



Agilent 200 Series AA Systems

**ATOMIC ABSORPTION SPECTROMETERS**  
**PRODUCTIVE, PRECISE, RELIABLE.**



**Agilent Technologies**

## PRODUCTIVE, PRECISE, RELIABLE.

**Agilent's AA range is productive, user-friendly and exceptionally reliable. The instruments deliver the high performance that analysts require, while being equally at home in routine laboratories where reliability and simple operation are vital.**

### **A family of Atomic Absorption solutions**

- Agilent's 240 AA combines flexibility with reliable hardware, providing budget-sensitive users with a high performance AA for routine flame/furnace/vapor analyses.
- Agilent's 240FS/280FS AA are fast and productive flame AA systems, with Fast Sequential operation doubling sample throughput and dramatically reducing running costs. Able to handle multi-element suites with ease, they are ideal for food and agriculture or any high throughput labs.

- Agilent's 240Z/280Z AA Zeeman Graphite Furnace AA (GFAA) systems are productive and precise, providing superior furnace performance and accurate background correction.
- Agilent's Duo system will double your productivity, providing true simultaneous operation of flame and graphite furnace without changeover delays.

Agilent is committed to continued product development across our entire range of atomic spectroscopy product lines. We are dedicated to delivering innovative technology, best-in-class quality and reliability, and unmatched support.



The Agilent 240FS AA



The Agilent 240Z AA

# FOR YOUR APPLICATION

Agilent is committed to providing solutions for your application. We have the technology, platforms, and expert guidance you need to be successful.

	 <b>INDUSTRIAL</b>	 <b>CHEMICAL &amp; PETROCHEMICAL</b>	 <b>ENVIRONMENTAL</b>	 <b>FOOD &amp; AGRICULTURE</b>	 <b>METALS/MINING</b>
<b>FS Flame AA</b> 240FS/280FS AA + SIPS 20	Pb & Cd in consumer goods e.g., toys, jewelry Ca, Cr, Cu, Fe, K, Mg & Na in plating solutions	Na & K in FAME (fatty acid methyl esters) Pb & Mn in unleaded gasoline	Heavy metals in soils	Major elements in food, beverage & agricultural samples Cations & nutrients in soils	Au, Ag & Pt group elements in ore grade material
<b>Flame AA</b> 240 AA	Chemical analysis of cement Zn & Sb in paper Ca, Cr, Cu, Fe, K, Mg & Na in plating solutions	Wear metals in used oils Additives (e.g. Ba, Ca, Mn & Zn) in fresh lubricating oils Major elements in polymers	Pb in airborne particulates		Major components in steel & alloys Analysis of high purity gold
<b>Vapor Generation AA</b> 240FS/280FS AA + VGA 77	As, Hg & Sb in coal fly ash		As, Sb and Se in sediments Hg in waters, effluent, etc. (US EPA Method 245.1) Hg in electronics & plastics (WEEE/RoHs)	Hg and As in fish & sea foods Trace As & Sb levels in plant materials	As & Sb in zinc plate solutions
<b>GFAA</b> 240FS/280FS AA + GTA 120	Al & Fe in paper	Ni, V, Fe & Na in crude oils Trace metals in engine oil		Pb and Cd in fish, sea foods & plant materials	Trace metals in high purity copper
<b>Zeeman GFAA</b> 240Z/280Z AA	Trace elements in high purity sulfuric acid Na, Ca and Si in pure process water	Trace elements in heavy, industrial fuel oils	Cd, Cu, Pb, Co & Ni in marine invertebrates Toxic elements in waters & soils (US EPA Method 200.9) Pb, Cd & Cr in electronics & plastics (WEEE/RoHs)	Cu, Fe & Ni in edible oils	Minor components in steel & alloys



The Agilent 280FS AA



The Agilent 280Z AA

## FAST SEQUENTIAL FLAME AA.

**Achieve the productivity and speed of sequential ICP with Agilent's Fast Sequential (FS) AA systems.**

Fast Sequential mode will:

### Boost productivity and slash running costs

- Determine the concentration of all elements from a single aspiration of each sample
- Halve your analysis time by reducing sample analysis delays
- Reduce sample consumption — with less delay throughout analysis and less sample waste
- Save labor and reduce running costs — the more elements you determine, the more you save on gas, reagent and lamp usage

### Get accurate results

- Determine 10 elements per sample in < 2 minutes without sacrificing data quality
- Provide full elemental coverage, no matter how many elements you require
- Improve precision and accuracy with online internal standard corrections for physical differences, sample preparation errors, or drift

