novAA®

Quality is the difference

More than 150 years of experience in the field of Optical Spectroscopy

Analytik Jena has a long tradition in developing high quality and precision analytical systems which dates back to the inventions made by Ernst Abbe and Carl Zeiss. Today Analytik Jena is a leading manufacturer of high performance analytical instruments and one of the most innovative companies.

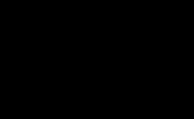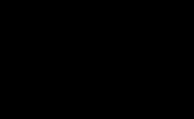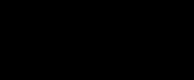|	
1874	First spectrometer
1924	First Pulfrich photometer – the basis for the development of spectrophotometry in Jena
1937	First flame photometer – Carl Zeiss establishes the methodology of flame photometry
1963	SPEKOL® and SPECORD® update the tradition of Pulfrich photometers in Jena
1969	Prototype of the first commercial flame AAS
1971	Launching of the first AAS 1 of Carl Zeiss Jena
1982	First simultaneously measuring UV VIS spectrometer with MCS
1993	Introduction of the first Zeiss-AAS graphite system with transverse-heated graphite furnace
2000	AAS ZEEnit, the first transverse-heated Zeeman graphite furnace AAS instrument with variable magnetic field and 3field mode
2004	Analytik Jena AG presents the first High-Resolution Continuum Source AAS (HR-CS AAS) worldwide, a revolution in Atomic Absorption
2006	HR-CS AAS for graphite furnace technology

novAA
400P

Made in
Germany

Technology
Quality
Innovation

analytikjena

Recent technologies translated into a family of instruments that sets standards

Decades of experience in the development of spectrometers, plus the most recent findings made in electronics and furnace design, have gone into the novAA® series.

Transverse-heated graphite furnace
The future-oriented furnace heating concept, which can cope with a variety of samples, including complex matrices and refractory elements.

Automation has never been more convincing
Flexibility and efficiency, requirements in fully automatic sample preparation, are provided by AS-F, AS-FD and AS-GF, intelligent autosamplers for more than just automatic dosing. Functions such as intelligent dilution and preconcentration, automatic dosing of modifiers, and automatic depth adjustment, combined with high dosing precision, make unattended overnight operation a mere routine and guarantee profitable sample throughputs.

**A new generation for the whole range of AAS**
The novAA® series covers up the complete range of fully automatic single element and sequential multi element analysis. The series combines a unique union of performance, versatility, automation, reliability and flexibility. With its vast range of adjustable parameters, flexible analysis systems and the highest precision found on the market, it lives up to the demands of modern analysis and regulations.

novAA®
The novAA® series includes the novAA® 400 P, an AAS for flame, graphite furnace and hydride technology and the novAA® 350 for flame and hydride technology which meet all your expectations and requirements of an easy to use and powerful AAS.
Both systems combine intelligent design with optimum functionality and convincing performance features:

- 8 lamp changer for maximum automation and sample throughput
- Single and double beam available
- D2 background correction
- Integrated RFID Tool for working with coded lamps (novAA® 400 P)
- Integrated super lamp power supply for best analytical performance (novAA® 400 P)
- Integrated High-end Vision Tool for best observation and control of sample injection and sample drying in the graphite tube (novAA® 400 P)
- Direct analysis of solid samples (novAA® 400 P)
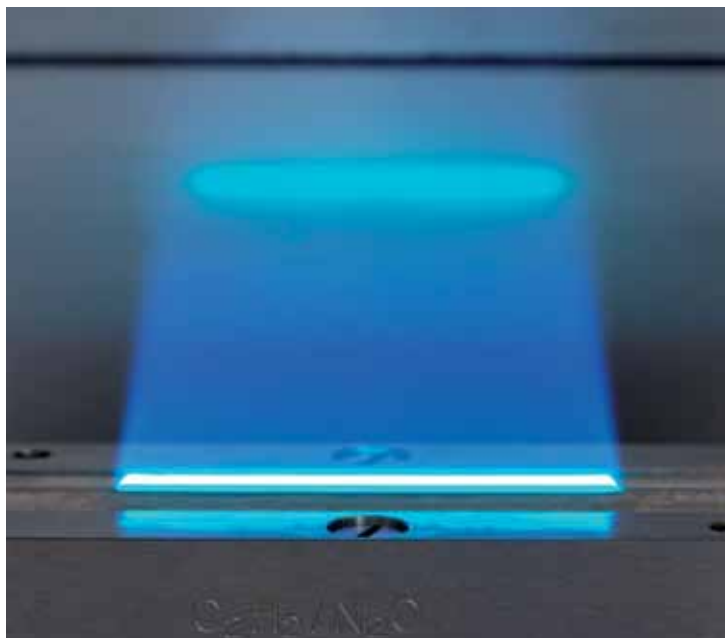
A match for every requirement

