



ZEEnit

Quality is the difference



120 years of experience with spectroscopy in Jena

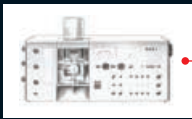
We are proud of a unique 120-year tradition that dates back to the inventions made by Ernst Abbe and Carl Zeiss.



1874 First spectrometer



1924 First Pulfrich photometer – the basis for the development of spectrophotometry in Jena



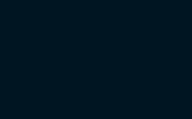
1937 First flame photometer – Carl Zeiss establishes the methodology of flame photometry



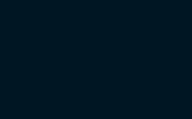
1963 SPEKOL and SPECORD update the tradition of Pulfrich photometers in Jena



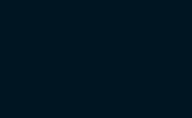
1969 Prototype of the first commercial flame AAS



1971 Launching of the first AAS 1 of Carl Zeiss Jena




1982 First simultaneously measuring UV VIS spectrometer with Multi Channel System (MCS)



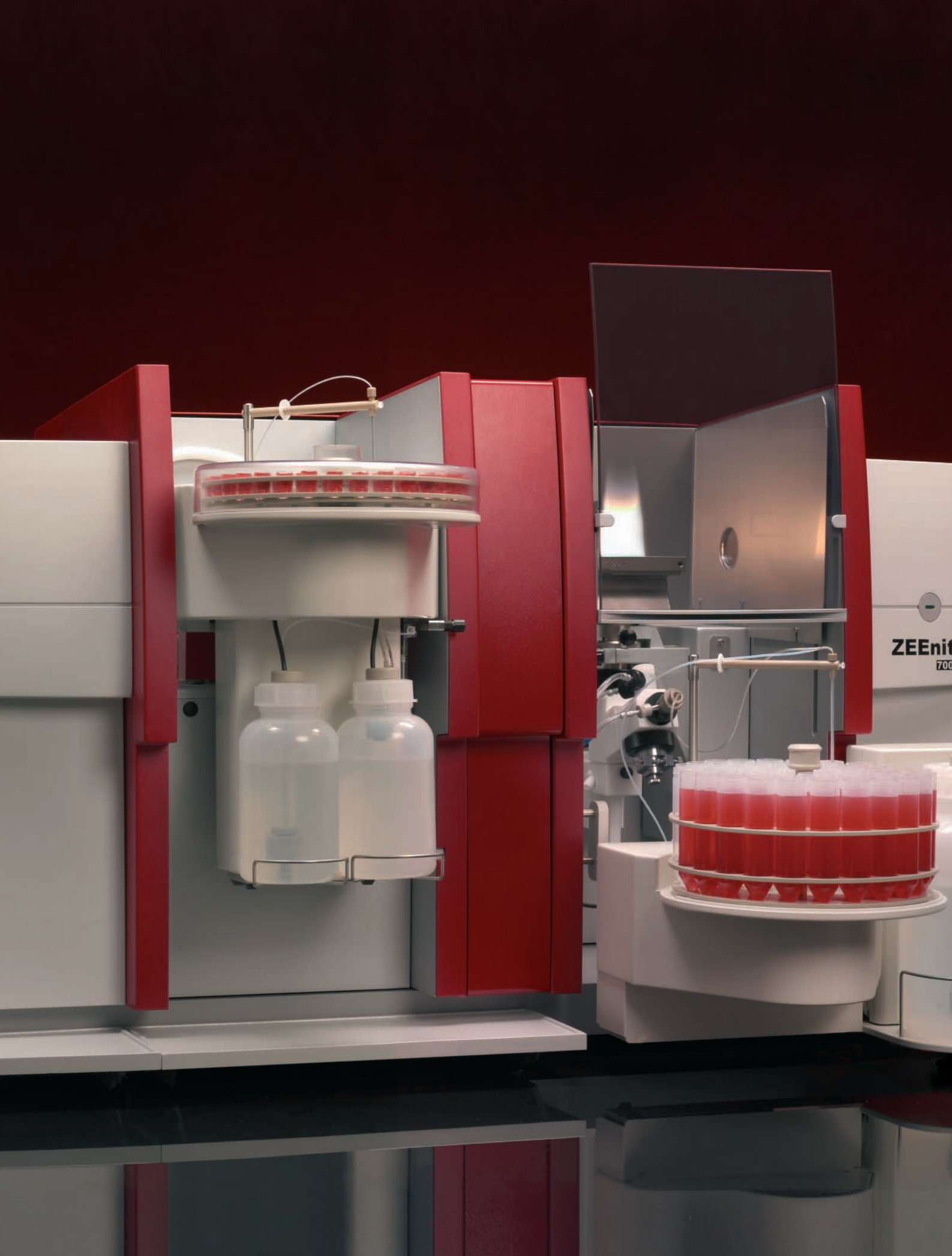
1993 Introduction of the first Zeiss-AAS graphite system with transverse-heated graphite furnace

