## Analytik Jena Product Overview Chemical Analysis





## Superior Technology from Jena, Germany

Analytik Jena develops and manufactures high-end analytical instrumentation, accessories, and software solutions that meet all the requirements of chemical analysis.



#### Sample Preparation & Digestion

- Homogenization SpeedMill PLUS
- Microwave digestion TOPwave



- AOX sample preparation APU family and AFU
- HPLC for LC-ICP-MS PQ LC





#### Elemental Analysis

- AAS novAA and ZEEnit series
- AAS contrAA series
- Accessories for AAS
- Mercury analysis mercur DUO plus
- ICP-OES PlasmaQuant 9100 series
- ICP-MS PlasmaQuant MS series



- C, N, S, Cl elemental analysis multi EA 5100
- S, N elemental analysis compEAct series
- C, S, Cl elemental analysis multi EA 4000





#### Sum Parameter Analysis

- TOC/TN<sub>b</sub> multi N/C series and multi N/C pharma series
- AOX/TOX/EOX multi X 2500





#### Molecular Spectroscopy

- UV/Vis SPECORD S 600
- UV/Vis SPECORD PLUS series





## **Innovative Analytical Solutions**

Analytik Jena stands for high-quality analytical instrumentation tailored to the needs of our customers. At our R&D and production sites throughout Germany, we develop and manufacture innovative technologies proven by their unique analytical performance.

#### Tradition with innovative power

Analytik Jena takes pride in a long history and tradition of developing high-end analytical instrumentation, which dates back to the inventions made by Ernst Abbe and Carl Zeiss in Jena over 150 years ago.

Within the last 25 years, Analytik Jena has become one of the most innovative manufacturers of analytical measuring technology serving the demands of routine laboratories as well as of sophisticated niche applications worldwide.

#### Industries and fields of application:

- Food & Agriculture
- Environment
- Chemicals & Materials
- Geology, Mining & Metals
- Oil & Gas
- Pharma & Life Science
- Power & Energy

## **Sample Preparation and Digestion**

Analytik Jena offers versatile systems for the preparation of samples in a wide range of applications – from homogenization and microwave digestion to species separation by HPLC for LC-ICP-MS.

## **Sample Preparation**

Efficient and economic solutions



## Homogenization SpeedMill PLUS

## Microwave Digestion speedwave XPERT





SpeedMill PLUS is a system for highly efficient homogenization of a wide range of starting materials. Up to 20 samples can be completely and reproducibly homogenized in parallel. Efficient sample cooling enables preparation without cost-intensive and complex consumables such as liquid nitrogen or dry ice.

#### SpeedMill PLUS at a glance:

- Touch control panel and large display for operating convenience
- Pre-programed protocols or user-defined programing with freely selectable parameters
- Can easily be operated continuously
- Homogenizing with comparably low-noise
- No tools required to operate the instrument

Microwave-assisted pressure digestion is used as a sample preparation technique for reliable elemental analysis in routine and research laboratories alike. speedwave XPERT is a universally applicable microwave digestion system for the preparation of organic and inorganic sample materials that impresses with its reliability, safety, and economy. Realtime temperature and pressure monitoring takes place contactless for all vessels, which can be removed individually after digestion. The vessels of speedwave XPERT have an outstanding lifetime of up to 10,000 digestion cycles. Low material wear and protection of the vessels against damage by optical pressure and temperature control also ensure that you can significantly reduce your running costs in sample preparation.

#### speedwave XPERT at a glance:

- Reliable digestions
- Low running costs and low material wear
- Maximum operational safety







Digestion vessels, easy to use without tools

## **AOX Sample Prep** APU Family / AFU



APU 28 series and APU sim are universally applicable systems, ideal for both AOX sample preparation and enrichment of samples to determine the environmental parameter AOF. Sample and rinsing volumes are individually selectable.

#### APU at a glance:

- Automatic preparation of up to 28 samples according to column method (DIN EN ISO 9562)
- Suitable for unattended 24/7 operation
- Very robust, ideal for particle-containing and saline samples
- Compatible with columns from all manufacturers

**AFU 3** is a versatile system for semiautomated sample preparation of up to three samples by batch method. The filtration takes place directly into the frit container. The system is extendable for sample preparation according to column method.

