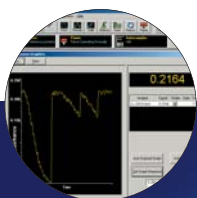


AAAnalyst 400 atomic absorption spectrometers



expect more **flexibility** from your AA

flexibility

for a **no-compromise** approach



Q U I C K G L A N C E

Expect more flexibility from your AA

- Rugged design can handle the toughest matrices
- Modular parts are easily replaced so there is no downtime
- WinLab32 software is easy to learn and easy to use
- PerkinElmer reliability and performance at a price that is easy to afford

You can expect more flexibility from your atomic absorption (AA) system than ever before. Whether you need the most powerful and versatile software or the easiest system to use and service, the AAnalyst™ 400 meets these challenges. The AAnalyst 400 provides a no-compromise approach to atomic absorption – from sample introduction to results.

The modular design of the AAnalyst 400 ensures easy maintenance and allows you to simply replace components for quick service – saving time and money – while getting your instrument up and running right away. The AAnalyst 400 system is designed for the rigorous needs of today's analytical laboratory, with proven WinLab32™ software, providing all the flexibility and power you need in an easy-to-use, easy-to-learn package.

The AAnalyst 400 dramatically changes the way instruments are used and serviced, while maintaining the performance users have come to expect from PerkinElmer®. The system incorporates innovations typically offered only on expensive research-grade instrumentation. True double-beam echelle optics combined with the power of a solid-state detector deliver performance levels not typically available with mid-range AA. And, fully automated gas controls and integrated safety checks yield the safest AA system available today.

The AAnalyst 400 is flexible enough to meet the challenges of the most routine analyses and of the most demanding applications, making it the perfect choice for any laboratory needing a reliable, trouble-free solution for atomic absorption analyses.

easy maintenance and modular design

ensure **maximum uptime**

Designed for easy maintenance

The sampling compartment is extremely spacious (25 cm wide by 25 cm deep), allowing easy access when you need to change burner heads or nebulizers. The burner system uses a new, innovative quick-lock design (Figure 1) that allows the complete burner assembly to simply glide and lock into place. All connections are made automatically, so tedious manual disconnection of gas lines to remove the burner assembly is eliminated. There are no fittings to tighten or connections to make and most importantly, no tools are required.

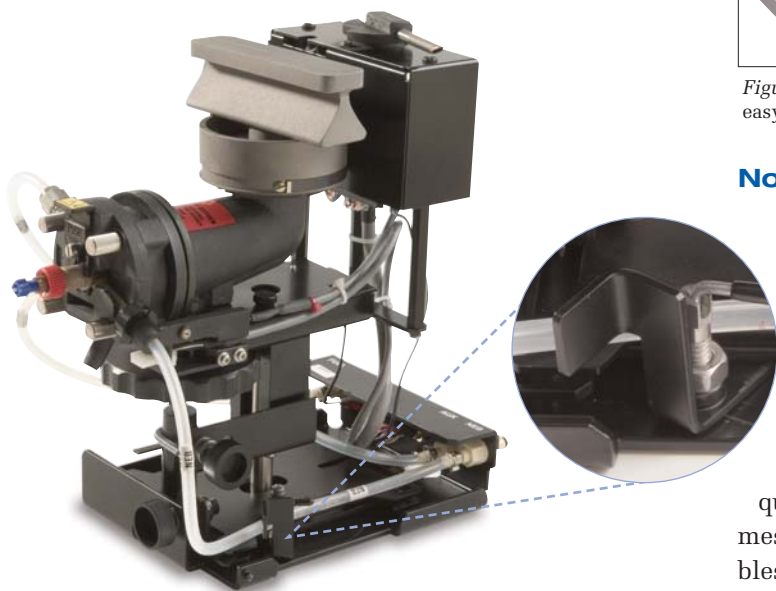


Figure 1. Improved sample introduction system and burner assembly with quick-lock mechanism make operation safe and easy.



Figure 2. User-replaceable electronic module simply slides out for easy replacement.

No downtime

The AAnalyst 400 makes troubleshooting and repair easy. All electronics are located in a single, user-replaceable module. The operator can just slide the module out from the front of the instrument and replace it with a new one (Figure 2). Instrument operators can replace most parts quickly and easily without a service visit. In addition, integrated diagnostics can be used to quickly help troubleshoot the system. All error messages are clearly written to provide useful troubleshooting information, eliminating cryptic numeric codes. These capabilities ensure maximum uptime and reduced cost of ownership.