2000 AAS ZEE nit, the first transverse-heated Zeeman graphite furnace AAS instrument with variable magnetic field and 3field mode

2004 Analytik Jena AG presents the first Continuum Source AAS worldwide, a revolution in Atomic Absorption



analytikjena



ZEEnit
700



Recent technologies translated into a family of instruments that sets new standards

Decades of experience in the development of spectrometers, plus the most recent findings made in electronics, magnetic field technology and furnace design, have gone into the ZEEnit series (ZEEnit 600/650/700). The ZEEnit 700 completes yet another milestone in spectrometer development at Analytik Jena: A system that combines excellent analytical performance with a high degree of user friendliness.

Dual atomizer concept

A design that is impressive because of its functionality. Change of techniques without mechanical movements, conversion or readjustment – immediately ready for use.

Transverse-heated graphite furnace

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

Third-generation magnetic field technology

Maximum sensitivity and optimum matching to the analytical problem thanks to the variable magnetic field strength up to 1.0 tesla and the use of two different correction modes. Expansion of the linear working range by means of the 3field technique, and a dynamic mode for automatic adaptation to varied element contents – the ZEEnit opens up unparalleled capabilities in Zeeman graphite furnace AAS.

Automation has never been more convincing

Flexibility and efficiency, musts in fully automatic sample preparation, are provided by AS 51/52 and MPE 60z, 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 overnight operation a mere routine and guarantee profitable sample throughputs.

Variable sample feeding techniques

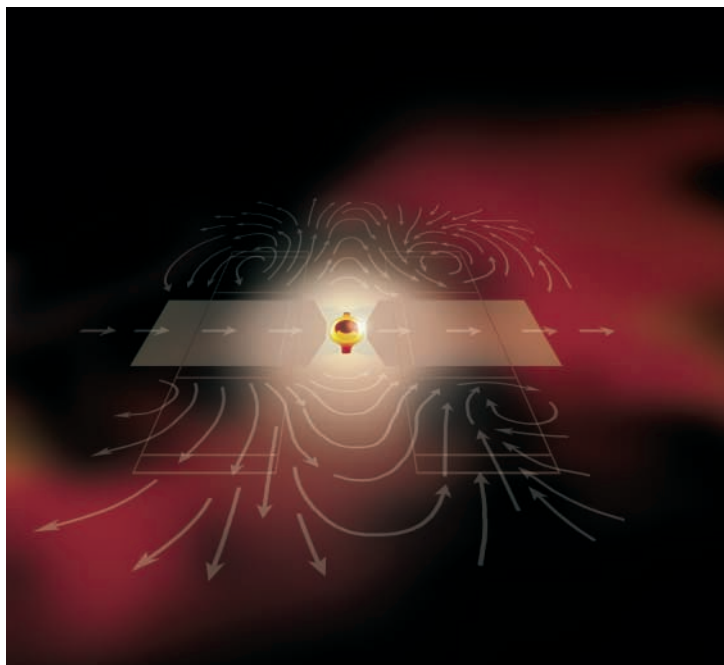
This is unique: Smooth feeding of liquids and solids (direct method), and fast change between both techniques.

WinAAS® 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.

Various configurations available

- | | |
|-------------------|--|
| ZEEnit 600 | Graphite furnace AAS with Zeeman background correction |
| ZEEnit 650 | Graphite furnace AAS with Zeeman and deuterium background correction |
| ZEEnit 700 | Compact spectrometer for graphite and flame techniques with Zeeman and deuterium background correction |



A match for every requirement

A high-aperture optical system with extraordinary components provides excellent light throughput for superior analytical results. Our spectrometers are built from optical components satisfying every requirement of quality, service life and performance. For many years this technology has been defined by these essential principles:

- Use of a minimum number of high-grade optical components to reduce energy losses.
- Sturdy optical construction according to an optimized Czerny-Turner design to guarantee best imaging conditions.