APU 28 – sequential sample preparation
APU 28 S – simultaneous preparation of two samples
APU 28 SPE – AOX and SPE-AOX sample preparation
APU sim – simultaneous enrichment of up to six
samples or semiautomated preparation of SPE-AOX
samples

AFU 3 – sample preparation of up to three samples by batch method

## **Liquid Chromatography** PQ I C



PQ LC is a series of modular chromatography systems for LC-ICP-MS in combination with the PlasmaQuant MS, ideally suited for the determination of element species. PQ LC is available as a compact routine LC system for limited lab space or as a fully equipped LC model. An ion chromatography option completes the portfolio.

A LC-ICP-MS interface kit enables a fast connection with the ICP. Control of the systems as well as data acquisition and processing are carried out by the Chromatography Data Station (CDS).

#### PQ LC at a glance:

- Variable modular design for easy upgrade
- Easy handling with up to four solvents for uncompromised method flexibility
- Interactive setup for seamless communication

**PQ LC compact** – the routine HPLC system, metal free in PEEK

**PQ LC** – available in stainless steel and PEEK with various upgrades

**PQ IC** – the uncompromised ion chromatography solution

# Elemental Analysis – Innovative Technologies for Flexibility and Efficiency in Various Applications

Analytik Jena's broad technology portfolio offers instrument solutions for all application requirements in elemental analysis. Performance-enhancing accessories and auto samplers round off the range.

## **Elemental Analysis**

Modern technologies



## **Atomic Absorption Spectrometers (AAS)**

## novAA | ZEEnit





#### Reliable partner for routine element analysis

The AAS series novAA and ZEEnit combine high performance, versatility, automation, reliability, and robustness for various applications in elemental analysis.

#### novAA and ZEEnit at a glance:

- 8 lamp changer for maximum automation and sample throughput
- Fully automatic gas box and automatic burner height adjustment
- Single and double beam optics
- Integrated high-end vision tool for monitoring processes in the graphite furnace
- Fully automated optimization routines
- Analysis of liquid and solid samples
- D2 background correction

The **novAA series** offers efficient, cost-effective systems for AAS routine applications in various industries.

novAA 800 F – AAS for flame and hydride technology novAA 800 G – AAS for graphite furnace technology novAA 800 D – AAS for flame, hydride, and graphite furnace technology The **ZEEnit P** series is designed for routine trace analysis in demanding matrices. The systems combine an outstanding graphite furnace concept with the most powerful and latest generation of Zeeman effect background correction with variable magnetic field strength.

#### Special features:

- Zeeman and D2 background correction
- 2Field Mode maximum sensitivity
- 3Field Mode expansion of the linear working range
- Dynamic Mode automatic adaptation to varying element concentrations without dilution
- Direct analysis of solid samples

**ZEEnit 650 P** – high-performance graphite furnace AAS

**ZEEnit 700 P** – high-performance AAS for flame, hydride, and graphite technique

## **High-Resolution Continuum Source AAS**

### contrAA









#### contrAA - AAS redefined

contrAA closes the gap between AAS and ICP-OES and offers the optimal solution for users who need a high degree of flexibility with regard to element selection and application range as well as powerful detection limits and higher sample throughput.

#### contrAA at a glance:

- Multi-element one light source for fast sequential and simultaneous multi-element analysis
- High-resolution optics interference-free analysis and highest precision by means of detailed 3D spectrum display
- Significantly better detection limits and higher throughput in flame operation
- Direct solids technology

#### Simple method development

With only one light source, the xenon lamp, the contrAA 800 measures all elements and over the entire wavelength range of 185 nm to 900 nm.

The user can freely select the optimal line for the respective analysis task and determine the elements in optimized sequences with fast line-switching and simultaneous background correction.

#### Interference-free analysis

**contrAA 800 F** – HR-CS AAS for flame and hydride technology

contrAA 800 G – HR-CS AAS for graphite furnace technology, including solid AA and hydride technology contrAA 800 D – the most versatile system for HR-CS AAS offering flame, hydride and graphite furnace technology, including solid AA

The high-resolution 3D spectrum display opens up unprecedented possibilities for parameter optimization. Users can easily identify interferences and precisely correct them using innovative software routines.

#### Increased productivity

The HR-CS technology allows the number of samples to be increased by up to 40% in flame mode. Powerful detection limits in flame and graphite tube mode improve the detection capability.

#### **Expanded application range**

Evaluation of atom lines and molecular bands allows the analysis of additional elements like non-metals.