“With the AAnalyst 400 troubleshooting and repair are so easy that I can do it myself.”

designed to handle the toughest matrices

Rugged design for real-world applications

Whether your AA is in a state-of-the-art laboratory or a remote mining location, the AAnalyst 400 ensures dependable operation. The entire optical system in the AAnalyst 400 is sealed in a protective housing to shield it from corrosive environments. The optical system can also be purged to ensure optimum performance in extremely corrosive or dirty environments.

The PerkinElmer burner system is equally user friendly. The corrosion-resistant solid titanium burner head installs easily in the burner chamber. A fail-safe mechanism ensures that the burner head is always properly restrained without the need for hold-down cables. No tools are required to assemble or disassemble the burner system for routine maintenance. For convenience, a large corrosion-resistant tray that can accommodate a variety of sample vessels is included. The tray is detachable and mounts quickly and easily on the front of the instrument.

Worry-free sampling

An inert polymer spray chamber provides superior performance for the analysis of corrosive and high-solids samples. The spray chamber is manufactured from a high-strength composite, which eliminates the need for pressure-relief devices.

The high-precision nebulizer maximizes stability and sensitivity, even for the toughest matrices (Figure 3). The nebulizer is adjustable so a wide variety of sample matrices – aqueous or organic, acids or bases, diluted or concentrated – can be analyzed under optimum conditions. Whatever your application, the AAnalyst 400 provides trouble-free operation.

Safety first

The entire instrument is not only easy to use and maintain, it also includes safety features normally found only on top-of-the-line AAs. The fully automatic gas box is standard on every system, providing the highest level of safety available on any flame AA. The system automatically recognizes which burner head is installed and adjusts the gas settings correctly for the type of flame used, providing worry-free and safe operation.

The AAnalyst 400 continuously monitors critical components, including burner, flame ignition, gas pressure, drain status and many others. If any system check indicates an unsafe operating condition, the flame is automatically extinguished. When nitrous oxide is used, the gas box will automatically light the flame under air/acetylene conditions and properly switch to nitrous oxide and adjust the gas flows to the proper levels for safe operation.



Figure 3. The AAnalyst 400 nebulizer is designed to handle the toughest samples.

the performance you expect

Combining double-beam optics with a solid-state detector improves performance

The AAnalyst 400 features the first true double-beam echelle optical system used in an AA. True double-beam systems compensate for changes that may occur in lamp intensity during an analysis. The system ensures a more stable baseline and improved performance – precision and detection limits – plus simpler operation. Compared to pseudo double-beam approaches offered in other systems, which move an optic or the burner head, the AAnalyst 400's true double-beam system compensates for signal drift many times per second rather than only once between each sample.

At the heart of the high-performance optical system is a unique solid-state detector designed to provide high-quantum efficiency in the UV region. When combined with the high light throughput of the echelle optical system, even difficult elements can be measured with excellent signal-to-noise ratios. Plus, using a solid-state detector means that no expensive photomultiplier tubes will ever have to be replaced, once again lowering the cost of ownership.

Automatic lamp selection and alignment ensure proper installation

The systems include a four-lamp mount with built-in power supplies for both hollow cathode lamps (HCLs) and electrodeless discharge lamps (EDLs) (Figure 4). EDLs provide much higher light output and longer lifetime when compared to conventional hollow cathode lamps. The patented PerkinElmer cableless Lumina™ lamps ensure proper connection. Just slide them in – you cannot connect them incorrectly. The Lumina lamps are then recognized by the AAnalyst 400 and the wavelength, slit and lamp parameters are automatically set and the lamps aligned.



Figure 4. Four-lamp mount for maximum flexibility.

improve productivity

with WinLab32 software

WinLab32 software combines ease-of-use and flexibility to bring a new level of productivity to your laboratory (Figure 5). Designed with extensive input from laboratory managers and AA users around the world, WinLab32 software provides all the tools and features needed to quickly start running samples and meet the requirements of today's laboratory.

Easy to learn and easy to use

With WinLab32, extensive Wizard features make complex tasks easy with step-by-step instructions. (Figure 6). Tool Tips, available in eight languages, provide additional information about screen text and entry fields. Status Panels display the status of each instrument component for easy monitoring. The Analysis List combines standard, sample and method information into one list, showing the exact order the analysis will be run. This list also displays the analysis status at all times and can be printed as a summary at the end of the run.

