



Agilent 6000 Series LC/MS Solutions

# CONFIDENCE IN QUANTITATIVE AND QUALITATIVE ANALYSIS

The Measure of Confidence



**Agilent Technologies**

## UNRIVALED ACHIEVEMENT AT EVERY LEVEL

The Agilent 6000 Series of LC/MS instruments embodies more than 40 years of innovative development in mass spectrometry, with systems that set the standard for reliability, flexibility, and sensitivity.



### Engineering Excellence in Every Aspect of Performance

- Innovative LC/MS platforms comprising single quad, triple quad, TOF, and Q-TOF technologies
- Leading HPLC and UHPLC instruments and columns that match your analytical needs and budget
- The widest range of interchangeable ionization sources ensure the right mode for your compounds of interest
- 24/7 Agilent reliability to maximize your lab's uptime and productivity

### Solutions that Span Critical Applications

- Environmental analysis
- Food safety analysis
- Forensic toxicology
- Biomolecule analysis
- Metabolite identification
- Proteomics and metabolomics
- Pharma and biopharma QA/QC
- Drug discovery and development

# FASTER SEPARATIONS, BETTER DATA, AND GREATER PRODUCTIVITY

Many technological developments illustrate Agilent's commitment to innovative design and performance. No matter where you look in our portfolio, the performance and reliability serve to demonstrate that Agilent is serious about mass spectrometry.

## Powerful HPLC and UHPLC Separations

Agilent 6000 Series LC/MS systems integrate seamlessly with our 1290 Infinity LC to routinely deliver results. Agilent MS instruments are the only systems that can accurately capture the unmatched throughput of ultrafast UHPLC separations.

## Novel HPLC-Chip Technology

Agilent 6000 Series LC/MS systems are fully compatible with our innovative HPLC-Chip technology—a plug-and-play alternative to complicated conventional nanoflow source configuration. HPLC-Chip/MS delivers robust, reproducible, and ultra-sensitive results from small sample volumes.

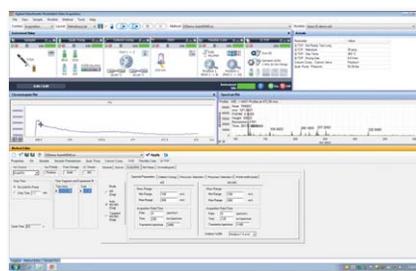
## MassHunter Software

Comprehensive MassHunter software controls Agilent LC/TOF, LC/Q-TOF, and LC/triple-quad instruments, as well as Agilent HPLC modules and the Capillary Electrophoresis system. The same Data Analysis software is common for GC/MS, ICP-MS and LC/MS platforms.



Agilent 1290 Infinity LC system

HPLC-Chip technology



MassHunter Software

## UNPRECEDENTED PERFORMANCE AND PROVEN RELIABILITY

From routine QC to research-level applications, Agilent 6100 Series Single Quadrupole LC/MS systems deliver superior MS data quality in an easy-to-use, space-saving package. With configurations to fit all budgets, the industry's most popular single quad LC/MS complements your existing LC detectors and integrates seamlessly with Agilent's ChemStation LC control.



**Agilent 6100 Series Single Quadrupole LC/MS systems**—the sensitivity, selectivity, and information content of mass spectrometry in an amazingly compact package.

- **Faster acquisition speeds** let you take full advantage of the higher throughput of today's faster UHPLC chromatography with 16,000 amu/second scan speed.
- **Ultra-fast ion polarity switching** lets you obtain both positive and negative spectra (up to 20 spectra/second), providing maximum information from a single injection—essential for second-wide UHPLC peaks.
- **Faster injection-to-injection cycle time** (<10 seconds) lets you run more samples per hour.
- **Supports walk-up operation**, mass-based fraction collection, and data conversion to MassHunter.
- **Supports front end separation techniques** such as SFC, CE and direct sampling devices.

## ULTRA HIGH DEFINITION TOF TECHNOLOGY FOR UNPARALLELED CONFIDENCE

Whether you are confirming synthetic compounds, profiling biomarkers, identifying impurities, screening for pesticides, or characterizing intact proteins, the Agilent 6230 Accurate-Mass Time-of-Flight (TOF) LC/MS system delivers unmatched speed and performance in a compact benchtop instrument.

- **Sub ppm mass accuracy** improves confidence and reduces false positives.
- **Resolving power of 22,000** distinguishes desired compounds from interferences.
- **Data acquisition rates of up to 30 spectra per second** ensure compatibility with fast chromatography and high-throughput methodologies.
- **Up to five orders of in-spectrum dynamic range** reveals trace-level targets even in the presence of vastly more abundant compounds.
- **Low picogram on-column sensitivity** finds impurities or biomarkers at extremely low concentrations.
- **Accurate intact protein MW determination**, in combination with MassHunter BioConfirm software, allow rapid QC of recombinant biotherapeutics.
- **Automatic tuning and automated introduction of internal reference solution** ensure consistent mass accuracy and reliable molecular weight measurements over wide temperature ranges.



