pH Sensor Systems

Optical pH Sensors Available in a Variety of Form Factors

Our optical pH sensors use a proprietary sol-gel formulation optimized for the biological range and are available in probe, cuvette and patch formats. Each pH sensor works on the same principle: a colorimetric change that's detected with a spectrometer. We immobilize a pH-sensitive dye in a modified sol-gel matrix, where the free diffusion of hydrogen ions in and out of the matrix pores allows for interaction with the dye. When this interaction occurs, the dye exhibits a visible color change.

Form Factors

We offer transmissive pH probes, self-adhesive pH patches and pH-sensitive cuvettes (see Smart Cuvettes on p. 179) to meet your pH sensing needs. While typical optical sensors are susceptible to changes in ionic strength, our pH sensors overcome this limitation and thus can be used in applications such as food and beverage processing and pharmaceutical production. Also available is a new reflective patch form factor.

Advantages of pH Sensors

- Are immune to ionic strength sensitivity
- Are compatible with alcohols and other organic solvents
- Have faster response time and better thermal performance than pH electrodes
- Are designed for use in the biological range (pH 5-9)
- Work well even in low salinity solutions
- Meet USP Class VI certification requirements for biocompatibility
- Are available in probe, patch or cuvette options
- Can be used for non-intrusive measurements

Ocean Optics' new non-intrusive reflective pH technology comes as the next evolution of our pH sensing product line. Previous pH sensor products have been based on colorimetric transmissive measurements, and have therefore fallen susceptible to ambient light interferences and sample color or turbidity effects.

Our new approach uses electroformed mesh to metallize the pH sensor material, providing an optically reflective yet ion permeable membrane between the sensor and the environment.

pH Sensor Specifications

The pH Probes from Ocean Optics use a proprietary sol-gel formulation infused with a colorimetric pH indicator dye. This material is coated onto our exclusive patches to reflect light back through the central read fiber or to transmit light through the sample in order to sense the color change of the patch at a specific wavelength.

	Reflective
pH range:	5 – 9
Temperature range:	-6° to +60 °C
Analytical wavelength:	617 nm
Baseline correction wavelengths:	509 nm (isosbestic) or 800 nm
User calibration accuracy:	Up to 2% of reading
Factory reset accuracy:	0% at reset point 1% within 1 pH unit of reset Up to 4% at 3 pH units from reset
Resolution:	~0.03 pH unit in most cases
Response time (t90):	30 seconds
Calibration requirements (minimum):	Factory calibration: 3 buffers
User calibration:	5 or 6 buffers
Sterilization:	Gamma, EtO
Acceptable probes:	3-Around-1 Angled RE-BIFBORO Reflection probes (200 µm, 400 µm, 600µm)

	Transmissive
pH range:	5 – 9
Temperature range:	-5° to +70° C
Transmissive accuracy:	<1% of reading across range
Transmissive resolution:	0.02 pH
Transmissive response time:	30 seconds
Calibration requirements:	3 buffers
Sterilization:	Gamma, EtO, Autoclave
Chemical compatibility:	Aqueous, alcohols, some organic solvents, peroxides, ammonia, sodium hypochlorite
Drift (continuous stability):	1% per day
Discrete stability (life-time):	50 uses or more, dispose when absorbance at pH 11 <0.1 (assumes pH1 reference)
Storage conditions:	Dry or wet storage