Improved productivity

WinLab32 software improves laboratory productivity by reducing the time required for method development, sample analysis and report generation. Furnace method development is completely automated, helping to optimize the pyrolysis and atomization temperatures as well as sample and modifier volumes (Figure 7). You can create methods, review or reprocess data offline, even add samples anytime without interrupting the active analysis. Recall Calibration eliminates the need for initial calibration, while Edit Calibration gives you complete control over the quality of your calibration curve before you proceed with QC and sample analysis.

Easily work with data

Once you have performed an analysis, WinLab32 software makes it easy to work with your data in any way you wish. The Reporting Wizard in Data Manager allows you to report and save data in a variety of formats compatible with commercial word processing and spreadsheet formats, even HTML (Figure 8). The Export Wizard in Data Manager allows comma- or other character-delimited files to be created.

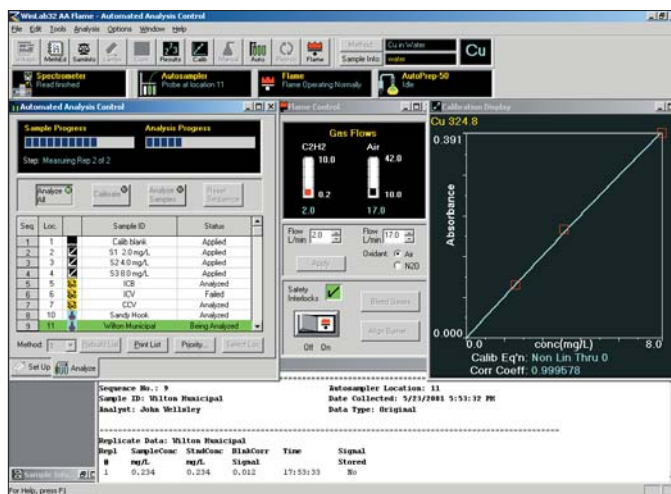


Figure 5. A suite of task-oriented windows can be displayed.

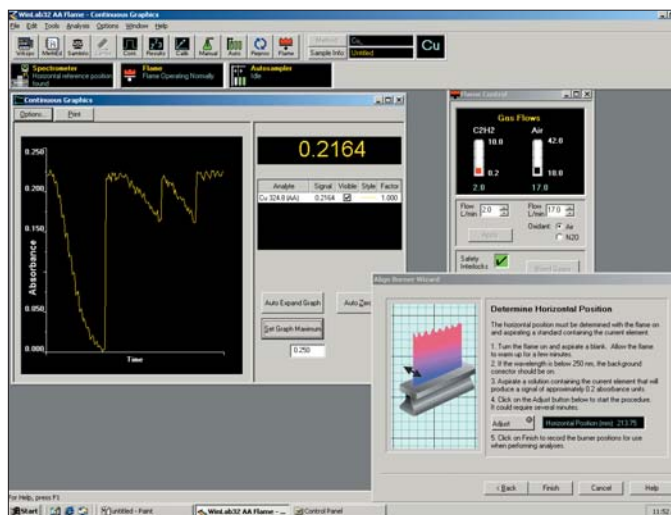


Figure 6. Wizards make complex tasks easy.

improved productivity (continued)

You can also select and export data items describing the sample, mean values or replicate values from the results library. Peak profiles can be exported and read by most spreadsheet programs. Use a PerkinElmer LABWORKS™ LIMS system to create sample-information files from backlog lists or QA batches and to store results.

Meeting regulated laboratory requirements

Many laboratories must comply with a variety of regulations imposed by government agencies or quality protocols and WinLab32 software can help your laboratory meet these regulations. Leveraging the powerful security features of the Microsoft® Windows® operating system, WinLab32 software provides the protection your laboratory needs. WinLab32 software allows the administrator to define groups and assign permission levels using password-controlled access. Once an analysis is completed, a copy of the method is stored with the results and the software even “signs” its data during storage. This ensures that any alteration is readily detected using Data Manager’s Verify Signature

feature. Reprocessing does not change the stored data, but rather new data will be written to the database with an appropriate notation.

The optional Enhanced Security™ (ES) software adds additional capabilities needed for regulatory requirements such as 21 CFR Part 11. Some of the regulatory features include the following:

- A Master Event Log records all actions performed by the user.
- Version numbers added to all files and data sets.
- Options to prevent analysis without data storage.