Variable sample feeding techniques

This is unique: Smooth feeding of liquids and solids (direct analysis), and fast change between both techniques.

ASpect LS data analysis and control software

A convincing software concept that is not only efficient for laboratory routine but also gives the user every freedom for method development and optimization. Analytical quality assurance and validation feature greatly in this product.

Long high-performance life guaranteed for 10 years

Quartz coated optics and encapsulation guard against corrosive laboratory atmospheres and extend the life span – an advantage we pass on to our customers: A long-term warranty of ten years is standard for our atomic absorption spectrometers!

Thoroughly studied burner-nebulizer system

A burner-nebulizer-system optimized over many AAS generations and a mature mixing chamber concept ensures stable operation and high repeatability in the flame mode.

■ Universal coded titanium burner and corrosion resistant nebulizer achieve best performance

■ An inert mixing chamber for ideal aerosol formation and high vaporization efficiency

■ Fully automated gas box ensures maximum safety in all operating steps

■ Fully automated burner height adjustment for best results

Designed-in safety

Rely on a tight control system – Self Check System. Permanent testing of all relevant parameters avoids any possible malfunctions. Trouble-free and fully automatic operation of the instrument system is ensured and operating costs can be considerably reduced.

◀ *novAA® 350 with hydride system*

Transverse-heated graphite furnace – State-of-the-art technology

A unique furnace design

The transverse-heated graphite furnace is a must where optimum atomization conditions and high sample throughput are required simultaneously. This clearly superior concept has, for a number of years, been successfully employed in all Analytik Jena graphite furnace AAS systems. It guarantees uniform temperature all along the optical axis throughout the tube and eliminates memory and condensation effects that occur at the cooler tube ends of conventional, longitudinally heated graphite tubes. Lower atomizing temperatures prolong tube life. Problem-free analysis of low-volatility elements (e.g., vanadium, molybdenum), and the direct analysis of solid samples are possible.

Sensorless adaptive temperature control (STC) completely monitors the condition of the graphite tube and compares important actual furnace parameters with the settings. Deviations of the tube resistance caused by chemical corrosion and ageing of the graphite material are immediately corrected, and the correct temperature is readjusted. The temperature inside the graphite tube is monitored and recalibrated by a unique emission-independent, pyrometric quotient method. A formation routine optimally prepares new tubes for the analyses and checks the overall status of the furnace. This is the only way to ensure that your measurements stay comparable over long times.

Marked improvement in accuracy

Transverse-heated graphite tubes considerably diminish many chemical interferences and therefore matrix effects. As a consequence, your analyses are almost memory-free.

Cost-efficient analyses

To save operating costs, you can choose between two types of tubes:
The platform tube allows you to determine all elements with just one tube – no need to change tubes during a multielement routine. For simple applications, the low-cost wall tube is the best choice.

Time-saving and amazingly easy

The transverse-heated tube design makes tube change and adjusting the sampler pipetting tip easier than ever before.

STPF

Thanks to the consistent implementation of the "Stabilized Temperature Platform Furnace", so-called (STPF) concept, directly improves the accuracy of the analytical data. The novAA® thus meets all requirements for interference-free graphite furnace analyses. This considerably increases efficiency and saves time.

♥ *Graphite tubes*

▲ *Solid sampler SSA 600*

▲ *Sample tray for up to 84 samples*

▲ *Liquid dosing accessory*

solid AA® – Direct analysis of solids.
Intelligent innovation pushes back limits

Two different feeding systems for solid samples are available:

SSA 6 z – manual solid sampler
Manual module for the reproducible insertion and removal of the sample carrier. Even with external manual weighing, automatic data transfer is made via the ASpect LS software.

SSA 600 – automatic solid sampler with integrated microbalance
This system allows routine solid AAS. Not only transport of the loaded sample carrier into the furnace but also weighing with the fully integrated microbalance is completely automated.