Sample Preparation | Elemental Analysis | Sum Parameter Analysis | Sum Parameter Analysis | Molecular Spectroscopy

### **Modules for AAS**

## Mercury / Hydride Systems | solid AA





#### Multiple solutions for special challenges

Modular systems for the determination of hydrideforming elements and mercury in flow injection and batch mode guarantee convenient handling, precision, and efficiency during analysis. The standard hydride formation and atomization method happens in the electrically heated quartz cell. For high-performance trace analysis, electrothermal atomization can also be performed in a graphite furnace.

- Flow injection mode: fully automated mode with optimized gas / liquid separator and membrane drying system ensures high sample throughput
- Batch mode: specially designed reactors for large sample volumes, for foaming samples, and low element concentrations
- Enrichment mode: integrated gold collector unit for the enrichment of mercury

#### solid AA - direct solid AAS

Solid and paste like samples, e.g., powders, creams, or viscous oils, can be analyzed in the graphite furnace. In direct solids analysis, the decomposition of the sample matrix by means of an acid digestion is replaced by the temperature program of the graphite furnace.

#### solid AA at a glance:

- Simple and direct analysis of the original samples
- Highly sensitive trace analysis of sample quantities in the microgram range
- Selection of the degree of automation from manual to fully automatic handling of up to 84 samples
- Integrated liquid dosing module for calibration and addition of reagents

Analytik Jena's contrAA and ZEEnit graphite furnace systems can be upgraded with our solid AA technology.

HS50 – simple batch mode, flame heated cell HS55 – batch mode, electrically heated cell

**HS60** – fully automated system with flow injection and electrically heated cell

SSA 6z – manual solid sampler SSA 600 – fully automated solid sampler with integrated microbalance and liquid dosing module

## Accessories

### **AAS**





Top: Scraper

per Bottom: SFS 6.0

The **Segmented Flow Star SFS 6.0** is a switching valve for flow injection operation. It continuously rinses the sample introduction system and the burner head and enables the segmented introduction of small sample volumes. It also reduces carry-over effects with high salt and matrix contents as well as the risk of clogging of the burner head.

The **Scraper**, an automatic, software-controlled cleaning device for the nitrous oxide flame, guarantees continuous and reproducible operation over a long period of time.

The AS-F, AS-FD, and AS-GF autosamplers offer unique flexibility and efficiency in routine analysis. Functions such as intelligent dilution and pre-concentration, automated dosing of modifiers, and automatic depth adjustment, combined with high dosing accuracy, make unattended operation (even overnight) routine and guarantee high sample throughputs.

## Mercury Analyzer mercur DUO plus



#### Mercury analysis with best analytical certainty

The mercur DUO plus is a powerful mercury analyzer that meets all requirements and directives for mercury analysis (EPA, EN, ISO) based on atomic absorption (AAS) and atomic fluorescence (AFS). An integrated enrichment module with two gold collectors extends the range of applications. Depending on the type of sample and configuration, detection limits from the low ng/L (ppt) to the pg/L (ppq) range can be achieved with high method robustness.

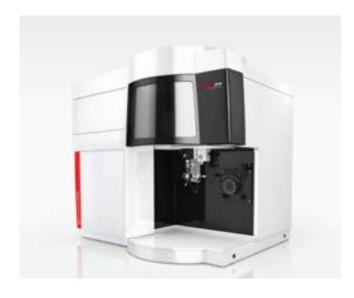
#### mercur DUO plus at a glance:

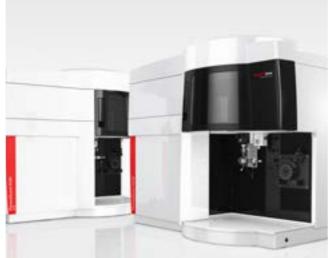
- Highly automated and fast continuous flow injection with or without autosampler and unique FBR routine
- Safe bubble sensor, specially optimized drying membrane and cascade enrichment
- Efficient intelligent gas-liquid control; minimum reagent consumption and short measurement times
- Reliable Self Check System (SCS)

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## **High-Resolution Array ICP-OES**

### PlasmaQuant 9100 / 9100 Elite





#### Impressive analytical performance

Innovative components of the PlasmaQuant 9100 series set a new standard in analytical performance:

#### **High-Resolution Optics\***

- Double-monochromator Echelle Optic for interferencefree analytics
- HR-CCD detection with exceptional wavelength accuracy

#### V Shuttle Torch

- Vertical plasma torch with shuttle design for carefree operation
- Plug-and-play installation with precision auto-alignment

#### **Dual View PLUS**

- 2+2 plasma views for extended working range
- Argon-neutral counter-gas technology for unique sensitivity

#### **High-Frequency Generator**

- Unrivaled plasma performance for direct analysis of extreme matrices
- Short warm-up for high method flexibility and low running cost

With a clear emphasis on wide applicability, simplicity, and cost-effectiveness the **PlasmaQuant 9100** ensures excellent plasma performance, detection limits, and accuracy in general applications. Fulfilling the demands of agricultural, food and environmental analysis it is a convincing all-rounder providing enhanced productivity and operator ease of use.