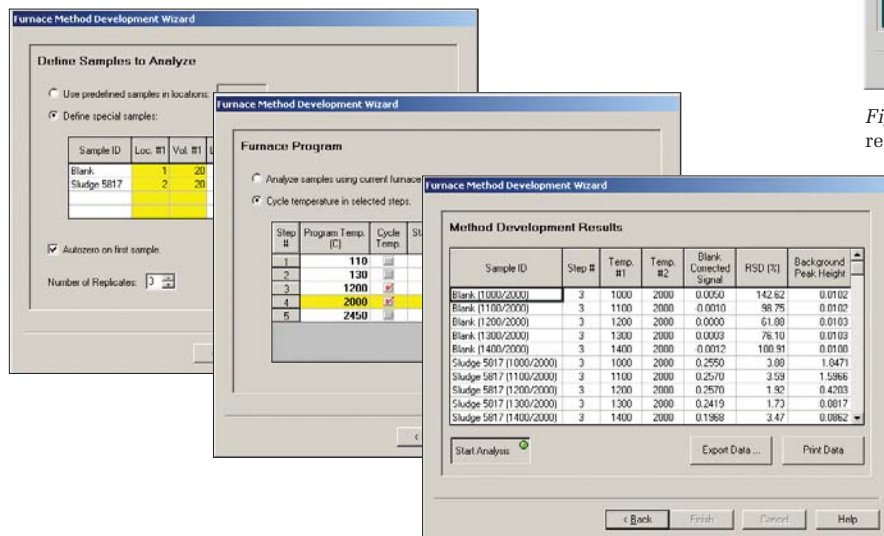


Figure 7. Method development is simplified using the Furnace Method Development Wizard.

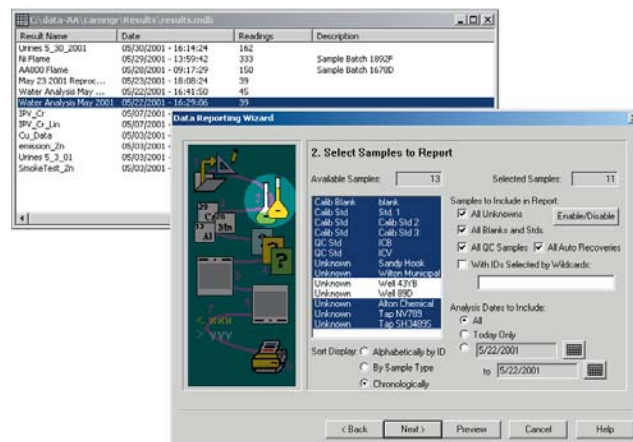


Figure 8. Data Reporting Wizard allows you to report your data in a variety of formats.

integrated solutions

for your application

Whatever your needs, you can trust PerkinElmer, the leader in inorganic analysis, to provide you with the right tools for the job. A variety of accessories designed for specific types of analyses are available for the AAnalyst 400.

Graphite furnace with autosampler for lower detection limits

More than 30 years after PerkinElmer introduced the world's first commercial system, graphite furnace atomic absorption spectroscopy is still an excellent choice for quantitative trace-metal determination. Through decades of PerkinElmer pioneering developments and improvements, today's HGA 900 graphite furnace offers numerous advantages including:

- Lower capital investment
- Exceptional detection limits
- Lowest sample consumption
- Freedom from interferences
- Complete automation
- Proven reliability



Figure 9. Moving the HGA 900 into the sample compartment after removing the burner system.

With the included AS-800 autosampler accessory, the AAnalyst 400 can accommodate up to 148 samples with true random sampling. Digital, micro-stepper motor-driven pumps provide unmatched accuracy and reproducibility. The autosampler completely automates calibration, reducing operator time and eliminating dilution errors (Figures 9 and 10). The autosampler can be easily programmed to automatically add spikes and matrix modifiers, perform multiple injections and dilute over-range samples. Solutions can be automatically injected into preheated tubes to optimize drying conditions and analysis speed. Additionally, the AS-800 offers variable pipetting speeds to improve reproducibility for viscous solutions.



