

50 YEARS

SPECTORD®

analytikjena

My SPECTORD®!

Time for new demands!



My SPECORD®! Time for new demands!



Valuable and unique.

My SPECORD®!

Sets the highest standards!



SPECORD® tradition!

Among the more than 150,000 photometers from Jena installed worldwide, the SPECORD® is a classic. By now it is approaching its 50th anniversary and is more and more becoming a class of its own. The latest SPECORD® spectrophotometer generation, the double-beam photometer SPECORD® PLUS, once again sets a new course to the future!

The SPECORD® PLUS offers the right solution for numerous applications. Routine analysis or special application in chemistry, pharmacy, medicine, food control, environment, life science and many other areas – with your SPECORD® PLUS you are well prepared for all future requirements.

The SPECORD® PLUS appeals to the user because of:

- **PRECISION**

The SPECORD® PLUS offers highest precision and total reliability of measurement results.

- **FLEXIBILITY**

An extensive range of accessories guarantees flexibility and efficiency for all routine- or special applications.

- **USER-FRIENDLINESS**

The generously sized sample chamber and easily accessible durable radiation sources are a novelty in respect of functionality and instrument design.

- **INTELLIGENCE**

The modular software package WinASPECT® PLUS is the basis for the intelligent control of the SPECORD® PLUS generation and allows intuitive and precise operation.

- **DURABILITY**

Analytik Jena is the only manufacturer worldwide that offers a long-term warranty of 10 years for the optical components of the device.

- **DESIGN**

The intelligent design of the SPECORD® PLUS impresses with ergonomics and a particularly beautiful shape. With it, visual variety and a fresh breeze will enter your daily laboratory routine. But, above all it offers fast operational readiness, high effectiveness and easy handling.

My SPECORD®!

Assures highest quality!

High-end optics

At the heart of all of our instruments, the optical components are quartz coated and equipped with high-quality encapsulation. They guarantee highest quality, maximum performance and extreme durability.

The 10-years long-term warranty for the optical components emphasizes this promise.

SPECORD® PLUS simply convincing!

- Monochromator with imaging holographic grating for stray light reduction
- Minimized number of movable components for best reliability, notably improved signal-to-noise ratio and best energy throughput
- Aspheric optics for optimized, highly precise imaging conditions
- Innovative CDD technology – two temperature controlled detectors for outstanding long-term stability
- Pre-adjusted and voltage stabilized radiation sources
- Double-beam mode for highest precision
- Internal holmium oxide filter for automatic wavelength calibration and for optimized wavelength accuracy and reproducibility
- Variable spectral resolution includes the smallest details of the spectrum
- Second cell position directly in front of the detector area for measuring turbid samples
- Maximum lamp lifetime





Precise and durable.

Autosampler for particularly high sample throughput

Adjustable cell holder with ultra-micro cell for precise quantitative analysis of extremely small sample volumes

My SPECORD®! Time for new demands!



High sample throughput with the 15-cell changer or individual analysis with the single cell holder, the SPECORD® PLUS offers the ideal equipment for all requirements.



Functional and elegant.

My SPECORD®!

Maximum user-friendliness guaranteed!

Intuitive user-oriented

SPECORD® PLUS has been developed for user-friendly operation:

- Easy to use
- No warm-up phase, plug and play
- Self Check System (SCS)
- Large, easily accessible sample compartment
- Easy use of different cell variants
- Automatic accessory recognition
- Easy lamp replacement
- Intuitive software navigation
- Comprehensive method collection
- Modular software concept
- Multilingual software

The generously sized sample compartment is ideal for the quick, easily repeatable addition of reagents and the fast replacement of samples and accessories.

The light sources are pre-aligned, readily accessible and easily interchangeable. The integrated device check indicates when a lamp replacement is necessary. A switch between the deuterium and halogen lamp can easily be preprogrammed by the user. With striking simplicity, both lamps can be switched on or off via the software menu.

WinASPECT® PLUS software

The use of the WinASPECT® PLUS software serves for complete control, monitoring, and documentation of all operations from spectrometer to accessories.

