



Process NIR Spectrometers

Fast, precise, reliable

Product brochure



Process analytics: universal and efficient



INCOMING GOODS →



PRODUCTION PROCESS →



PRODUCTS





Polytec Advanced Spectrometer (PAS-System) open up numerous possibilities for economic improvements of production processes from incoming materials inspection to final product control.

The decisive advantage of process analytics is the automated real-time control of production processes. In addition to ensuring a consistent product quality, the production process can be monitored and optimized. Process analytics enables high-quality, cost-effective, and convenient solutions that provide a fast ROI. The technique can be applied at several levels of the production chain: incoming goods inspection, process control and 100% end product qualification. Many relevant parameters can be derived from a single measurement. In the food and animal feed industry, for example, moisture, fat and protein content are determined simultaneously.



Diode array spectroscopy

Optical spectroscopy is one of the most important and widely used methods in process analytics. Especially when based on diode array technology, it provides reliable results even at high measurement rates.

Advantages of optical process spectroscopy:

- Real-time process monitoring and control
- Non-destructive measurement, without sample preparation and waste disposal
- Increased efficiency and cost reduction e.g. through reduction of rejects, down-times, optimized cleaning cycles, lower laboratory costs, automated documentation
- Statistical evaluation of the measurement series and trend chart analysis
- Proven technology in agriculture, food, chemistry and pharmaceutical environment



The system concept:
modular for any demand

As a manufacturer of high-quality optical measurement equipment, Polytec offers configurable spectrometer systems allowing optimized solutions for any individual application.



**Modular spectrometer systems:
designed for flexibility and precision**

PAS-Systems are designed to be flexibly configured to achieve the most advantageous solution for a wide variety of applications. Individual combinations of the most suitable probe, spectrometer and software fulfill the needs of different applications. Each component is standardized in order to ensure high precision and ease of use during process integration. The PAS systems are based on well-proven technology and offer application-specific solutions that are nevertheless safe and easy to integrate.



**Benefits of the modular
system concept:**

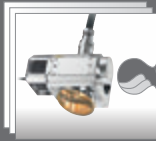
Standardized equipment and
software providing

- High flexibility
- Easy integration
- Simplified operation

The basis: high-quality components

PAS-Systems are manufactured using optical and electronic components specifically developed and manufactured in-house. We know our products down to the smallest screw. Everything is precisely coordinated to achieve high reliability with prompt and highly competent customer support.

Probes



Spectrometers



Sensitive detection: the probes

Appropriate sample presentation is the key to successful system operation. A variety of specialized probes are available to address different sample properties and installation situations.



Fast, sensitive and precise measurements: the spectrometers

Diode array technology combined with a superior transmission grating design enables the PAS spectrometers to be used for fast and reliable data acquisition. Two optimized spectral ranges and different power supply options are available.





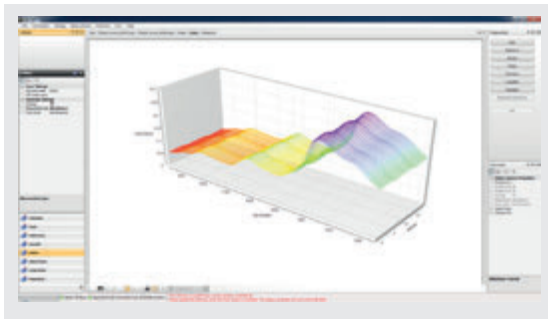
Software



Direct, relevant results: the software

Depending on the application, special software solutions are available for data acquisition:

- Software platform for laboratory analysis
- Multivariate data analysis for method development
- Software for process control



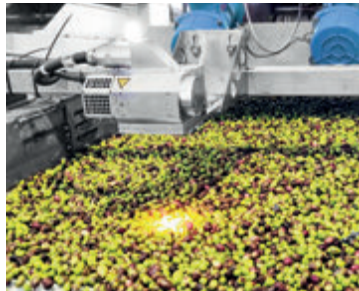
Probes



Adequate sample presentation is the key to successful system operation. To accommodate different sample properties and installation situations a variety of specialized probes are available.



PAS systems can be used for inline quality assurance and quality control in the processing of foods, agriculture commodities, chemicals and plastics.