The unique resolving power, unmatched sensitivity and exceptional matrix tolerance of the **PlasmaQuant 9100 Elite** consistently offer the lowest detection limits and incredible ease of use in demanding applications. Considering the superior precision, it is the first choice for advanced material analysis, research and quality control labs facing complex matrices including refractory, ferrous, and high-purity metals, rare earths, and petrochemicals.

**PlasmaQuant 9100** – cost-effective analysis without compromises

PlasmaQuant 9100 Elite – the number one ICP-OES in spectral resolution and sensitivity

## **High-Performance ICP-MS**

### PlasmaQuant MS / PlasmaQuant MS Elite Series









#### Powerful, patented technology

The PlasmaQuant MS is the world's best performing quadrupole ICP-MS. With their unsurpassed sensitivity of over 1.5 million counts/second/ppb and halved argon consumption the instruments of the PlasmaQuant MS series guarantee efficiency and precision in high-throughput analysis and demanding research with unsurpassed low operating costs.

The high sensitivity guarantees lowest detection limits even when diluting high matrix samples and enables high sample throughput without compromising precision. The combination of an efficient HF generator and an intelligent torch design reduces argon consumption by up to 50% while maintaining excellent plasma robustness.

#### PlasmaQuant MS at a glance:

- Eco Plasma robust plasma performance with only half the argon gas
- iCRC integrated collision reaction cell, for interferencefree analysis plus BOOST technology
- ReflexION reflecting 3D focusing ion mirror for maximum sensitivity
- HD quadrupol 3MHz quadrupole for superior mass separation
- AD detection all-digital detection system with 11 orders of analytical range (0.1-10<sup>10</sup> cps)

The PlasmaQuant MS series offers four models optimized for individual application requirements. Together with a range of upgrade options and accessories – such as aerosol dilution for easy handling of particle containing samples, Nitrox for direct analysis of organic solvents, or the HPLC systems of the PQ LC series for the separation of element species for speciation analysis – the systems can be optimally adapted to the respective field of application.

PlasmaQuant MS – the robust ICP-MS for sensitive characterization of high matrix samples
PlasmaQuant MS Q – the universal ICP-MS for high throughput and best detection limits in routine monitoring and quality control
PlasmaQuant MS Elite S – the specialist with

elite sensitivity and best signal-to-noise ratio for unparalleled ultra-trace performance

PlasmaQuant MS Elite – the flexible system with

ultimate sensitivity and targeted performance optimization for advanced research

<sup>\*</sup>only available with the PlasmaQuant 9100 Elite

Elemental Analysis Sum Parameter Analysis Molecular Spectroscopy

## C, N, S, X – in Any Kind of Sample

### multi EA 5100



multi EA 5100 with multi matrix sampler

#### C, N, S, Cl trace analysis in gaseous, solid, and liquid samples

The multi EA 5100 is a universal talent to be used in various fields of application for the determination of TC, TN, TS, TCI, and also TOC, EOX, EC/OC, and AOX/TOX. The globally unique double furnace technology offers fast and optimum adaption to any sample matrix and analysis standard with minimal effort. Its unique modular principle allows individual configurations and adaption of the multi EA 5100 to growing needs and requirements.



The multi matrix sampler for vertical and horizontal applications, liquid and solid samples reduces working time

#### multi EA 5100 at a glance:

- Multi-application: liquid, solid, and gaseous samples
- Multi-element: C, N, S, and Cl as well as TOC, EOX, AOX/ TOX, and EC/OC analysis
- Wide measuring range, from ppb to wt-%
- Preset standard methods, including a comprehensive library of approved methods for routine analysis and special
- Standard compliance, ASTM, EPA, DIN, ISO, EN, etc.
- Flame sensor technology for matrix-optimized sample decomposition
- Double furnace technology vertical and horizontal mode in a single instrument
- Multi-purpose combustion tube for all standard
- Multi matrix sampler, for fully automatic determination of solid, liquid, TOC, EOX, and AOX/TOX samples in vertical or horizontal operation
- Application-optimized sampling systems for safe and reliable analysis of pressurized and non-pressurized gases and LPG samples
- Self Check System (SCS) for maximum safety with minimum maintenance requirements

## N, S – Liquids / Gases C, S, Cl – Solids

## compEAct N / compEAct S and $S^{MPO}$



#### Efficient TS and TN determination in liquids, gases, and LPGs in a compact profile

The stand-alone devices of the compEAct series combine efficient, catalyst-free high-temperature combustion with highly sensitive HiPerSens detection and provide maximum sample throughput with minimal space requirement.