The intuitive software navigation and the intelligent operating system allow for easy operation:

- Self Check System: The SPECORD® PLUS regularly and fully automatically checks all parameters that are important for instrument safety and the quality of the analyses and in doing so secures the trouble-free operation of the analysis system.
- Optimized analysis: The software indicates necessary adjustments for planned measurements.
- Automatic accessory recognition: The software recognizes inserted accessories and indicates necessary accessories.
- Method selection: The system includes a large selection of preprogrammed methods. Simply make a selection and start.
- Multilingual Software: The user can select between different languages, including German, English, French, Russian, Chinese, Spanish and Japanese.
- Spectra presentation and handling: individual color selection, easy shifting, copying and overlay of spectra.
- Compatibility: Data is exchangeable with many other commonly used programs.

WinASPECT® PLUS guarantees the GLP-suitable operation up to the complete conformity with FDA 21 CFR Part 11.

My SPECORD®!

Secures perfect measurement results!

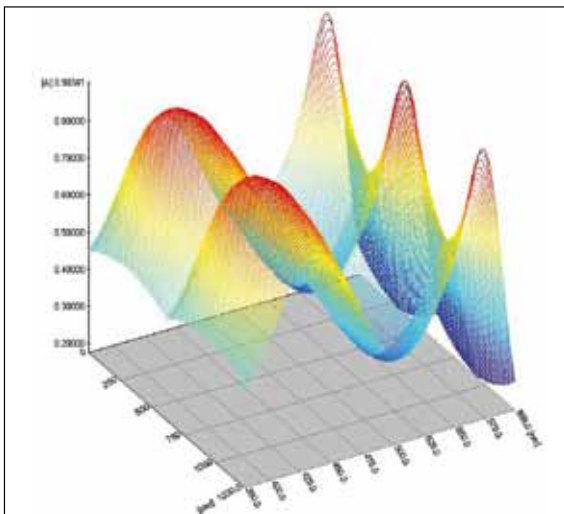
Analysis made easy

The SPECORD® PLUS is equipped with comprehensive basic software and numerous specific tools for individual applications.

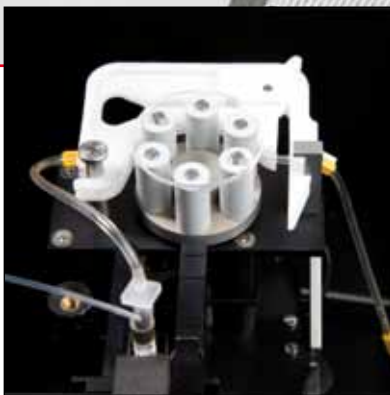
- Data handling such as addition, subtraction, peak search, smoothing, derivative, interactive wavelength selection, integration and normalization
- Quantitative analysis with statistical functions
- Formula editor for creating individual formulas
- Macro programming for individual method development for automated measurement-, evaluation- and documentation processes
- Life Science program package for the quantification of nucleic acids and proteins with numerous preprogrammed bio methods like DNA purity determination, Warburg Christian-, Scopes-, Kalb- and Bernlohr-Formula
- Kinetics tool for evaluating time-controlled reactions
- Tool for measuring the layer thickness of transparent coatings and foils
- Tool for color determination, like calculating the color coordinates using the different standard illuminant art, white/yellow index and color numbers



- Diverse preprogrammed methods for determining enzymatic content in food and for medical purposes
- Special brewery analysis tool for determining the parameters like color, bitter substances, iodine, ethanol, sulfite
- Water analysis with preprogrammed methods
- Validation software for quality assurance of the analysis which is strictly based on the regulations
- Device check to determine the overall technical condition



Example of a 3D Diagram in a kinetic analysis – Absorbance - wavelength spectra over time



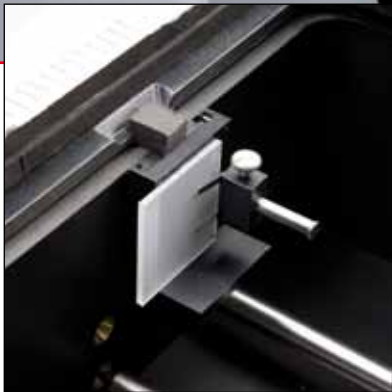
Sipper system for routine quantitative analysis

Double 8-cell changer for a speedy and an efficient working process



Reliable and versatile.