A specially optimized sample carrier can be used for many kinds of solids – from powders to lumps. The carrier geometry ensures optimum atomizing conditions in the solid tube and reliable transfer processes in sample feeding.

The analytical advantages
- Analysis of the unadulterated original samples
- No time-consuming sample digestion
- No dilution effect with substances harmful to health or the environment
- Minimized risk of contamination
- High sensitivity
- Genuine microvolume method (sample quantities in the order of µg or mg)
- Detection limits in the pg and fg ranges

The economic benefits
- Speed
- Reduced costs
- Flexibility
- Efficiency

Liquid dosing accessory for versatile applications
With the new liquid dosing module, solid sampling becomes even easier. A liquid calibration out of one or more stock solutions now is done automatically by the sampler. The modifier is also automatically pipetted to each solid or liquid sample.

Efficiency and productivity feature greatly

Automated flame technology – High precision and speed

In today´s laboratories, automation of the AA flame mode is more important than ever. Fast analysis, automated dilution, reliable quality monitoring, all with uncomplicated handling, are a must. Meeting these requirements with ease, the novAA® series is bound to become an indispensable routine spectrometer for element analysis.

Flame autosampler – Maximum sample throughput and automatic dilution

Autosamplers for the flame mode make your routine analysis of standards and samples almost fully automatic. Integrated in the overall concept of the instrument, either sampler can be simply hung directly into the sample compartment. This saves space and minimizes tubing lengths – the best way to prevent contamination in case of real samples.

A wide variety of accessories

Accessories such as the Segmented Flow Star (SFS) or the Scraper help you facing the challenges of complex matrices in flame analysis.
In addition to the standard flame technique the software cont-rolled SFS for injection mode operation, is convincing by:

- Easy operation of samples with high salt or acid content
- Stable burner conditions guaranteed by continuous rin-sing and constant temperature conditions
- Automatic metering of smallest sample volumes by time-controlled flow injection

The „Scraper" is an intelligent, automatic, software-controlled cleaning device:

- For the nitrous oxide burner head for troublefree work over a long period.
- Once activated in the software the Scraper guarantees a continuous and reproducible measuring cycle in the rou-tine analysis.
- Before each sample measurement and calibration the slot is cleaned.

The concept of this simple accessory is easy to use for best reproducable results.

▲ 8 lamp changer

▲ Scraper

▲ Injection module SFS 6

● *Graphite furnace autosampler*

● *Hydride system*

Unique technique to analyze hydride-forming elements

Mercury and hydride analysis – multiple solutions for special challenges

The measurement and monitoring of mercury and such elements as arsenic or selenium down to low ppb concentrations has always been a challenge. In order to keep the amount of these toxic substances under control in the environment, fast methods and convenient, yet flexible systems are required.

The availabilitiy of flow injection and batch mode at the various automation levels guarantees convenient handling and precision as well as efficiency during the analysis of hydride-forming elements and mercury with the cold vapour technique.

Flow injection mode

With the flow injection mode you benefit from all advantages of automated analysis with excellent measurement precision and fast sample throughput.

Batch mode

Thanks to the easy and quick change to the batch mode, the user can readily benefit from the advantages of this type of operation. The use of large sample volumes where element concentrations are minimum guarantees problem-free handling of foaming samples and fast overview measurements.

Modular concept of hydride systems

The hydride systems are based on a modular concept. They can easily be adapted to changing requirements of an analytical lab using Upgrade Modules. All systems of the HS series can easily be upgraded by adding new functions, e.g. adding an amalgamation module to an existing system, or converting a Batch- into a Flow Injection-System. The systems are fully integrated into the AAS software, which automatically detects the configuration installed and only shows the cookbook and parameter settings for that specific configuration.

