen, helium, hydrogen and oxygen. All these molecules make up the

total pressure in the environment. The ruthenium in our sensors are sensitive only to oxygen, which is just one part of the total pressure in the environment. So, when we determine the percentage of oxygen present in the environment at 1 ATM, we're measuring part of the total pressure, hence the term "partial pressure."

Probe-based System Specifications	FOXY Formulation	FOSPOR Formulation	HIOXY Formulation
Recommended use:	General purpose coating	High-sensitivity coating for low-oxygen environments	Robust coating for hydrocarbon-rich environments
O <sub>2</sub> % range (at 1 ATM):	0-100%	0-<21%	0-20.9%
DO range (ppm at 1 ATM):	0-40 ppm	0-8 ppm	0-8 ppm
Temperature range:	-50-+80 °C for probes	0-+60 °C for probes	-50-+60 °C
O <sub>2</sub> % resolution:	100 ppm in gas	10 ppm in gas	100 ppm
DO resolution (at room temp):	4 ppb	0.4 ppb	4 ppb
O <sub>2</sub> % accuracy:	≤5% of reading	≤5% of reading	≤5% of reading
DO accuracy:	≤5% of reading	≤5% of reading	≤5% of reading
Min. detectable level in gas:	0.01% - 0.05%	0.001% - 0.01%	0.01% - 0.05%
Response time:	<1 s in gas 45-60 s with overcoating in gas 30-45 s in pure water	<30-60 s in gas 60-90 s with overcoating in gas 60-90 s in pure water	<1 s in gas NA ~45 s in pure water
Patch-based System Specifications	FOXY Formulation	FOSPOR Formulation	HIOXY Formulation
Recommended use:	General purpose coating	High-sensitivity coating for low-oxygen environments	Robust coating for hydrocarbon-rich environments
O <sub>2</sub> % range (at 1 ATM):	0-100%	0-10%	0-20%
DO range (ppm at 1 ATM):	0-40 ppm	0-4 ppm	0-8 ppm
Temperature range:	-20 to +60 °C for patches	0 to +60 °C for patches	0 to +60 °C for patches
O <sub>2</sub> % resolution:	0.05% (at 20 s averaging)	0.01% (at 30 s averaging)	0.05%
DO resolution (at room temp):	20 ppb	4 ppb	20 ppb
O <sub>2</sub> % accuracy:	5% of reading	5% of reading	5% of reading
DO accuracy:	5% of reading	5% of reading	5% of reading
Min. detectable level:	0.1% O <sub>2</sub>	0.01% O <sub>2</sub> (at 30 s averaging)	0.1% O <sub>2</sub>
Min. detectable level in water (at room temp):	40 ppb	4 ppb	40 ppb
Response time:	<1 s in gas ~30-45 s with overcoating in gas ~45 s in pure water	30-60 s ~60-90 s with overcoating in gas ~60-90 s in pure water	<1 s in gas NA ~30-45 s in pure water
Stability (Continuous LED)	FOXY Formulation	FOSPOR Formulation	HIOXY Formulation
Lifetime stability (Tau):	0.0006 usec/hour	0.003 usec/ hour	0.0002 usec/hour
Oxygen stability %:	0.01% hour	0.005% hour	0.007% hour
Modulation range:	0.73 kHz-93.75 kHz	0.73 kHz-93.75 kHz	0.73 kHz-93.75 kHz