My SPECORD®! Time for new demands!



Solid sample holder to determine transmission characteristics



Reflectance attachment with variable angle for determining the refraction index and the film thickness



Peltier temperature controlled 8-cell changer performing measurements with high temperature accuracy

Flexible and comprehensive.

My SPECORD®!

Enhanced individual flexibility!

Individual all-rounder

Routine or special analysis – the SPECORD® PLUS guarantees flexible operation in all areas of application. Thanks to its extensive range of accessories and the modular software concept the device provides a unique individuality.

SPECORD® PLUS

- SPECORD® 50 PLUS ideal for qualitative and quantitative routine photometric applications
- SPECORD® 200 PLUS with fixed spectral bandwidth – ideal for the measurement of sample- and reference signal at exactly the same moment
- SPECORD® 210 PLUS with 5 variable spectral bandwidths – ideal for measuring solutions and solids with highest demands concerning the optical resolution
- SPECORD® 250 PLUS with 5 variable spectral bandwidths and double monochromator for samples with particularly high absorptions and higher stray light quotient

Perfect equipment

UV/Vis spectroscopy in particular requires a wide range of accessories aside from a solid basic instrument. Cell holder, cell changer, flow cell systems, reflectance accessories or fiber coupling – the SPECORD® range of accessories allows a broad area of application, the automation of analysis processes and performing special applications.

SPECORD® PLUS is the ideal equipment for quantitative photometry as well as different applications in research and development, production, quality control and several other areas. Here is a small selection of areas of application for the SPECORD® PLUS with its different accessories.

■ CHEMICAL INDUSTRY

The SPECORD® PLUS can be used in the chemical industry e.g. in the area of material analysis and purity control. Transmission characteristics of different materials such as glasses and foils can be examined with the holder for solid samples. The determination of the refractive index and the film thickness of these materials can be carried out using the variable angle reflectance attachment. The integrating sphere is suitable for the measurement of transmittance and diffuse reflectance of scattering solid or liquid samples as well as powdery samples. With the help of color software the determination of different color coordinates in textiles or the white/yellow index of e.g. the surface of teeth can be examined.

The autosampler with up to 116 sample positions allows an effective routine analysis with a high sample throughput.

■ FOOD AND AGRICULTURE

Reactions with time dependent concentration changes such as enzyme kinetics, e.g. citric acid, glucose and saccharose in foods can be carried out with the peltier temperature controlled 8-cell changer. Quantitative analysis of numerous elements and compounds found in foods such as calcium, phosphate and nitrate can be carried out quickly and easily using ready-to-use test kits.

My SPECORD®!

Equipped with numerous accessories!

■ **MEDICINE AND LIFE SCIENCE**

With the adjustable cell holder and the ultra-micro cell, the precise determination of concentrations can also be carried out with small sample volumes, like during DNA purity determination. By means of the peltier temperature controlled cell holder, the DNA melting point determination can be performed with a very high temperature accuracy.

The peltier temperature controlled accessories allow analysis in a temperature range of -5 to 105 °C and with an accuracy of ± 0.1 °C. This feature enables applications that demand high temperature accuracies like precise protein analyses and examination of photochemical reactions.

■ **WATER AND WASTE WATER ANALYSIS**

Quantitative analysis of numerous elements such as iron, copper and zinc can be automated using the Sipper system.

With the help of a measuring probe, less degradable organic compounds can be analyzed directly in the sample. The chemical oxygen demand (COD), ammonium, cyanide or elements such as lead, cadmium, nickel and aluminum in water samples can be detected quickly and easily using ready-to-use test kits and the round cell holder. The position for turbid samples at the SPECORD® PLUS allows reliable measurements of highly scattering samples such as turbid waste water.



