

Protein Analyzer

Fluorescence

Introduction

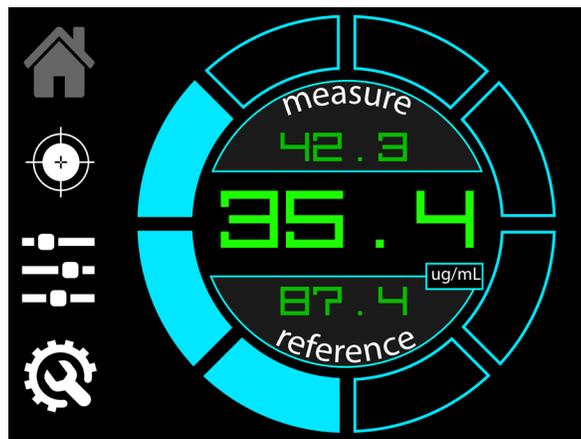
Quantifying proteins by monitoring UV fluorescence has become a crucial tool in biopharmaceutical and bioprocess applications due to its robustness, high sensitivity, and non-invasiveness. By utilizing the intrinsic fluorescence of proteins, a concentration measurement can be made using our PX2+ Photometer with our Front Surface Fluorescence Probe. Intrinsic fluorescence is also a strong indicator of protein structure and function and can give researchers and technicians an understanding of the protein's conformational states under various conditions like pH and temperature. CST's Protein Fluorescence Analyzer is designed for continuous, real-time monitoring of protein concentrations without the need for expensive dyes or labeling.

Features

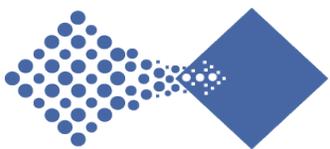
- ◇ Continuously and accurately measures protein concentration by monitoring UV fluorescence.
- ◇ The all-inclusive Protein Fluorescence Analyzer comes preassembled with a PX2+ Photometer attached to a Front Surface Fluorescence Probe via fiber optic cables.
- ◇ The fluorescence probe can easily be removed, cleaned, and re-installed if required.
- ◇ Easy to use software with a digital touch display allows users to view data and calibrate.
- ◇ High reliability with a typical light source lifetime of 10 years.
- ◇ Standard data outputs include MODBUS, 4-20mA, and USB to CST Software.
- ◇ Low cost of ownership with no routine maintenance or expensive dyes or labeling required.



CST's Protein Fluorescence Analyzer includes a PX2+ with a Front Surface Fluorescence Probe



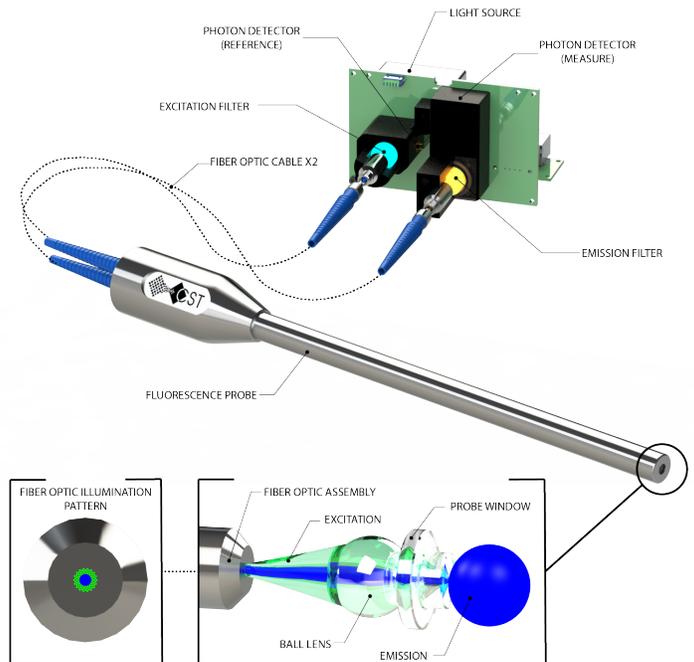
PX2+ Capacitive Touch LCD



Theory of Operation

CST's Protein Fluorescence Analyzer contains a PX2+ UV Photometer that uses optical filters to provide specific excitation and emission wavelength ranges chosen to coincide with protein fluorescence. The PX2+ is equipped with either a front surface in-line (in situ) probe that mitigates inner filter effects or single use flow cell to enable application across liquids, solids, semi-solids, and turbid solutions. Fluorescence occurs when a molecule absorbs light energy at one wavelength and re-emits most often at a longer wavelength. The wavelength where the maximum absorption occurs is called the excitation wavelength, and the wavelength where the maximum emission occurs is called the emission wavelength.

The Protein Fluorescence Analyzer monitors intrinsic protein fluorescence by exciting protein typically at 280 nm via LEDs and measuring the emission at approximately 350 nm. Alternative wavelength combinations and dual wavelength configurations are also available. This analyzer can and has been deployed to determine protein concentration, monitor protein folding, protein-protein interactions, protein aggregation and lyophilization. The analyzer can also be used for genetically encoded autofluorescent proteins (AFPs) applications. It has also found utility to detect real-time fouling in downstream biotherapeutic purification resins. Superior sensitivity, low level and trace detection, and rapid response summarize the figures of merits of this technology. Real-time intrinsic or autofluorescence is often a superior and established approach as it is non-invasive, rapid, and simple. It can be deployed in-line within a process stream, at-line within the biomufacturing environment or within a laboratory quality environment.



Technical Specifications

General	
Range	Application Dependent
Accuracy	± 1% of Full Scale
Repeatability	± 0.5% of Full Scale
Measurement Principle	UV Fluorescence
Light Source	Xenon Flash Lamp
Detector	PMT and Silicon Photodiode
Fiber Optic Cables	(2) 2 meter, 600 micron core
Sample Introduction	In-situ of Extractive
Process Pressure	2000 psi max
Minimum Flow Rate	100 ml/min
Calibration	Analyzer is calibrated with customer sample; measurement normalized by zeroing every 1-2 months or as needed.
Response Time	1 second
Power Requirement	24VDC nominal (12-48VDC), 8.5 watts max

Front Surface Fluorescence Probe	
Wetted Materials	316SS Body, Sapphire Window, and Viton Seal (custom options available)
Temperature Rating	0-400°F
Pressure Rating	2,000 psi
Insertion Length	8.66" / 220mm (custom options available)

PX2+ Operating Conditions	
Process Temperature	204°C
Operating Temperature	5°C to 50°C
Storage Temperature	-20°C to 50°C

Communications	
Outputs	4-20mA, RS-485 (MODBUS), or USB
Alarms	Contact closure (60VDC, 0.75 A max)
Display	3.2" capacitive touch LCD

*All information provided in this datasheet is subject to further application engineering based on customer sample.