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-atomizer system

A system optimized over many AAS generations consisting of titanium burner, inert atomizer and a mature mixing chamber concept ensures stable operation and high repeatability in the flame mode.

Designed-in safety

Safe operation is a top priority especially in flame AAS. With a multitude of sensors, all safety-relevant parameters are constantly monitored and controlled. From flame ignition to switching types of gas and to safe quenching in case of a malfunction: all functions are PC controlled and fully automated.



◀ Left: Magnetic field

◀ Right: ZEEnit 700 with hydride system and AS 52 s

State-of-the-art technology for higher accuracy and precision

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 function 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.

STPF

Thanks to the consistent implementation of the “Stabilized Temperature Platform Furnace” (STPF) concept, spectral interferences are reduced to a minimum. This directly improves the accuracy of the analytical data. The ZEEnit thus meets all requirements for interference-free graphite furnace analyses. This considerably increases efficiency, and saves time.

The resulting benefits for your daily routine speak for themselves:

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.

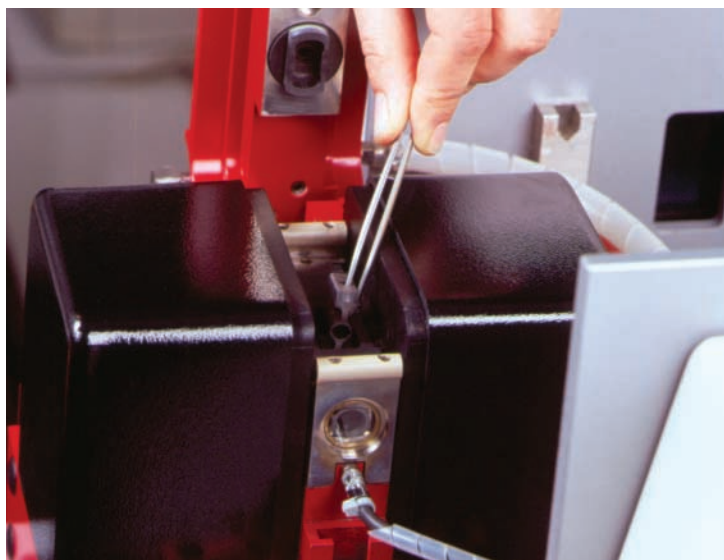
Cost-efficient analyses

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 – you need not 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.



Flexible analysis for all kinds of samples

The ZEEnit is the only system worldwide that permits the direct feeding of both liquid and solid samples.

The dream of smoothly changing between liquid and solid techniques has come true. With its built-in Zeeman system, the ZEEnit of Analytik Jena excel with the exacting demands the direct analysis of solids places on background correction and on the graphite furnace.

Two different feeding systems for solid samples are available:

SSA 60z 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 WinAAS® software.

SSA 61/62z 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 volumes in the order of μg or mg)
- Detection limits in the pg and fg ranges

The economic benefits

- Speed
- Reduced costs
- Flexibility
- Efficiency



Left to right:

- Graphite tube change without adjustment
- SSA 61z
- Solid sample carrier

Third generation zeeman magnetic field technology

In addition to efficient deuterium background correction, Zeeman technology is a must for many applications. In other commercially available Zeeman systems, the magnetic field has a fixed strength. The ZEEnit allows the user to vary the magnetic field strength.

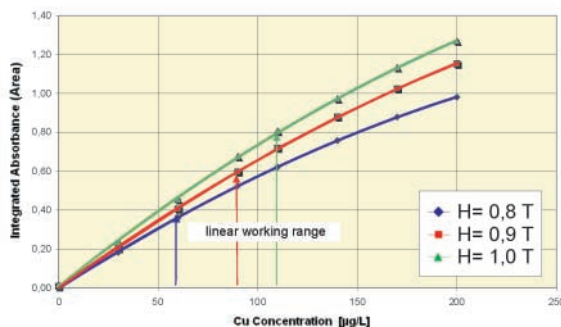
The advantages are obvious:

Optimum sensitivity

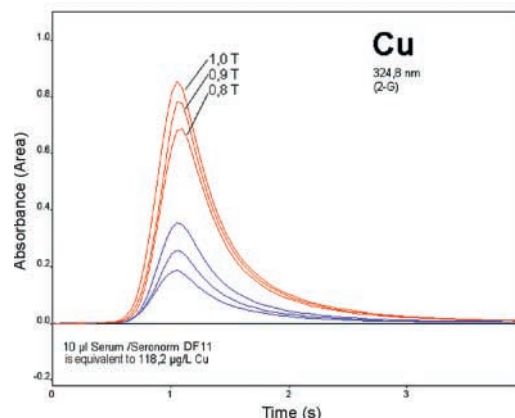
This is the only way to exploit the benefits of the Zeeman system for all elements. Varied according to the Zeeman factor, the magnetic field strength guarantees optimum sensitivity in every case.

Flexibility with varying concentrations

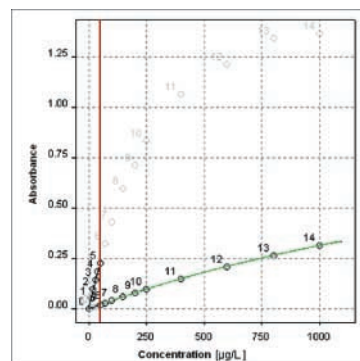
To ensure fully automatic routine work despite varying concentrations, the dynamic mode combines the 2field and 3field techniques. Two absorbances are measured within a measurement cycle, and two calibration curves established (Fig. 3). Depending on the concentration, either the high- or low-sensitivity calibration curve is used for data analysis. Large batches of samples with varied contents can thus be processed fully automatically.



▲ Fig. 1: Expansion of the linear working range



▲ Fig. 2: Higher sensitivity through an increase of the magnetic field strength



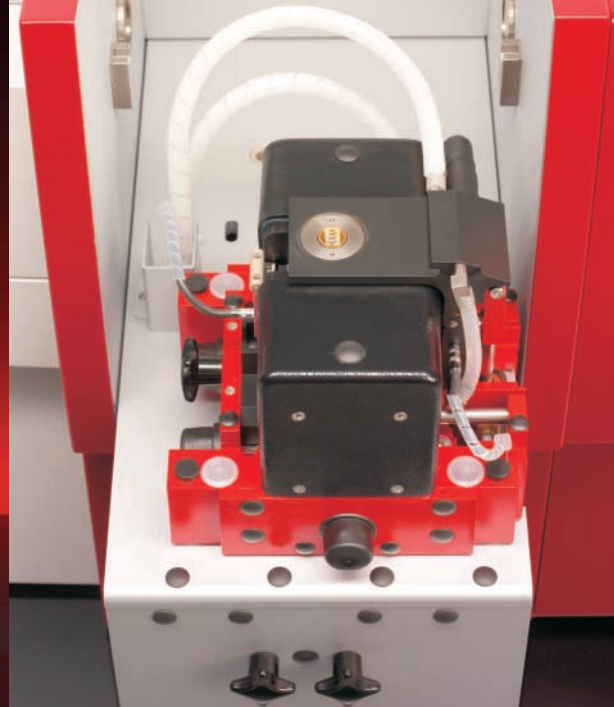
◀ Fig. 3: Application of the dynamic mode for Pb calibration from 10 to 1000 µg/L

Wide dynamic measuring range

Added to the conventional 2field mode (magnetic field on or off), the unique 3field mode (magnetic field off, medium, or maximum) provides the user with unparalleled analytical capabilities. The use of the variable magnetic field in the special data extraction mode makes it possible to calibrate over more than two concentration decades in Zeeman GF AAS. The measuring range and the linearity are considerably expanded towards higher element concentrations. High-factor dilutions are no longer required. Problems caused by diluent contamination and error sources in sample preparation can be avoided. This saves time and facilitates routine with higher element contents also.



▲ ZEEnit 650



▲ Graphite furnace in service position

User-oriented: New standards of operating convenience

Problem-free operation in trace analysis is conditional on the regular maintenance and cleaning of the furnace parts. The furnace of the AAS ZEEnit automatically slides out of the sample compartment to a defined parking position, which affords easy access.