Typical applications:

- Solids (e.g. bulk goods, powders, endless tracks)
- Fluids (e.g. liquids, suspensions, dispersions or paste-like media)



Our probes are designed specifically for industrial applications and meet demanding requirements. They are resistant to dust, humidity, pressure and temperature.

Compliance with common production and safety regulations, e.g., for use in food industry or in IECEx environment.



Non-contact probe PAS-H-A03

Reflection probe for measurements over large distances (conveyor belts, endless webs, etc.)

Combined illumination and sensor unit for distances varying from 100 to 500 mm.

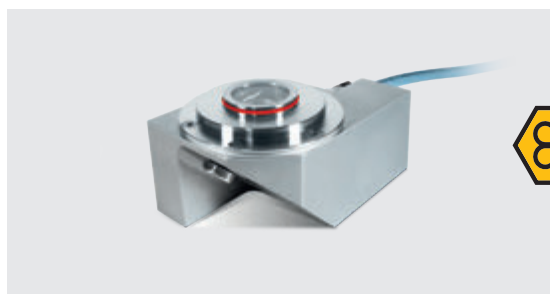
- Fully automated system calibration
- 20 mm measurement spot size
- Integrated 20 W tungsten-halogen light source for sample illumination
- SMA 905 optical fiber connection
- Industrial protection class IP64
- Housing made of stainless steel or anodized aluminum



Process integration & flanges.

Depending on the properties of the sample and the installation situation, a selection of specialized adapters and flanges is available. These enable optimum integration of the contact probe into the process system.

- Flanges for GEA- VARINLINE® at different sizes of sight glass position.
- Welded-in flange with sapphire window for hoppers, chutes or the outer wall of storage tanks.



Contact probe PAS-H-B04

Reflection probe for measurements over short distances or in direct contact with the sample (tubes, chutes, funnels, etc.)

Combined illumination and sensor unit for distances varying from 0 to 50 mm.

- Fully automated system calibration
- Integrated 10 W tungsten-halogen light source for sample illumination
- Compliant with food laws, ATEX and IECEx 
- SMA 905 optical fiber connection
- Industrial protection class IP66 / IP68
- Housing made of anodized aluminum with stainless steel process adapter and sapphire window for process integration.
- Different flanges and adaptation interfaces



Customized installation devices

Customized brackets and high-pressure adapters are available for special requirements.

- Flanges for pipelines with sapphire glass make it possible to remove the measuring head without interrupting the process.
- Brackets for the distance measuring head for installation above conveyor belts or collection containers in various positions.



Spectrometers



Precision spectrometers designed to cover your required spectral ranges: reliable in-process and laboratory measurements



PAS spectrometers offer an optimal solution for NIR process analytics. Based on diode array technology combined with transmission grating design, PAS spectrometers are used for fast and reliable data acquisition. The use of fiber coupled probes enables flexible integration in various measurement scenarios.

Features:

- Standardized spectral ranges
- Innovative transmission grating design
- High measurement rate
- High sensitivity and long term stability
- Uniform optical resolution at the theoretical limit
- Actively cooled diode array for optimum signal-to-noise ratio
- Extremely low scattered light levels
- SMA 905 fiber connectors
- Ethernet interface

Models & variants

Model	Spectral range	Detector	Resolution	Housing
PAS-172x	850 - 1650 nm	InGaAs 256 Pixel	< 7,0 nm	19 Zoll & 1/2 19 Zoll
PAS-175x	850 - 1650 nm	InGaAs 512 Pixel	< 4,0 nm	19 Zoll & 1/2 19 Zoll
PAS-212x	1100 - 2100 nm	InGaAs 256 Pixel	< 8,0 nm	19 Zoll & 1/2 19 Zoll

Housing and power supply

The PAS systems are available with an internal voltage input (+12 VDC and +24 VDC) for industrial cabinets. An external power supply with an input voltage range between 100 V and 240 V is available and thus offers ideal conditions for mobile applications.