An electrothermal cell heater is fully integrated as a standard in the hydride systems (HS 55/ HS 60) and offers enhanced performance and reproducible temperature conditions.
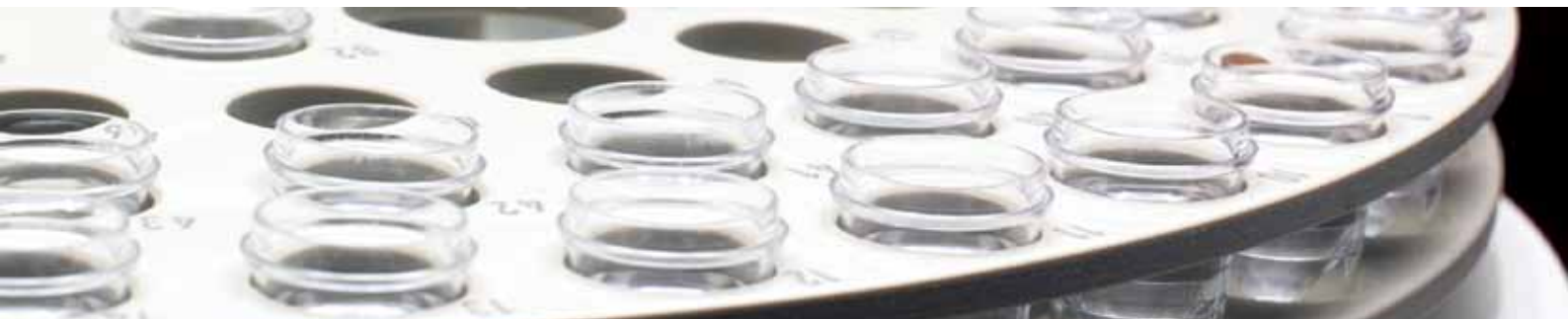
ASpect LS –
just how modern software should be

Completely automated optimization of the parameters

Great emphasis is placed on innovative functionality when developing devices. Fully automatic routines optimize the analysis process and thus also guarantee the optimum conditions at high sample throughput and therefore the maximum reliability of the results.

Pyrolysis and atomization temperatures are changed using the „Optimization of the furnace parameters" software function and adapted to the respective application.

At the same time, an integrated camera, the „Furnace Vision Tool" monitors the deposition of droplets and the drying phase in the graphite tube. Information in unique image quality provides detailed monitoring and effective correction.

In the new novAA® 400 P all lamp data are automatically read and recorded using a RFID tool to make the operation easier. The lamp is identified during initialization, the operating parameters are set and the running times are monitored.

The novAA® 400 P offers solutions for fast, automated routine operation, whether absorption or emission. To achieve optimum results, fuel composition and burner height can be automatically adjusted to the respective sample. The fully automated Total Flow Gasbox, which is integrated in all novAA® systems, ensures the settings and monitoring of all gas parameters.

Advanced user-friendliness

Simple, routine handling on one hand, great flexibility on the other – ASpect LS meets both requirements with perfection. The clearly laid-out user interface makes method development on the screen fast and simple. Ready-to-use cookbook programs facilitate getting into method development. With automatic optimizing routines, the user can easily test the limits of the system's capabilities.
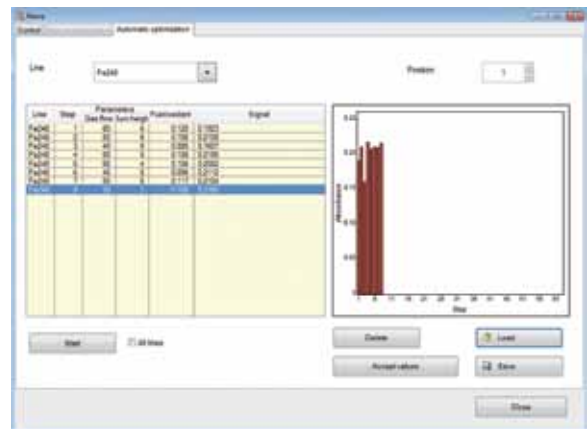
▲ *Automatic optimization*
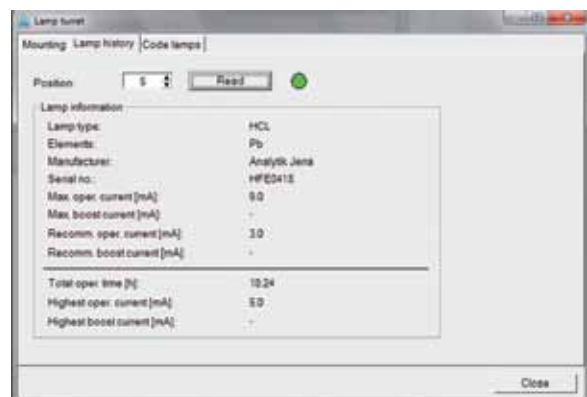
▲ *Display of coded lamp parameters*