The design of the graphite furnace is engineered to every detail. The unique, exchangeable pipetting insert is a small but very effective component. It guarantees long electrode and furnace jacket life even with the most aggressive substances, thus minimizing operating costs.

The dual atomizer concept of the ZEEnit 700 ensures fast, problem-free technique change without the need to change autosamplers or make adjustments.

Of prime importance: Speed

In graphite furnace AAS, speed is of the essence for every analyst. The Fast Furnace Concept of the ZEEnit has a number of features ensuring that analyses are completed quickly:

- Superfast linear heating rates
- Overlapping runs of the autosampler
- Cooling times adapted to temperatures
- Preheating of the next element lamp in multiroutine analyses
- Sensorless temperature control

For maximum efficiency and high sample throughput – the automation concept

The ZEEnit 700 offers solutions for fast, automated routine operation in the flame modes, whether absorption or emission. A variety of accessories and automatic software routines guarantee high sample throughput and maximum accuracy.

All gas parameters are set and controlled by the fully automatic Total Flow Gasbox. Thanks to automatic height adjustment, the burner head is always in an optimum position. Even as requirements vary, conditions are always kept at an optimum by an efficient optimization routine.

With a simple shutter mechanism, changing burner heads is just as easy as attaching the sample cell unit for hydride technology.

The determination of mercury and the hydride-forming elements down to the lowest concentration ranges has always been a special challenge. The ZEEnit takes up that challenge with a diversity of solutions. Combination with the hydride systems can be implemented in two ways.

- The traditional way: Atomization in the electronically heated quartz cell (ZEEnit 650, 700).
- The future-oriented way: Hydride formation coupled with Electrothermal Atomization.

HydEA technique

Coupling the hydride and graphite furnace techniques opens up new prospects for the determination of hydride-forming elements (e.g., AS, Se, Sb.) As these elements can be preconcentrated in the graphite tube, the detection sensitivity increases, cross-over effects and contamination problems are minimized and matrix influences are reduced – the appropriate response to the demand for ever lower detection limits.



▲ MPE 60z

More than only a sampler

With the MPE 60z, the autosampler for graphite furnace AAS of liquid samples, automated sample preparation and analysis are easy:

- Automatic generation of reference curves from one or several stock solutions (up to ten points)
- Dosing of extremely small sample volumes with excellent repeatability
- Automatic sample dilution and enrichment by a specified factor
- Intelligent automatic dilution of samples exceeding the calibration range; clean control limits to avoid contamination
- Automatic enrichment of samples below the calibration range
- Unique automatic correction of the immersion depth for every vessel containing sample or other liquid
- Robust, low-noise operation
- Fast, easy adjustment

Its many functions and the automatic running of optimizing routines make the MPE 60z an intelligent sample preparation station.



▲ AS 52 s



▲ Hydride System

Autosamplers for the flame mode

AS 51 s and AS 52 s make your routine analyses 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.

To prolong the service life of the samplers, all parts liable to be contacted by acids or solvents are made of corrosion-resistant materials. Varied, freely selectable rinsing routines markedly reduce the risk of carry-over and contamination.

The intelligent dilution function of the AS 52 s makes manual dilution, a time-consuming and error-prone process, unnecessary. Automatically, it dilutes your samples down to a factor of 1:625. Therefore, sample lots with greatly varying element contents can be processed without interruption. If concentrations exceed the calibration range, an automatic clean control prevents contamination of the subsequent samples. All these functions are completely integrated in the autosampler, so no costly, space-consuming extras, are required.

Accessories such as the Segmented Flow Star (SFS) or the Scraper help you face the challenges of complex matrices in flame analysis. The SFS is capable of dosing minuscule sample volumes. Thanks to continuous system rinsing, it extends the stable working time with samples of high matrix or salt contents. The Scraper facilitates work with the nitrous oxide flame. It automatically removes graphite deposits from the burner slot, ensuring continuous operation with gas also minimizing manual cleaning chores.



▲ SFS 6 Injection Module

▲ Scraper – the automatic cleaning module

Clearly structured and flexible – just how modern software should be

WinAAS® offers both routine operation and multifarious development and optimization facilities. It allows comprehensive control, monitoring and recording of all processes run in the spectrometer and its accessories.