PSS-M Polychromators

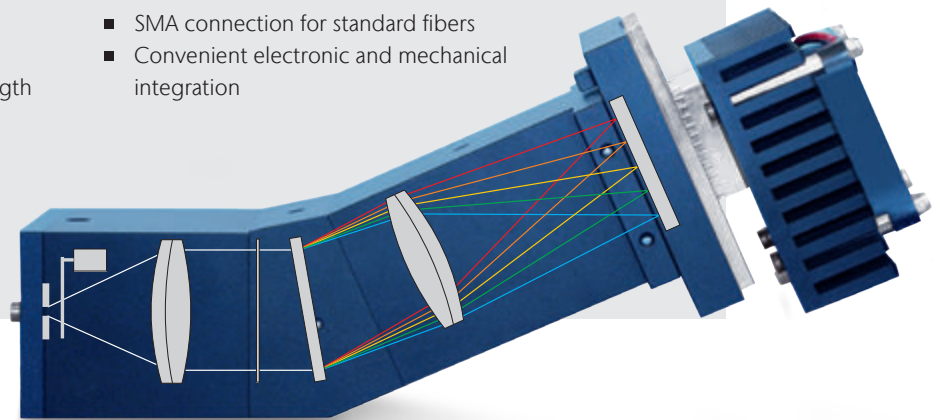
The core component of our NIR spectrometer systems is the PSS-M Polychromator, developed and manufactured in-house. It is a perfect match for many OEM requirements and comes with outstanding engineering support.

Features:

- Transmission design setup for maximum sensitivity and extremely low scattered light
- Integrated shutter for dark signal measurement
- Uniform optical resolution at the theoretical limit
- Pre-aligned and supplied with wavelength calibration data ($\Delta \lambda < 0.5 \text{ nm}$)
- Prepared for use with various sensor electronics

Benefits:

- High sensitivity for short integration times and high spectra rates
- Tightly specified wavelength ranges
- Ideal for calibration transfer
- SMA connection for standard fibers
- Convenient electronic and mechanical integration



The core component of our NIR spectrometer system is the PSS polychromator. This assembly combines advanced diode array and 3D transmission grating technology. The advantage of this technology is an optimized light throughput resulting from the higher regularity of VPH gratings (Volume Phase Holographic Gratings). The grating structure is additionally provided with an anti-reflective coating which increases the efficiency and thus enables a higher temporal resolution. The PSS polychromator is thus less sensitive to temperature fluctuations and vibrations.

Software

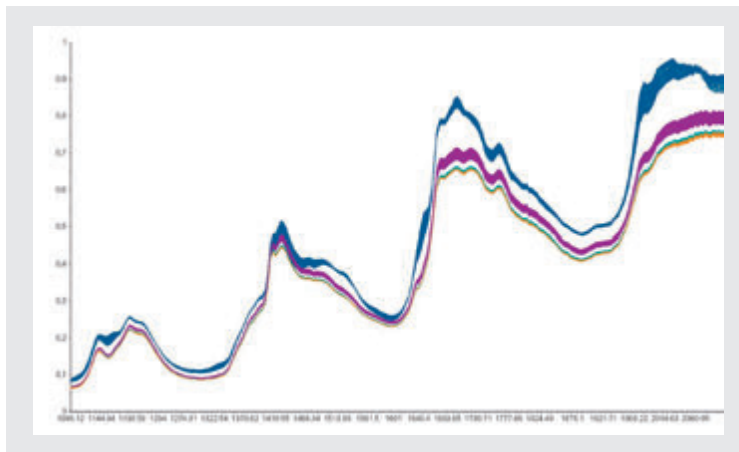


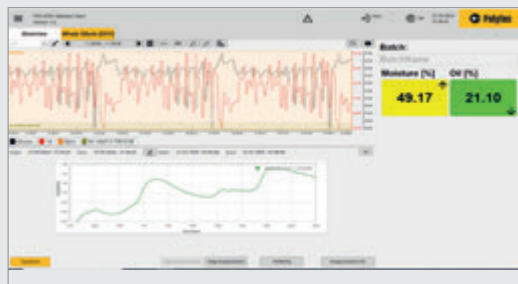
Depending on your needs, we have dedicated software solutions for laboratory data acquisition, multivariate data analysis and process control.

Laboratory and industrial applications differ depending on the measurement and output tasks required. For data acquisition in the laboratory, our software packages offer extensive measurement for fast and efficient data acquisition.



For industrial inline applications we offer configurable solutions covering the specific measurement setup all the way up to communication with the process control system. Our software portfolio is completed by a range of compatible packages from well established multivariate data analysis providers.