The peltier temperature controlled cell holder guarantees high temperature accuracies; the temperature is measured directly in the cell.



8-cell changer



The SPECORD® PLUS Dissolution can be used to examine the release of active ingredients in tablets during the dissolution process.



The SPECORD® PLUS Dissolution is fully integrated into the system software of the dissolution providers.

■ **PHARMACY**

The SPECORD® PLUS can for example be used for purity control of raw materials or active ingredient screening. With the SPECORD® PLUS Dissolution, online UV/Vis measurements of automatic test series are possible. The variable equipment with the double 8-cell changer allows several flow-through cells to be integrated in the process.

For more information on the wide range of SPECORD® PLUS accessories see our accessory brochure or visit our webpage: www.analytik-jena.com



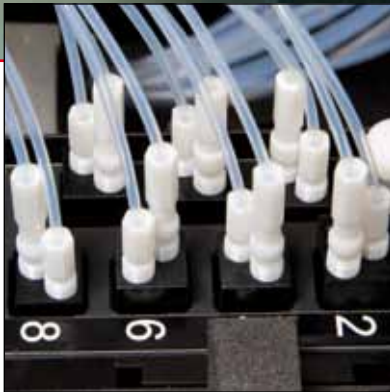
Ready-to-use test kits for water analysis



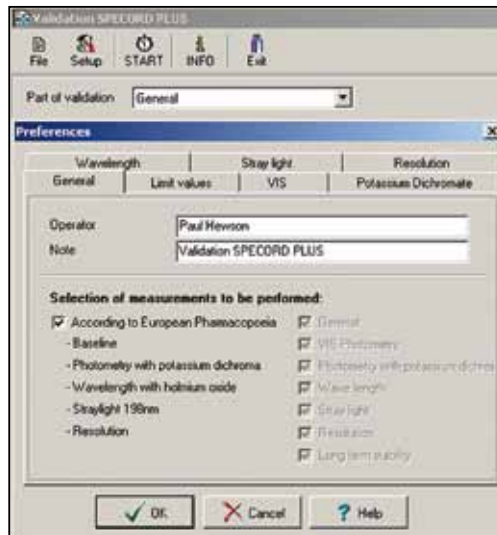
Position for turbid samples for measuring highly scattering samples



Integrating sphere for transmittance and diffuse reflectance measurements



Convincing and distinct.



My SPECORD®!

Compliance with relevant standards guaranteed!



In respect for today's statutory and in-house requirements, comprehensive quality assurance is a primary consideration implemented in the WinASPECT® PLUS software. According to GLP, all analytical data must be accessible and their accuracy ascertained and documented.

Compliance with these requirements can be assured through a variety of measures for the fully automatic monitoring of the precision and accuracy of measurements.

FDA 21 CFR Part 11

Conformity to FDA 21 CFR Part 11 is often a must for modern analysis software. The functions integrated in WinASPECT® PLUS ensure data security as well as the reliability, lucidity and traceability of all actions throughout the measuring time. All processes are presented in easily comprehensible terms and with a clear layout. Comprehensive user management, an electronic signature facility and the Audit Trail satisfy the requirements of FDA 21 CFR Part 11. Every audit will supply convincing proof that with these functions, WinASPECT® PLUS has the ideal tools you need for efficient work in everyday lab routine and yet conforms to FDA 21 CFR Part 11.

Validation of device parameters

To determine all important device parameters of your SPECORD® PLUS in compliance with internal or external quality standards, such as Ph.Eur., USP, TGA and ASTM and to ensure correct and accurate results, the WinASPECT® PLUS UV/Vis software offers a special Validation module.

Installation and Operation Qualification

Installation Qualification (IQ) means that the main instrument and its peripherals have been properly installed. A certificate of Installation Qualification is provided. Operation Qualification (OQ) means that the spectrophotometer has been certified to satisfy the performance specifications guaranteed by Analytik Jena. Validation tests are conducted with certified photometric standards, to ensure that measurement results conform to the highest standards of reliability, accuracy and precision.

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Subject to changes in design and scope of delivery as well as further technical development!