#### compEAct at a glance:

- Economical and efficient smallest footprint, short measurement times, and ideal for unattended operation
- User-friendly and functional integrated system control with intuitive touch operation and remote access options
- Safe and compliant automatic monitoring and optimization of all process parameters as well as conformity to ASTM, IP, EN, DIN, and UOP

**compEAct N** – elemental analyzer for total nitrogen (TN) determination

**compEAct S** – elemental analyzer for total sulfur (TS) determination

**compEAct S**<sup>MPO</sup> – elemental analyzer for interferencefree sulfur (TS) determination in fuels and other refinery samples

## multi EA 4000



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#### Simple and flexible C, S, Cl analysis in solids

multi EA 4000 – quality truly is the difference with its ease of use, analysis flexibility, and particularly excellent instrument stability and precision. It allows a unique combination of elements and parameters to be analyzed, TS, TC, TX, TOC, TIC, EC, and BOC. Therefore it is unchallenged in waste analysis! The modular design of the device allows expansion of the application options from one element to fully automated multi-parameter analysis.

#### multi EA 4000 at a glance:

- Incredibly easy to use and flexible
- Enhanced analysis with precision and reliability
- Minimal operating costs and low maintenance effort

#### Fully automated TOC determination

The TIC solids module "automatic" allows for an automatic determination of the total inorganic carbon (TIC) in solid samples. Thus, also enabling an automated determination of the total organic carbon (TOC) using the difference or direct method. Additional sample pre-treatment like manual acidification is not necessary.

## Sum Parameter Analysis – Clever Solutions for Water and Environmental Analysis, and Applications in the Pharmaceutical Industry

Whether in the analysis of drinking and wastewater, pharmaceutically used water or cleaning validation, surface water or solid analysis, e.g., TOC in soils or waste – optimized solutions from Analytik Jena make sum parameter analysis simple and efficient.

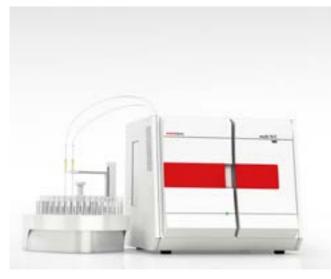
## **Sum Parameter Analysis**

Optimized solutions



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## TOC/TN<sub>b</sub> Analyzers multi N/C Series



multi N/C 3100

#### multi N/C - high-performance TOC analyzers

With the instruments of the multi N/C series, the parameters TOC, NPOC, POC, TC, TIC, and TN, can be measured easily, quickly and without conversion in aqueous samples. Separate solid modules, such as the HT 1300, allow the digestion of solid samples at up to 1,300 °C in a robust ceramic tube.

The available autosamplers with integrated sample homogenization, automatic acidification and purging provide a high degree of automation for diverse requirements in TOC analysis. Time-optimized processes, such as parallel analyzing and purging in NPOC mode, increase the sample throughput.

multi N/C 2100S - space-saving TOC/TN, analyzer for environmental analysis (direct injection) multi N/C 3100 – all-rounder for all TOC applications with high sample throughputs multi N/C UV HS – TOC system with wet-chemical UV oxidation, proven for complicated matrices and in the trace range



multi N/C UV HS

#### multi N/C at a glance:

- Wide measurement range without sample dilution: precise detection due to high-quality Focus Radiation NDIR Detector for TOC, chemiluminescence-detector (CLD) or solid state chemodetector (ChD) for TN.
- VITA Flow Management System: for stable device performance and highly reproducible analysis results
- Easy Cal: easy TOC multipoint calibration with just one standard for the best long-term stability
- Auto-Protection: effectively measured gas cleaning with integrated self-monitoring for the protection of high quality system components
- Reliable oxidation: high-temperature combustion (up to 950 °C) or high-power, long-life UV reactor
- Variable injection techniques: valve-free direct injection or flow injection
- Suitable for simultaneous TN<sub>b</sub> determination
- Double furnace technology ideal for water and solid samples without the need of an additional furnace
- Self Check System (SCS) with automatic leak test
- Long-term warranties on selected system components: Focus Radiation NDIR detector (10 years), TOC furnace technology (10 years), UV reactor (3 years)
- Compliant with international standards, such as: ISO, EN, DIN, EPA, and ASTM