PAS GUI

The process software with graphical interface enables the display and evaluation of analysis results in real time.

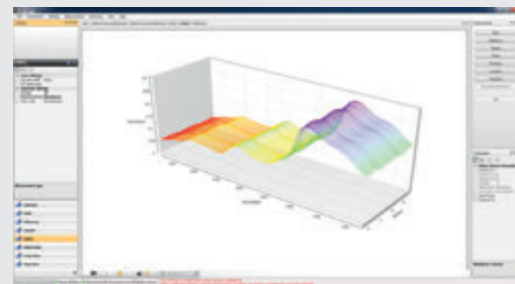
- Simultaneous analysis of multiple measuring points in the process.
- Real-time display of measurement results with trend chart.
- Display of analysis results with automatic warning when limit values are exceeded.
- Online BIAS and slope/offset correction.
- Various trigger modes and server functionality.
- Creation of dedicated user groups
- user groups with different access levels
- Access to all previous measurement and reference.
- reference results as well as data



PAS SERVER

The PAS SERVER software package is used for routine online analysis in process environments.

- Fully automated system operation
- Various user interfaces (clients or via PLC)
- Sophisticated data pretreatment
- Online chemometric predictions
- Warning and alarm thresholds
- Supports numerous analog and digital PLC interfaces



PAS LABS

Laboratory software PAS LABS is designed for spectroscopic purposes. It offers automated system operations and easy data acquisition.

- Enhanced system operation with preconfigured measurement routines
- Easy data storage for subsequent chemometric method development
- Determination of thin film layer thickness

Multivariate data analysis for laboratory and process spectroscopy

PAS-Systems are fully compatible with standard chemometric software packages for convenient multivariate data analysis of spectroscopic measurements. These packages can be successfully used for chemometric method development as well as for online predictions in process analytics.

The Polytec spectrometer software is compatible with the following chemometric software packages of external partners:

- SensoLogic (Calibration Wizard)
- Matlab
- Python
- CRAN R-Project



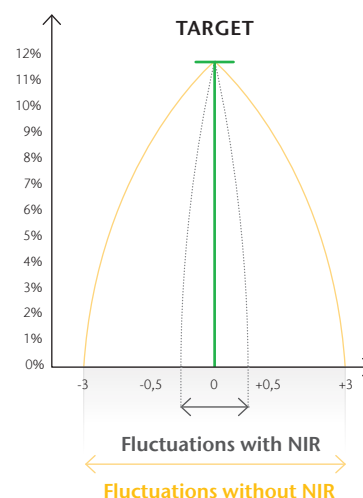
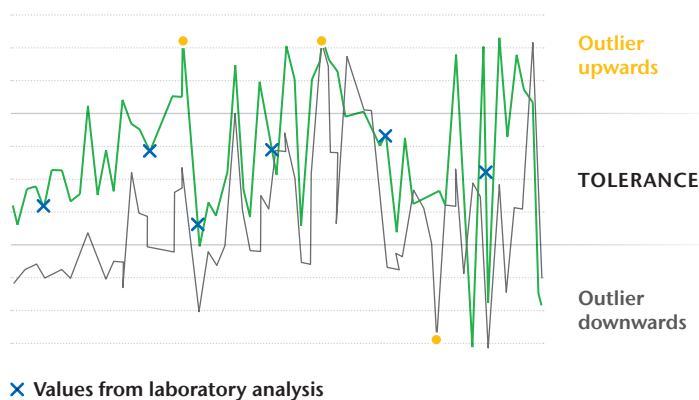


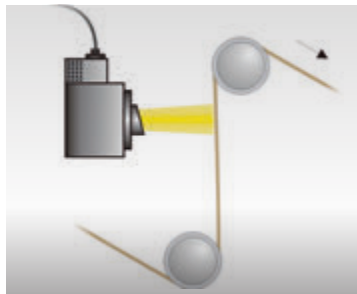
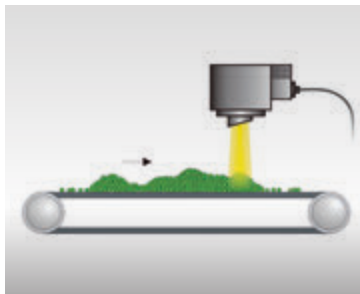
Advantages of near-infrared process technology

Reduce production-related product fluctuations and intervene directly in the processes to make any necessary adjustments promptly. Inline measurement technology helps to monitor standardized products more efficiently, adhere to product specifications more precisely and increase yields and profits.