Figure 10. The AS-800 autosampler can accommodate up to 148 samples.

integrated solutions (continued)

Flame autosamplers improve throughput

The AS-90*plus* or the AS-93*plus* flame autosamplers automate standard and sample introductions for instrument calibration and sample analysis, extending the spectrometer's capabilities to those of a fully automated analytical workstation. Both PerkinElmer autosamplers come with a self-rinsing sampling probe and the flexibility to select from multiple tray configurations. An advanced drive system moves the sampling arm in the X and Y coordinates simultaneously, minimizing changeover time between samples (Figure 11). Random access gives you exceptional flexibility in the placement of samples and reference solutions. Corrosion-resistant sampling components are made entirely of acid- and solvent-resistant material, ensuring longer life. With the AS-93*plus* autosampler, a built-in peristaltic pump permits continuous rinsing of the sampling capillary between samples, significantly reducing the risk of carryover. In addition to the standard sample trays, the AS-93*plus* autosampler is compatible with trays from many 3rd-party suppliers, providing increased flexibility.



Figure 11. AS-93*plus* autosampler for fully automated flame analysis.



Figure 12. MHS-15 Mercury/Hydride system offers superior detection limits for hydride-forming elements.

Mercury/hydride analysis systems

The MHS-15 Mercury/Hydride System can adapt your AAnalyst 400 for high-sensitivity determinations of mercury and hydride-forming elements such as arsenic and selenium (Figure 12). The MHS-15 offers detection limits down to the ng range, while minimizing capital investment and operating costs.

An optional automated flow-injection based mercury/hydride system can also be added to the AAnalyst 400. These flow-injection atomic spectroscopy (FIAS) systems combine the advantages of mercury/hydride AA with those of flow injection, thus providing true automation and exceptional detection limits even for sequential multielement determinations (Figure 13).

FIAS-Furnace coupling combines the large sample handling capability of a flow-injection system with the sensitivity of the graphite furnace. This provides detection limits that are at least 100 times lower than those obtained with conventional graphite furnace for hydride-forming elements such as arsenic and selenium and for mercury. With flow injection or continuous flow sampling, you can analyze milliliters of sample instead of the normal microliter volumes typical for graphite furnace AA. Since the matrix is completely removed, analysis is simplified.



Figure 13. FIAS 100 flow injection system with AS-91 autosampler for improved detection limits.



Figure 14. Multiwave 3000 for fast, easy sample preparation.

AutoPrep 50 automatic dilution system automates flame AA

With automatic, intelligent on-line dilution capabilities, the AutoPrep™ 50 eliminates the time-consuming manual portion of your flame AA analyses. The AutoPrep also eliminates problems associated with manual dilution, such as carry-over and contamination. When used in conjunction with PerkinElmer autosamplers, the AutoPrep 50 provides fully automated sample introduction.

Multiwave microwave digestion system

The Multiwave™ 3000 system is a versatile and powerful microwave sample-preparation system that is easy to operate (Figure 14). Ideally suited for atomic spectroscopy techniques, the Multiwave system simplifies sample preparation for all sample types, including foods, oils, plastics and environmental samples.

PerkinElmer, Inc.

Expect more from the leader in atomic absorption

With over 40 years experience and a product line that includes flame AA systems, high-performance graphite furnace AA systems, flexible ICP-OES systems and the most powerful ICP-MS systems, PerkinElmer is the undisputed leader in inorganic analysis. We have placed over 40,000 systems throughout the world, performing inorganic analyses every hour of every day. With the largest technical service and support staff in the industry and a solid reputation for quality products and service, the AAnalyst 400 high-performance atomic absorption spectrometers deliver the maximum in performance and flexibility.

Whatever you're looking for, we've got it

PerkinElmer is a world leader in chemical analysis. Our analytical instrument technologies serve the fast-evolving pharmaceutical, chemical, forensic, environmental and semiconductor industries, providing integrated solutions – from sample handling and analysis to communication of test results.

As one of the best-known brands in research, analysis and testing, ours was probably the first analytical instrument you ever used. In addition to our AA systems, we offer a broad range of solutions in Luminescence, UV-Vis, NIR, GC, GC/MS, MALDI-TOF MS, HPLC, ICP, ICP-MS, Thermal Analysis, Elemental Analysis, FTIR and LIMS. There are over 60 years of experience built into every product we make. So, for leading edge R&D and demanding QA/QC, you get the speed, accuracy and reliability you seek – for the productivity you need.

Our service and support people are located in 125 countries throughout the world and are factory trained. Compliance doesn't get any easier than with our software, including 21 CFR Part 11 technical compliance on many products. And, convenient consumables and accessories ordering lets you get your hands on what you need fast.

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