Advanced user-friendliness

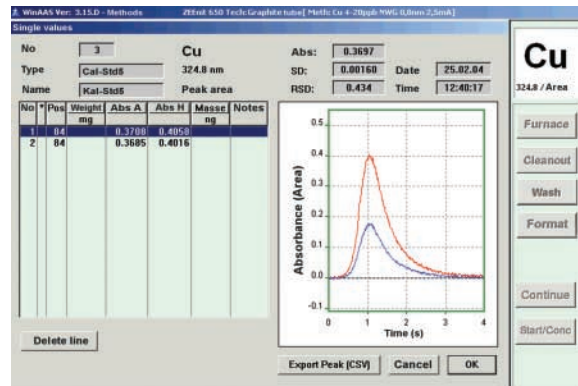
Simple, routine handling on one hand, great flexibility on the other – WinAAS® meets both requirements with perfection. The clearly laid-out user interface makes method development on the screen fast and simple. Ready-to-use cookbook programs facilitate getting into method development. With automatic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

Automated optimization

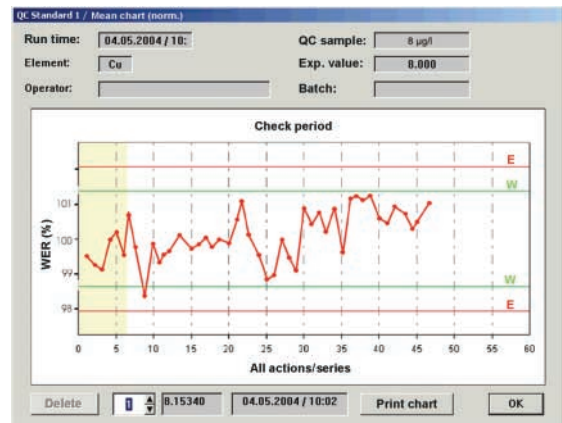
The comprehensive external PC software ensures the highest degree of automation for all techniques. The automatic optimizing routine simplifies the adaptation of methods to an unknown matrix. All parameters and functions are automatically monitored and controlled. The software automatically optimizes and adapts flame and graphite tube parameters, such as Zeeman magnetic field strength in the 2field or 3field mode, atomizing and pyrolysis temperature, roll-over effect, and control of the 3field mode.

Data postprocessing the easy way

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



▲ Display of measured data



▲ Quality assurance control chart

Conforming to standards and rigorous requirements

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. According to GLP, all analytical data must be accessible and their accuracy ascertained and documented. Compliance with these requirements can be assured by a variety of measures for the fully automatic monitoring of the precision and accuracy of measurements:

- 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

FDA 21 CFR Part 11

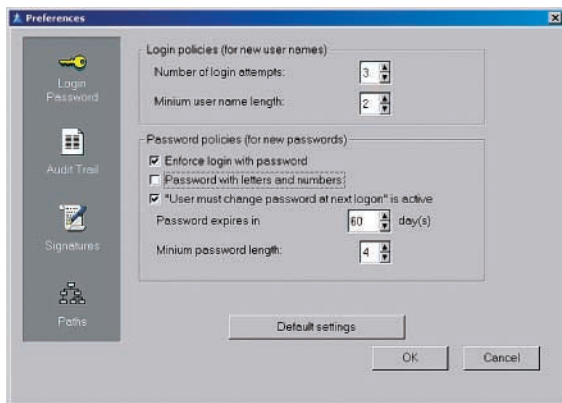
Conformity to FDA 21 CFR Part 11 is a must for modern analysis software. The functions integrated in WinAAS® ensure data security as well as the reliability, lucidity and traceability of all actions throughout the measuring time. All processes are presented in easily comprehensible terms and with a clear layout.

Comprehensive user management, an electronic signature facility and the Audit Trail satisfy the requirements of FDA 21 CFR Part 11.

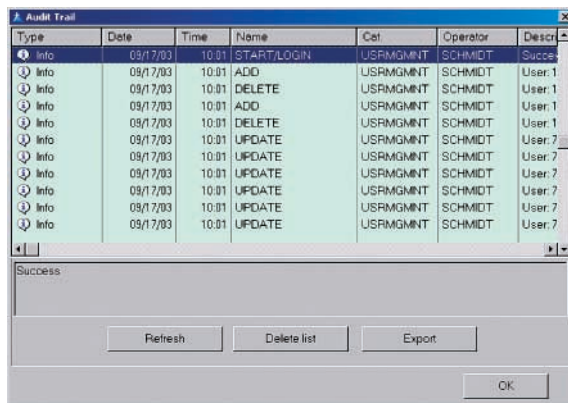
In the User Management function you can define the access rights of individual users. Passwords with specified runtimes guarantee data security.