- Minimize product fluctuations
- Avoid production errors
- Reduce rejects & waste
- Optimize use of raw materials & energy

Reduce production-related fluctuations and get closer to the desired product specification.





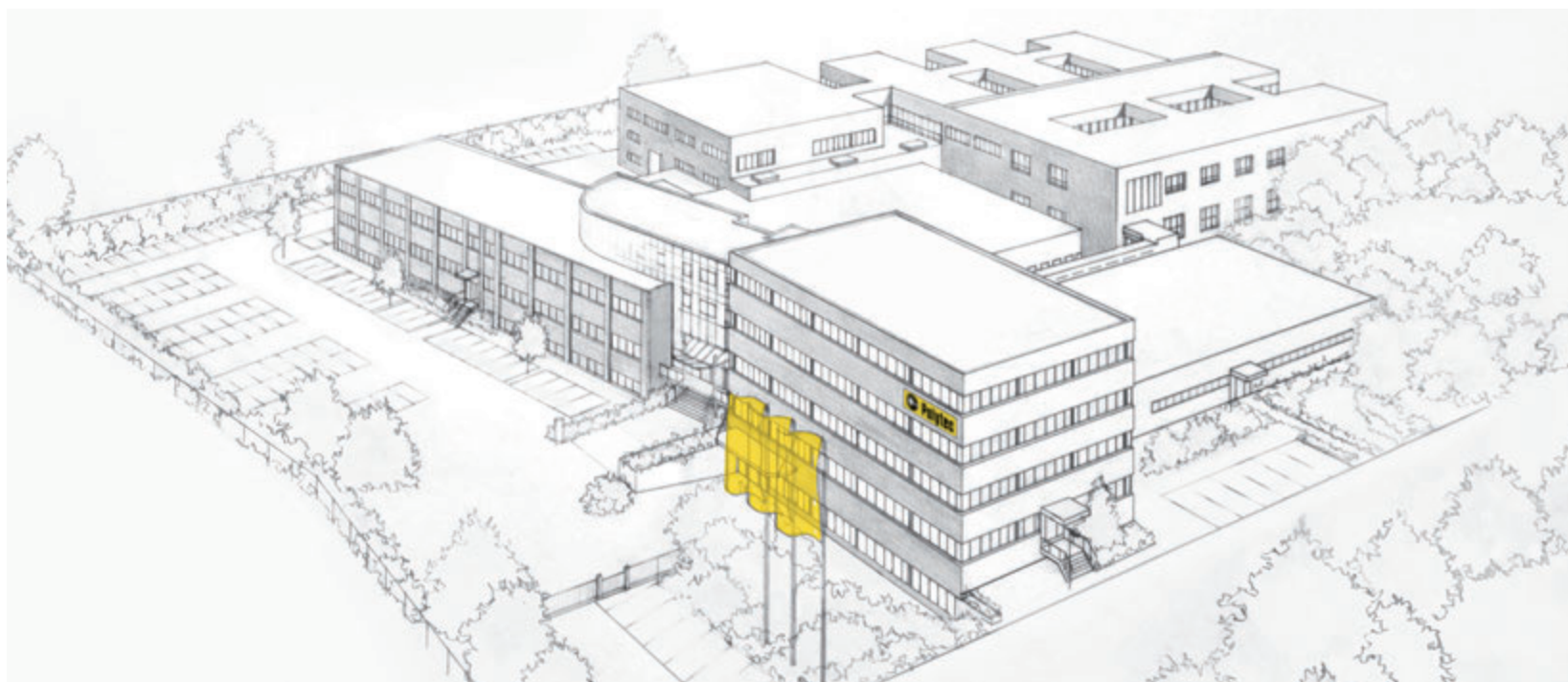
Non-contact probes

Non-contact inline control of paper and textile webs or solid materials such as bulk goods on conveyor belts or chutes.



Contact probes

Contact measurements of powders and solutions such as liquids, dispersions and pasty media. 



Shaping the future since 1967

High tech for research and industry.
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