



**Fluoroprobe<sup>™</sup> Technology**  
*Changing the Way the World Measures Oxygen*

**This Patented Optical Sensor  
Changes the Technology for Oxygen Measurement and Control  
In The Environmental, Biotech And Aquaculture Industries**

**No** electrolyte solutions or membranes to change  
No more constant calibration or probe fouling

Optical measurement **does not** consume oxygen,  
therefore the problems caused by the consumption of  
oxygen are eliminated

There are **no** parts to replace on the probe. This reduces  
the hours of lost time for probe maintenance and  
eliminates the cost of probe replacement parts



**Designed for long-term monitoring in remote and harsh environments**

The **Fluoroprobe** is not a re-engineered Clark or Galvanic probe.

The **Fluoroprobe** is the biggest technology breakthrough for long-term monitoring and control  
of dissolved oxygen in **50 years!!!**

No other oxygen meter in the marketplace can even compare. Other methods are now obsolete.

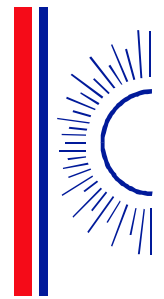
Clark and Galvanic probes consume oxygen and  
any water borne organisms that also consume  
oxygen. These organisms coat the membrane and  
cause rapid oxygen depletion behind the  
membrane.

The **Fluoroprobe**, when coated with Bio-Mass can  
simply be wiped off and immediately returned to  
service with NO need for recalibration.



**Guaranteed Performance with a 5 Year Sensor Warranty**

# FL-3 FLUOROPROBE SPECIFICATIONS



## Sensor Design:

Measurement Principle	Fluorescent (Patented)
Tip Thickness	0.005" (0.127mm)
Tip Material	Silicone Rubber
Body Material	PVC with Epoxy encapsulant
Cable	Polyurethane
Length	9" (230mm) Nominal
Diameter	1.25" (32mm) Nominal
Optics	400nm Excitation, 610nm Emission
Internal Power	+/- 12 Vdc, +/- 5 Vdc
Output Signal	AC Modulated

## Application Data:

Power Supply:	240 Vac, 50Hz, < 25W (standard) 12 & 24 Vdc, on order.
Temperature Limits:	
Instrument	-30°C to +50°C
Sensor	0°C to +50°C
Operation Range	0 <sub>ppm</sub> to Supersaturation in Aqueous Solutions.
Accuracy:	1% over 0 to 10ppm Range in Aqueous Solutions.
Repeatability:	0.5% of Range.
Response Time*:	30 sec (90%) in Aqueous Solutions. 7 sec (90%) in Gaseous Phases.

\*Note: The response time is based on 0.3 m/s flow across sensor. The response time will decrease with increased flow rate. However, flow is not required for the measurement.

Sensor Lifetime:	Estimated 10+ years for conventional aeration. Based solely upon the application environment and the effect on Silicone Rubber.
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## Features:

Analogue Output Signal	1x 4-20mA, 600 Ω max.
Digital Outputs	2x Relay, 2A max.
Display	3 Lines: DO, Temperature and Elevation
Instrument Measurement	Steady State, Amplitude/Lifetime
Automated Air Calibration Routine	Yes
Temperature Compensation	Yes
Ambient Excitation Compensation	Yes



## **ENVIRONMENTAL INSTRUMENTS, LLC.**

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# "POLLUTION EQUIPMENT NEWS"

article August 2001

Galvanic and polarographic based dissolved oxygen sensors for environmental monitoring have been to date the predominate methods for dissolved oxygen measurement. Constant cleaning of the sensors; the need for membrane and electrolyte replacement, probe fouling and re-calibrating of the instrument can be so demanding that monitoring and more profoundly, control, can be frustrating, if not impossible.

Fluorescent based oxygen sensors are gaining acceptance and surprising municipal and industrial wastewater treatment plant operators with their dependability. Low maintenance and no consumables or replacement parts to worry with are a hallmark of these sensors. This in turn reduces hours of lost time for maintenance and eliminates the cost of replacement parts. Another very important feature is that fluorescent-based sensors do not consume oxygen and require no flow across them to work. They also perform very well in harsh environments that normally destroy other conventional sensors.

## PRINCIPAL OF OPERATION

The oxygen present in water as dissolved oxygen migrates into the sensor, which is a 1mm by 15mm disc. The oxygen associates with a fluorescent compound in the disc, which causes it to glow when stimulated with a blue laser diode (LED). The fluorescent compound is not consumed in this process. The oxygen also is not consumed or chemically altered. The glow from this passive event is detected from behind the disc with the water on the opposite side. This arrangement creates a stable optical link to the disc. The disc is a combination of Teflon and Silicon polymers. The sensor is permanently mounted and is not replaceable.

## PERFORMANCE- Municipal and Industrial

Environmental Instruments, LLC, a manufacturer of the fluorescent based dissolved oxygen monitoring and control systems, offered several municipalities and industrial clients a 30 to 60 day trial with a promise that the unit could be returned if it did not perform to standards agreed upon by both parties.

The results were both impressive and somewhat perplexing for these installations. At one installation, the Knoxville Utility Board, Knoxville TN., ran a 30 day trial in one of their aeration basins and purchased the unit after the unit met the agreed upon performance standards. **They did not have to wipe the probe for eight months** after the installation. This consisted of pulling the probe from the basin, wiping the sensor with a rag and replacing the probe in the basin. Although very pleased with the extremely low maintenance of the unit, they were also perplexed by spikes recorded by the unit of up to 10 mg/l in the basin. The average D.O. for this particular basin was around 1.0 to 2.0 mg/l. An alarm was set within their computer monitoring system to indicate when the spikes occurred. In response to the alarm they went to the basin to physically cross check the reading of the fluorescent monitor with a hand held D.O. meter. After determining that these were real events, KUB is now in the process of tracking the source of these spikes and will be purchasing additional units to begin the process of controlling their blowers. It also appears that these units can be used in the KUB pre-treatment programs.

The City of Waynesville, NC also participated in a trial, resulting in huge savings on energy consumption and also **60% reduction in chlorine consumption**. Similar trials were run at Dunkirk, NY, Sonoma County, Ca., West Chicago, IL., Western Carolina Regional Sewer Authority, Greenville, SC, Arch Chemical, Lexington, Ky. and Las Vegas, NV., just to name a few of the other trial sites. All of these trials provided excellent results, greatly exceeding the expectations of the clients and proving that fluorescent based dissolved oxygen technology has provided a new paradigm for the consistent and dependable monitoring and controlling of dissolved oxygen.

## DAY OF JUDGEMENT

Package Wastewater plants

One of the largest potential markets of oxygen sensors for control and real time monitoring are package wastewater treatment plants. This market was not being penetrated due to maintenance and lack of dependability of conventional oxygen sensors.

Operators of package plants and more importantly contract operators, need to have a dissolved oxygen monitor and controller that can be installed and forgotten about until their next visit to the plant. The dependability of fluorescent based dissolved oxygen technology is now providing a means for these operators to monitor and control their plants.