In the Audit Trail, all actions and accesses during the run of a measurement are lucidly recorded. Together with the electronic signature, this allows every result to be traced back and prevents manipulations.

Every audit will supply convincing proof that with these functions, WinAAS® has the ideal tools you need for efficient work in every-day lab routine and yet conforms to FDA 21 CFR part 11.



▲ User Management



▲ Audit Trail

Technical Service & Application Support

Premium quality from Analytik Jena

Our high-precision analytical systems, based on Carl Zeiss technology and produced according to a stringent quality management system, guarantee the premium quality our customers are used to obtain from us.

Before our high-performance instruments are delivered, all technical parameters are tested, the results recorded and entered in a test certificate. Only those instruments that have passed the complete range of tests, as confirmed by the inspector's signature, will be delivered.

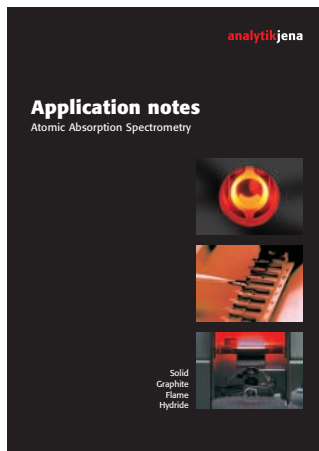
Reliability and certainty

Well-deliberated design concepts, the expertise of our staff, individual application consulting and comprehensive customer service ensure the certainty and reliability of your results. All service operations and safety tests are recorded in the device logbook. Software updated at regular intervals satisfies the requirements of the FDA for conformity to 21 CFR Part 11 and guarantees the safe and reliable electronic documentation of your data.

Our prompt delivery of parts and consumables allows you to work without losing time.

We take time for you

While installing the device, our specialists will intensively train your personnel in operating it, demonstrate the analytical performance of the device and record the obtained results. Our application specialists also provide comprehensive qualification of your personnel enabling them to solve specific analytical problems.



Technical Service

Our world-wide service network guarantees nearness to our customers thus ensuring quick response times, short travel times and low costs for you.

With comprehensive solutions, such as:

- Continuous quality control by our service engineers
- Individual maintenance and service contracts
- 24-hours advisory phone service via our hotline
- Documentation of performed service operations and safety tests in a logbook
- Continuous software update service
- Factory-trained staff employed by our subsidiaries and sales representatives

we provide total service support.

Application Support

A strong team of application specialists is available to you at any time to assist you in your everyday laboratory work.

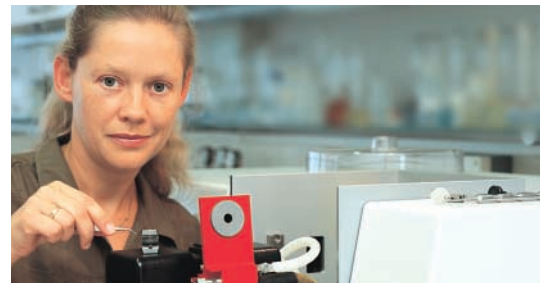
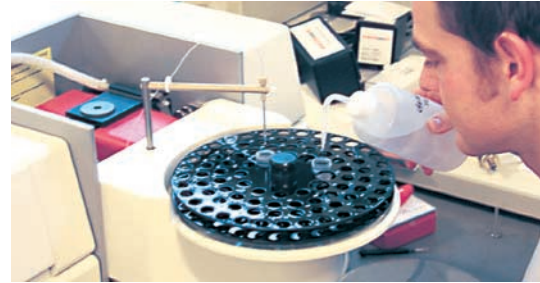
With our services and staff giving you advice around the globe, we ensure optimum customer care and support at any time:

- Individual advice on specific questions of application
- Development of analytical method packages
- Validation of analytical systems
- Individual hands-on user training in specific applications
- Organization of user workshops
- Preparation of application newsletters

Our well-trained, globally active staff ensures optimum customer care and support at any time, as we are keenly aware that this, together with product quality, is the key to customer satisfaction.

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