### Simplify your analysis

- Take the guess work out of method development with SpectrAA's comprehensive cookbook
- Easily setup FS methods with the FS wizard
- Accelerate method development with increased sample throughput

### Tune your flame AA performance

Agilent's Mark 7 atomization system can:

- Achieve high sensitivity — typically > 0.9 Abs. from 5 mg/L Cu
- Optimize precision — typically < 0.5% RSD from ten 5 second integrations
- Reduce interferences for complex samples with removable twin headed mixing paddles
- Minimize burner blockage with a contoured burner design
- Corrosion-resistant components provide increased durability making it ideal for high acid matrices

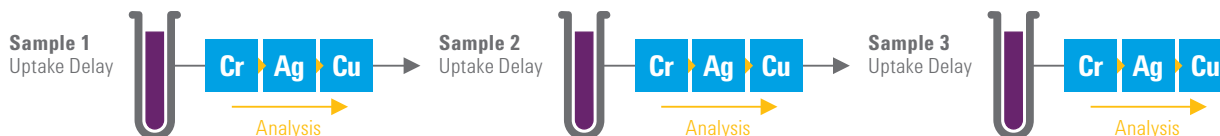


Agilent's Mark 7 atomization system

## Fast Sequential vs Conventional AA

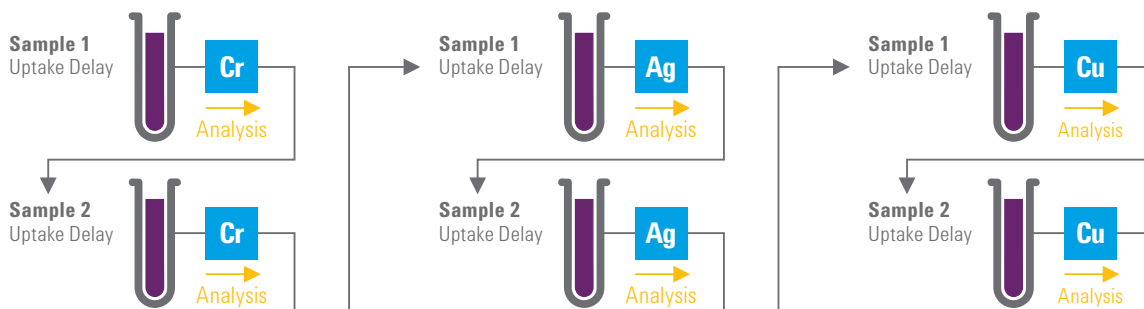
### Fast Sequential mode

Using Fast Sequential mode, samples are only aspirated once, with all elements being measured before the next sample is aspirated.



### Conventional mode

Conventional AA determines only one element from each sample aspiration, so samples are analyzed time and time again during a multi-element sequence.

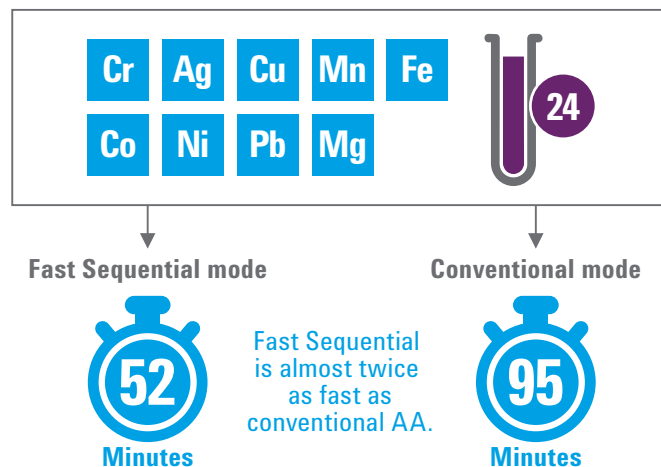


### How does Fast Sequential AA work?

1. The software sorts the elements by wavelength and flame type
2. All lamps operate simultaneously, to eliminate warm-up delays
3. A motor-driven mirror provides fast lamp selection
4. Reproducible wavelength positioning is achieved with minimal delays by the high speed wavelength drive (2,000 nm/min) operating under intelligent software control
5. The automatic gas control initiates instantaneous changes to programmed flows and provides superb reproducibility with optimum flame conditions for each element

### How much faster is Fast Sequential?

Fast Sequential can greatly improve productivity for a typical high throughput analysis.