♥ *Sequences of the integrated color camera in the graphite furnace*

Clearly structured and flexible

Designed-in safety

Safe operation is a top priority especially in flame AAS. Rely on a tight control system – Self Check System. With a multitude of sensors, all safety-relevant parameters are constantly monitored and PC-controlled. From flame ignition to switching types of gas and to safe quenching in case of a malfunction:

- Maximum operating safety
- High user and operating safety through automatic control of gas flows and safety valve technology
- Electrical operating safety
- Monitoring of the optimal pressures of the gases
- Avoidance of malfunctions in non-stop operating through automatic control of liquid quantities and safety functions

Quality control and GLP

In view of today's statutory and in-house requirements, comprehensive quality assurance is a prime consideration implemented in the AAS software.

Compliance with these requirements can be assured:

- Keeping different control charts for statistical quality control
- Various responses when error limits are exceeded or warning levels reached
- Automatic instrument functionality test
- Data recording and printout conforming to GLP

**Data postprocessing the easy way**

To postprocess measured data by external programs, ASpect® LS offers diverse export routines in compatible data formats. Linking into networks or data transfer into LIMS is not a problem either.

FDA 21 CFR Part 11

Conformity to FDA 21 CFR Part 11 is a must for modern analysis software. The functions integrated in ASpect® LS 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.
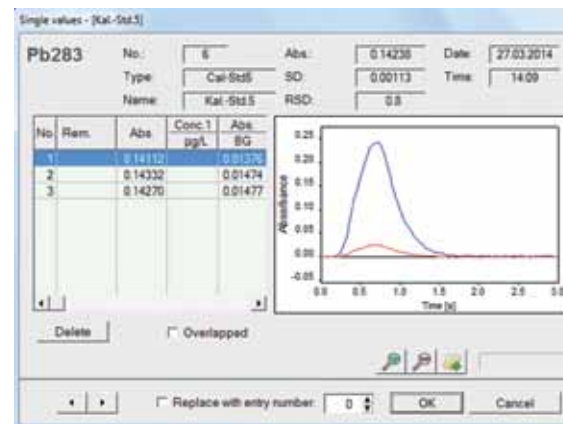
🔺 *Display of measured data*
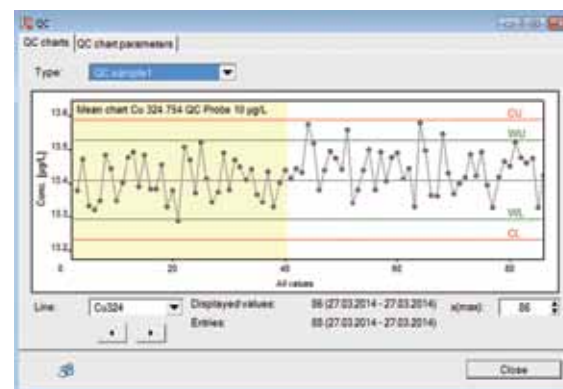
🔺 *Quality assurance control chart*

ATOMIC SPECTROSCOPY

novAA® series

Classical line source AAS with Dual Optics. and Deuterium background correction.

ZEEnit® series

Line source AAS with Deuterium and Zeeman background correction with third generation magnetic field control.
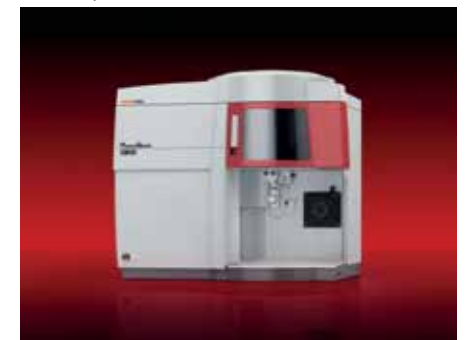

contrAA® series

High-Resolution Continuum Source AAS with simultaneous background correction for fast sequential and simultaneous multielement analysis.

PlasmaQuant® OES series

High-Resolution Array ICP-OES with Dual View PLUS plasma observation for automated attenuation of axial and radial plasma views.

MASS SPECTROSCOPY

PlasmaQuant® MS series

Bench-top ICP-MS with patented ion optics for unmatched sensitivity and all-digital detection with 10 orders linear dynamic range.

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