



Measurement directly in the process

World's first Raman-FTNIR spectrometer for in-line use under process conditions. A system designed and optimized for industrial needs with high stability, robustness and measurement speed at low power consumption.

Combined Raman-FTNIR spectrometer

All system components (Coherent Raman laser, Wasatch Raman spectrometer, high quality i-RED FTNIR spectrometer, chemometric engine) are already integrated.

All computational operations, especially the real-time application of chemometric models, run on board or at the system level. A PC is only required for model development. The process spectrometer then works in a networked, intelligent and autonomous manner.

The device has an integrated PLC for the control of all system components and the external periphery (e.g. multiplexers), the selection of measurement parameters, and for the implementation of project-specific control processes.

The spectrometer communicates directly with your process control system via standard digital process industry protocols (e.g. OPC UA, CANopen). Other fieldbuses are supported via gateways.



Raman-FTNIR Process Spectrometer

- Two complementary measurement technologies united in one system
- All system components are already integrated – including the Raman laser
- Spectra calculation and chemometrics on system level
- Chemometric modeling with MATLAB and Eigenvector PLS Toolbox



Technical Specifications

Raman:

- **Excitation wavelength** 785 nm, other wavelengths on request
- **Max. excitation power** 500 mW, other maximum excitation powers on request
- **Spectral range** 200 – 2100 cm^{-1} (Raman shift), other spectral ranges on request
- **Spectral resolution** 8 cm^{-1} with 25 μm slit, other resolutions on request
- **Aperture** f/1.3 for higher light intensity (sensitivity) and improved SNR

FTNIR:

- **Spectral range** 11000 – 3800 cm^{-1} (900 – 2600 nm)
- **Spectral resolution** 1.5 cm^{-1} (@ 10 measurements/s) to 12 cm^{-1} (@ 100 measurements/s)
- **Infrared detector** InGaAs or extended InGaAs; 24 bit ADC conversion
- **Signal-to-noise ratio** SNR > 10000
- **Measurement speed** up to 100 measurements per second
- **Gain** 9 gain levels to increase the dynamic range by up to a factor of 1000



Technical Specifications

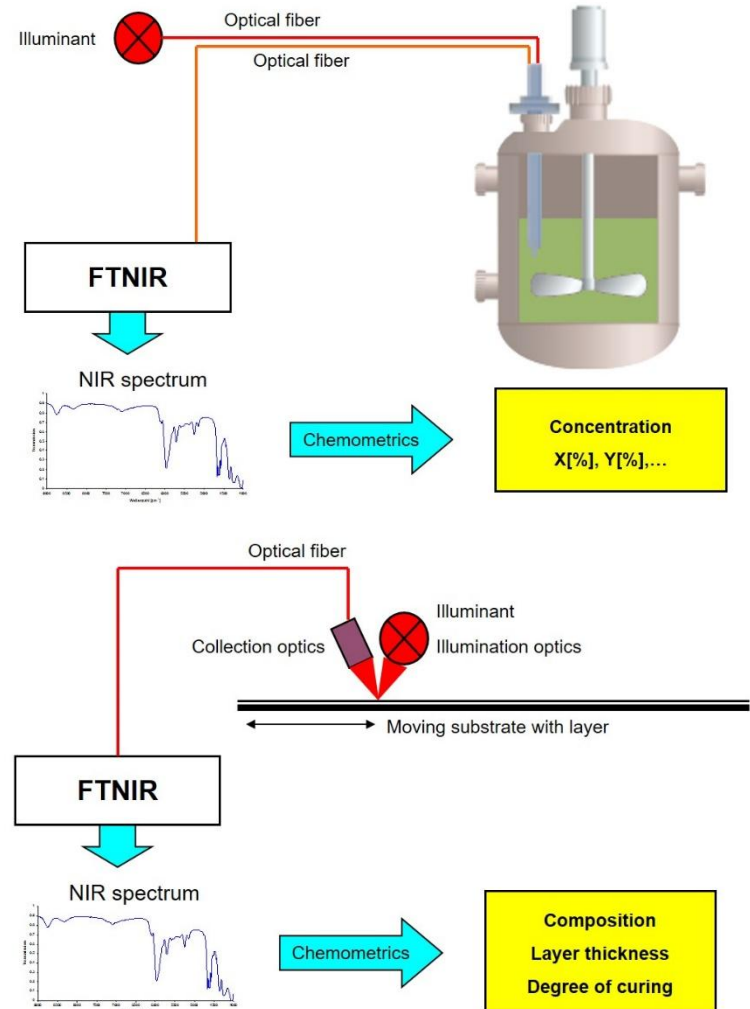
Complete system:

- **Data acquisition** Chemometric evaluation of spectral data in real time via DSP technology
- **Measurement accessories** High flexibility in probes and light sources
Accessories are offered according to the customer's measurement task
- **Remote support** Direct network implementation allows remote support, diagnostics and update of the chemometric models
- **Interfaces** LAN for high-speed data transfer and remote control
CANopen field bus interface implemented for real-time data transmission
Other fieldbuses via gateway (e.g. Profibus DP, Profinet, EtherCAT, EtherNet / IP)
OPC UA and Modbus TCP for integration into higher-level control systems
Digital I/O, 4..20 mA
- **Software platform** Integrated PLC functionality enabling automated measurement applications
Freely programmable real-time chemometric evaluation engine
User specific and platform independent visualization of measurement results
- **Software data format** Any format possible (if documented)
- **Power supply** 24 V DC, 30 W
- **Dimensions** 19 inch rack, height: 3U; supplied in a suitable desk-top case if required



Applications

- **Assessment of concentrations**
Real-time analysis of complex material mixtures (liquid, solid, gaseous)
- **Chemical reactions**
Inline process monitoring of chemical reactions (e.g. esterification, nitration, chlorination, polymerization)
- **Solids and powders**
Inline quality control of films, fibers, glass, food, pharmaceutical and technical powders, ash, etc.
- **Coatings**
Inline monitoring in paper, film and steel finishing
- **Gases**
Inline analysis of process gases (H₂, N₂, O₂, CO, CO₂, etc.)





Service & Support

- **Analysis of your production process**
How can you get more quality information in real time at critical points in your manufacturing process?
- **Feasibility studies**
Preliminary examinations in the lab, pilot plant or time-limited test operation in your production plant
- **Hardware**
Spectrometers (UV/VIS, FTNIR, FTIR, Raman)
Light sources, optical fibers, probes
Development of specific hardware
- **Software**
Automation, communication, visualization
- **Chemometrics**
Multivariate data analysis & modeling
AI for automated model optimisation
- **Support**
Maintenance of hardware and software
Professional personnel training
Availability: 24h a day / 7 days per week