## SENSITIVE & ACCURATE FURNACE AA.

**Agilent's 240Z/280Z AA with Zeeman background correction provides the furnace performance and background correction accuracy required to measure ppb levels of toxic, heavy metals such as Pb and Cd.**

### 240Z/280Z AA Zeeman dedicated GFAA

Agilent's 240Z/280Z AA features Zeeman background correction for correction over the full wavelength range, structured backgrounds, spectral interferences and high background absorbances.

### Outstanding performance for challenging samples

- Outstanding performance at ppb levels from the Constant Temperature Zone (CTZ) furnace design
- High sensitivity and freedom from interferences. Competing systems may limit performance by restricting elements, the wavelengths available for analysis, or compromising furnace conditions
- Accurate correction with Agilent's unique magnetic waveform providing double the background correction speed of longitudinal Zeeman instruments and three point polynomial interpolation

### Simple setup and operation

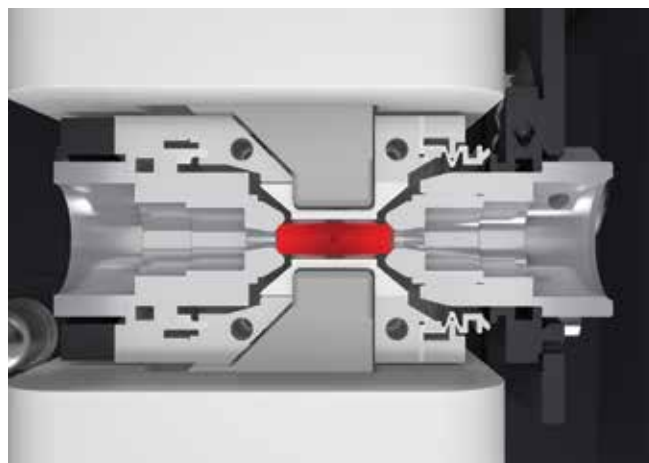
- Use Tube-CAM to accurately set the probe dispensing height and confirm the optimum drying temperature
- The Surface Response Methodology (SRM) furnace optimization software wizard simplifies method development, enabling you to easily select optimum conditions for your analysis
- Easy alignment — only a single light source is required

### High sensitivity and accurate background correction for your toughest samples

Zeeman background correction has been widely accepted by international regulatory agencies (such as the US EPA) as the most effective background correction technique for regulated environmental analyses.

Agilent Zeeman systems feature the transverse AC modulated Zeeman configuration with the field applied across the atomizer.

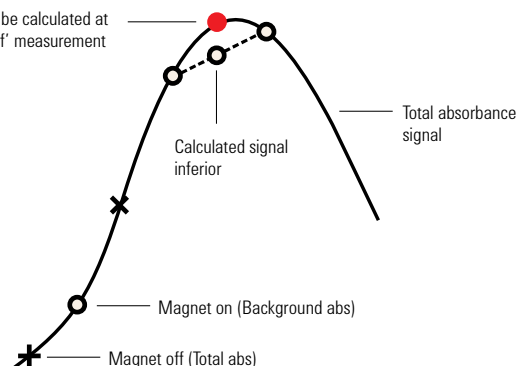
This avoids the sensitivity losses observed with a DC (permanent) magnet, and maximizes light throughput compared with longitudinal designs where end caps restrict the light passing through the pole pieces of the magnet. This ensures outstanding sensitivity and maximum performance with challenging sample matrices.



The Agilent Zeeman systems feature the transverse Zeeman configuration and Constant Temperature Zone furnace design.

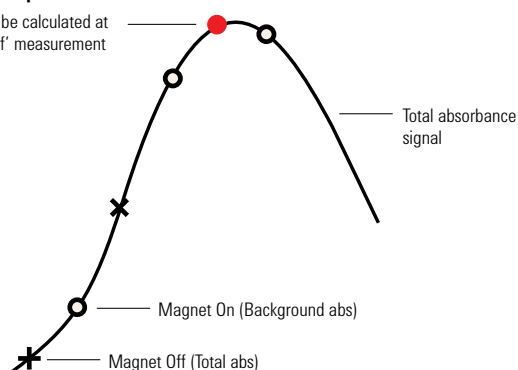
### Linear Interpolation Procedure

Background to be calculated at this 'magnet off' measurement



### Polynomial Interpolation Procedure

Background to be calculated at this 'magnet off' measurement



Agilent Zeeman systems use three point polynomial interpolations to accurately track the background signal, resulting in an 11-fold improvement in correction accuracy.

