

Single-channel Viserion Monitor and control your biotechnological and chemical processes

Measure Control Improve

Non-invasive, non-destructive analyses possible with Viserion :

- Measurement of the chemical composition of complex blends with high selectivity
- Simultaneous information on several process variables
- Nutrient monitoring in cell culture
- Inspection of finished products through plastic or glass packaging
- Very low influence of water, ideal for analyzing liquid products





Raman spectroscopy is based on inelastic scattering of a low number of photons from the incident beam at different frequencies. Due to the type of transition involved (vibrational transition), this spectroscopic method ensures high specificity by analyzing the re-emission bands specific to the chemical groups. It is also a technology particularly suited to liquid media due to the near-inactivity of water in Raman emission because of its very low polarizability.

A system suitable for the laboratory and for industrial environments

Viserion enables in-situ, non-destructive analysis of samples. Two wavelengths are proposed, 785 nm or 830 nm, to reduce fluorescence interference. The system is equipped with a low-temperature thermo-electric cooling unit (-15°C), ensuring very low-noise measurements to guarantee stability over time and in the sometimes drastic conditions which may be encountered for measurements in industrial circuits. This detector provides the best possible compromise between measurement speed, sensitivity and implementation costs.

3 markets concerned



PHARMA



BIOTECHNOLOGY



CHEMICALS

Advantages

This **parameterizable instrument based on Raman technology** combined with a measuring and data visualization system offers significant advantages:

- **Flexibility when choosing your probes** to optimize measurement of the product of interest
- Measurement inside the process across **a wide range of wavelengths**
- **Integrated software** facilitating analysis and processing of the data
- **Fast acquisition** and display of the measurement and the associated prediction
- **A communicating system which is easy** to integrate in industrial environments

Your partner for industry 4.0

Viserion includes an industrial PC with the Viserion Ready firmware.

Viserion Ready allows:

- modulation of measurement acquisition over the integration time, as well as the number of scans and the power of the laser,
- **integration of several chemometric models**, e.g. from toolboxes like PLS_Toolbox (PCA, SVM, ANN and PLS models). Once these models have been uploaded, it is possible to display the monitoring of the critical process parameters.

Thanks to this **rugged design**, the system can be used in production environments with the possibility of control via the OPC-UA communication protocol. This type of integration **enables full production automation** and the implementation of feedback loops to **guarantee process performance and quality at all times**.

A versatile tool adaptable to your needs

The measuring interface with the process is crucially important. Indeed, the measuring probe provides a direct interface between the medium to be analyzed, the process equipment and the measuring instrument. For this reason, Indatech has developed a whole ecosystem around the head of the Raman optical probe.

- **An immersed probe** for in-line or at-line monitoring through a sapphire window,
- **An in-line measuring cell** for monitoring the evolution of downstream production; the cell is made of stainless steel,
- **An at-line measuring cell** for measuring in vials of various appearances; this cell is called the Vial Analyzer.

Various possible configurations

Each excitation wavelength has advantages and disadvantages for a given application, so there must be a choice adapted to the requirement in order to optimize measurement.

• 785 nm Raman laser:

The most popular excitation wavelength, offering a compromise between Raman signal intensity, sensitivity to fluorescence, measurement range, cost and overall performance.

• 830 nm Raman laser:

A wavelength minimizing fluorescence which is more suitable for certain dark-colored samples (dyes, oils, colored polymers), but which also increases the integration time and reduces the measurement range.

3 possible applications

- **Monitoring** of cell culture in biotechnology, **quantification** of products of interest (antibodies, nutrients)
- **Qualification and quantification** of the active ingredients in complex blends in the chemical industry (detergents, lyes)
- **Qualification** of finished products in the laboratory



Example of industrial application



Real-time in-situ monitoring of antibody glycosylation site occupancy during CHO cell culture in the bioreaction

When connected inside a bioreactor for antibody production by CHO cell culture under perfusion, Viserion made it possible to:

- **Check the quantity** of glycosylated and non-glycosylated antibodies
- **Quantify** the nutrients in the medium (glucose, lactates, etc.) and monitor the evolution of the various glycoforms of glycosylated antibodies
- **Provide this information** to the operator and the controlling PLC in **just a few minutes**



Technical specifications

Technology	Non-destructive* Raman analyzer for agrochemical, pharmaceutical and biotechnological media.	
Light source	1 Raman laser with a max. power of 500 mW. 785 or 830 nm emission wavelengths	
Spectrometer	1 measuring spectrometer	
Spectral range	@785 nm	400 – 2,500 cm^{-1}
	@830 nm	400 – 2,000 cm^{-1}
Spectral resolution	@785 nm	9 cm^{-1}
	@830 nm	8 cm^{-1}
Samples	Samples of diverse natures in diverse states, particularly clear to dense liquids and colored media, as well as solid matrices (vials, cups, etc.)	
Measurement time	Integration time between 0.1 and 60 seconds, possibility of several scans per measurement and display of the mean spectrum	
Measurement processing	Real-time display of the spectra from the sample measured by means of the Viserion Ready firmware, with integration of specific models and data predictions. Compatible with the "Simca" software from Sartorius and "PLS_Toolbox" from Eigenvector.	
Environmental temperature	5 – 40°C	
Relative humidity (uncondensed)	5 – 90 %	
PC	Fanless industrial PC integrated in the Raman unit	
Casing	Stainless-steel unit, H 600 x L 400 x W 250 mm (dimensions including the internal PC), CE	
Laser safety	Compliant with EN-NF 60825-1: • Class IV regulatory marking • Interlock system on the probe and the door of the casing • Manual re-initialization of interlock if interlock circuit broken • Key to activate/deactivate the laser • Emergency stop button	

*Caution necessary with some solid and/or very dark samples