## TOC/TN<sub>b</sub> Analyzers AOX/TOX Analyzer

## multi N/C pharma Series multi X 2500



multi N/C 2100S pharma

#### multi N/C pharma - tailored solutions for TOC and TN analyses in the pharmaceutical industry

From ultrapure water control and cleaning validation to extractables testing from packaging materials to total protein analysis in vaccines, the multi N/C pharma series offers optimized solutions complying with international pharmacopoeia regulations.

Enhanced software features ensure full data integrity and FDA 21 CFR Part 11 compliance. A complete service package including system qualification and software validation ensures reliability and ease of use while operating the analyzers.

multi N/C pharma UV – highly sensitive TOC ultratrace analysis using wet chemical UV digestion multi N/C pharma HT – sensitive TOC ultra-trace and TN analysis using catalytic high-temperature combustion

multi N/C 3100 pharma – high-throughput TOC trace and TN analysis in a wide concentration range, using catalytic high-temperature combustion multi N/C 2100S pharma – fully automated total protein analysis by catalytic high-temperature combustion and CLD detection



multi X 2500 with autoX 36

#### multi X 2500 – unique flexibility in AOX analysis

Whether POX determination, fast AOX routine analysis in vertical mode, reliable determination of the smallest EOX trace contents, or TOX analysis for other organic liquids and solids, such as waste oil, in horizontal operation, the double furnace technology of the multi X 2500 enables free choice of the best combustion mode for each application.

The intelligent software multiWin, the fast changeover between column and batch method, and the user-friendly design ensure outstanding ease of use. Modules for sample preparation according to column or batch method as well as diverse sampling systems ensure flexibility and guarantee maximum sample throughput with minimum operating effort.

#### multi X 2500 at a glance:

- Versatile application POX, EOX, AOX, TOX, TOC
- Wide measuring range from ppb to wt-%
- Standard conformity with ASTM, EPA, DIN, ISO, EN, etc.
- Flame sensor technology for matrix-independent, optimum measurement results
- Double furnace technology enables vertical and horizontal combustion in a single unit
- Flexible automation for maximum sample throughput

## Molecular Spectroscopy -**Highly Flexible and Uniquely Versatile** Innovative and intelligent technology in combination with

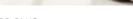
decades of experience create instrument solutions that guarantee reliability, user-friendliness and flexibility in UV/Vis analysis.



## **UV/Vis Spectrophotometers**

### **SPECORD Series**







The SPECORD series covers the entire spectrum from highperformance spectrophotometers with split beam technology to two-beam spectrophotometers with cooled double detection to high-performance diode array systems for simultaneous high-speed measurements. The instruments operate in the spectral range from 190 nm to 1100 nm and 185 nm to 1200 nm for SPECORD 210 PLUS respectively. Versatile software, special software packages, and a wide range of accessories guarantee easy operation, flexibility, and high efficiency in a wide variety of applications.

#### SPECORD S 600 - diode array system

SPECORD S 600 combines the precision and convenient handling needed in laboratories with speed, reliability and superior optical performance.

#### SPECORD S 600 at a glance:

- High-precision diode array systems
- Excellent spectral properties, fast measurement of complete spectra in less than 12 milliseconds
- Self-adjusting photometric linearity, automatic stray light correction, open sample compartment

**SPECORD S 600** – diode array spectrophotometer for UV to NIR range (190-1100 nm)









Versatile accessories for flexible and efficient analysis

#### SPECORD PLUS

Routine analysis or special applications – with the double beam spectrophotometers of the SPECORD PLUS series you are well prepared for all requirements.

#### SPECORD PLUS series at a glance:

- Automatic accessory recognition
- Large, easily accessible sample compartment
- Extensive method collection
- Software tool for the device check

**SPECORD 50 PLUS** – double-beam spectrophotometer with split-beam technology SPECORD 200 PLUS – double-beam spectrophotometer with fixed spectral bandwidth SPECORD 210 PLUS - double-beam spectrophotometer with five variable spectral bandwidths and expanded measurement range (185-1200 nm) SPECORD 250 PLUS – double-beam spectrophotometer with five variable spectral

bandwidths and double monochromator

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