## The Duo – simultaneous flame and furnace

Agilent's range of Duo systems offer simultaneous flame and furnace operation that deliver the lowest cost per analysis, making it ideal for busy laboratories.

- Double the productivity of your laboratory — an Agilent AA Duo provides true simultaneous operation of flame and graphite furnace from a central computer
- Save time with dedicated atomizers that eliminate complex setup and time consuming changeovers. Each atomizer is permanently aligned for immediate use and never needs re-alignment
- Analyze any sample, with the widest linear dynamic range from sub ppb (using furnace and hydride techniques) to percent levels (flame)
- User friendly software delivers rapid instrument setup, easy operation and simple method development



An Agilent Duo system – simultaneous flame and furnace operation from one PC

## ACCESSORIES TO MEET YOUR ANALYSIS CHALLENGES.

With an extensive range of accessories to extend the capabilities of Agilent AA instruments, you can meet all your analysis challenges.



Agilent SIPS 20

### Automatic dilutions, calibrations and in-line additions and spikes

Agilent's Sample Introduction Pump Systems (SIPS) improve productivity with a range of unique benefits for flame AA.

- In-line addition of ionization suppressants during analysis, eliminating manual preparation before analysis
- Eliminates tedious, manual preparation of multiple calibration standards. SIPS requires only one calibration standard
- Fast, in-line dilution — even if your sample is out of the calibration range, you'll get an immediate result
- Enhances accuracy and precision — with < 2% error, SIPS reduces manual dilution errors
- Performs in-line spiking of samples for spike recovery studies
- Automates the tedious task of flame standard addition calibrations when tackling samples with complex matrices



Agilent SPS 4 Autosampler

### Fast and flexible autosampler

Automate your analyses with Agilent's SPS 4 Sample Preparation System and speed up flame AA even further. Using the SPS 4, you can create a convenient sample preparation platform for your laboratory.

- Fastest ever sample to sample changes
- High sample capacity to enhance laboratory productivity with support for rack exchange during analysis
- Flexible configuration with standard laboratory racks for different tube types and probes
- Optional environmental enclosure for purging/fume extraction





Agilent VGA 77

## Hydride analysis

The 240 AA flame with Vapor Generation Accessory (VGA 77) is well suited to cost-conscious environmental and food and agriculture laboratories. It offers a dedicated solution for trace level determination of Hg using the regulatory approved cold vapor technique, or hydride forming elements such as As and Se using the vapor generation technique.

- Determine mercury and hydride forming elements (As, Se, etc.) at ppb levels
- Convenience of flame AA operation with better sensitivity than flow injection
- Greater productivity – results are obtained in less than a minute, even with three replicates per sample
- Reduce sample consumption to as little as 8 mL per element during analysis
- Simple and automatic operation, as samples are automatically combined with a continuous flow of acid and reagent, for rapid reaction and best sensitivity
- Simple changeover. Reduce setup time and eliminate cross contamination by changing modules when switching between elements with conflicting chemistries



Agilent AA 280FS, fitted with the GTA 120

## Graphite furnace

Agilent's integrated GTA 120 Graphite Tube Atomizer provides superior furnace performance, no matter how difficult the sample, making it ideal for applications as diverse as chemical, petrochemical, food and agriculture.

- Extremely fast atomization even with difficult sample matrices
- Best signal-to-noise, due to the long atomization cell. This ensures the highest sensitivity and lowest detection limits
- Reduces running costs with extended tube lifetimes and a 40% decrease in gas consumption
- Simplifies method development. Use Tube-CAM to accurately set the probe dispensing height and confirm the optimum drying temperature. The SRM wizard also optimizes the ashing and atomization temperatures
- Run unattended longer — with capacity for 130 solutions, carousel changes are reduced for high throughput labs

# SOFTWARE TO SIMPLIFY YOUR ANALYSIS.

User friendly software with all instrument controls, sample results and signal graphics accessible from one window.

## Simple method development

- Be guided through every aspect of analysis, such as setting up a Fast Sequential sequence or creating custom racks and layouts for use with the SPS 4
- Automate furnace optimization with the Surface Response Methodology (SRM) wizard. This wizard recommends the optimum parameters and automatically creates a method using these conditions

## Run an urgent sample

- Got an urgent sample to run? Simply click the Random Sample option to run it immediately. When complete, the system will resume the programmed sequence

## Powerful reporting options

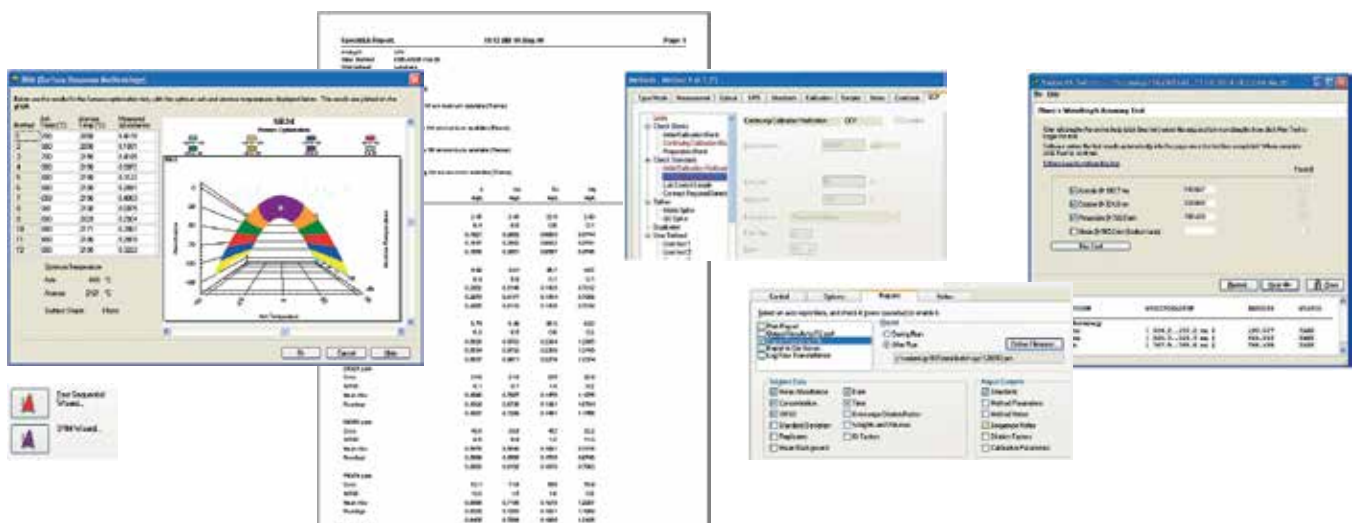
- Select which data to include and the report type, including sequential or multi-element formats
- Directly import and export to the LIMS online, eliminating tiresome and error-prone manual transfers

## Track consumables usage

- Save on downtime and running costs by tracking the operating lifetime of key consumables such as lamps, electrodes and pump tubing. You can also track how many replicates or samples have been run to help anticipate consumable replacement

## Compliance support for regulated industries

- Confirm your results during analysis with a comprehensive range of QC tests to ensure full compliance with US EPA requirements
- Instrument qualification services (IQ/OQ) provide initial and ongoing verification that your system meets regulatory requirements
- Optional Spectroscopy Configuration Manager (SCM) and Spectroscopy Database Administrator (SDA) software helps you achieve compliance with the US FDA 21 CFR Part 11 electronic records regulations



Guide >

Report >

Validate >

Integrate >

Certify >

## SERVICES AND SUPPLIES.

Maximize your productivity and data quality with genuine Agilent atomic spectroscopy supplies.

### Your essential resource for supplies

Agilent AA supplies are manufactured to stringent specifications and rigorously tested to ensure you can optimize performance. Designed to maintain the high performance that today's applications demand, Agilent also offers an extensive range of single-element and solid cathode multi-element lamps and high intensity UltrAA lamps for superior, cost effective performance. Why risk compromising your analytical result with anything else?

For more information see [www.agilent.com/chem/specsuppliesinfo](http://www.agilent.com/chem/specsuppliesinfo)

### Our services let you focus on what you do best

Whether you need support for a single instrument or multiple labs, Agilent can help you solve problems quickly, increase uptime, and maximize the productivity of your team with:

- On-site maintenance, repair and compliance
- Service agreements for all your systems and peripherals
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### Agilent Service Guarantee

If your Agilent instrument requires service while covered by an Agilent service agreement, we guarantee repair or we will replace your instrument for free. No other manufacturer or service provider offers this level of commitment to keeping your lab running at maximum productivity.



## For more information

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**Agilent MP-AES**



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**Agilent ICP-MS**



**Agilent ICP-QQQ**

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