**Ultra High Definition TOF technology** brings together proprietary innovations to achieve the performance required for screening applications.

## SUPERIOR SENSITIVITY, EASY UPGRADEABILITY

The Agilent 6400 Series Triple Quadrupole LC/MS Systems provide superior sensitivity, renowned reliability, and easy upgradeability for your quantitative applications in pharmaceutical ADME/DMPK studies, biomarker validation, clinical research, food safety, forensics, toxicology, and environmental analyses.

The 6420 offers affordable entry into the world of triple quadrupole analysis. Upgrading to the 6430 brings enhanced sensitivity through improved pumping and collision cell transmission; a further upgrade brings the Jet Stream Technology of the 6460 with extended mass range and even greater sensitivity. The 6490 incorporates novel iFunnel technology for ultra-trace analysis—with attogram limits of quantitation and an unprecedented six orders of linearity for your most demanding quantitative analyses.



**The new standard for triple-quad sensitivity.** Agilent 6490 with iFunnel technology delivers unmatched sensitivity

- **Triggered MRM (tMRM)** combines fast and sensitive MRM quantitation with the generation of a product ion spectrum for library searching and compound screening and confirmation.
- **Ultra fast MRM acquisition and ion polarity switching** using an innovative collision cell to eliminate cross-talk and enable 1 ms MRM dwell times, together with 30 ms fast polarity switching, ensures compatibility with UHPLC analyses.
- **Higher full scan speed** of up to 12,500 Da/second allows you to take full advantage of today's high throughput UHPLC chromatography.
- **Dynamic MRM (dMRM)** simplifies method development and allows up to 4,000 compounds to be quantified in a single method with optimal sensitivity and reproducibility.
- **MassHunter Optimizer software** automatically optimizes MRM conditions for both small molecules and peptides.
- **Agilent Automated Card Extraction LC/MS System** provides a uniquely sensitive and turn-key solution for dried blood spot analysis in clinical research and pharmaceutical metabolite profiling.

## ROUTINE ACCURATE MASS, SUPERIOR MS/MS SENSITIVITY, UNCOMPROMISED PERFORMANCE

Incorporating several novel technical innovations, the Agilent 6550 iFunnel Q-TOF delivers the highest MS/MS sensitivity, dynamic range, mass accuracy and scan speed. The 6540 system gives you the capabilities needed to profile, identify, characterize, and quantify drug targets, food contaminants, proteins/peptides, or metabolomics samples.

- **Sub ppm mass accuracy** dramatically reduces uncertainty, improves database search scores and molecular formula generation of unknowns, while minimizing false positives.
- **Enhanced resolving power of 40,000** provides added confidence that you are detecting all mass peaks of interest in complex samples.
- **Superior MS/MS sensitivity** helps you identify very low-abundance compounds at femtogram levels.
- **Dynamic range of up to five orders in-spectrum** improves detection of low-abundance compounds in the presence of other major components.
- **Scan rates of up to 50 spectra per second** provide excellent spectral quality for fast UHPLC and HPLC-Chip separations.



**The world's most sensitive Q-TOF.** The Agilent 6550 iFunnel Q-TOF LC/MS delivers the lowest limits of detection over the widest linear dynamic range—all in a benchtop system.

## INFINITELY BETTER LC/MS RESULTS

Superior separations are key to obtaining the best results from your 6000 Series LC/MS. Agilent's 1290 Infinity LC System delivers best-in-class UHPLC speed and resolution.

The ideal front end for any Agilent mass spectrometer, the 1290 Infinity LC system allows you to optimize your separations to meet the needs of your analysis. UHPLC speed and unprecedented peak capacity and resolution combine to eliminate co-elution and peak overlap.

ZORBAX RRHD 1.8  $\mu\text{m}$  columns deliver the resolution and peak definition required for critical LC/MS analyses, with robust, reliable performance over the extended operating range of the 1290 Infinity LC System.

The extremely wide operating power range of Agilent's 1290 Infinity LC System—from 1200 bar at 2 mL/minute to 800 bar at 5 mL/minute—enables Agilent's 1290 Infinity LC System to deliver faster separations without loss of chromatographic resolution.



ZORBAX RRHD



Agilent 1290 Infinity LC system

### Agilent HPLC-Chip—Maximum Sensitivity for Low-level Samples

Working seamlessly with the Infinity Series Nanoflow LC system, Agilent's revolutionary HPLC-Chip integrates the sample enrichment and separation columns of a nanoflow LC system with the connections and nanospray tip used in electrospray mass spectrometry—all on a reusable microfluidic chip about the size of a microscope slide.

Solvent and sample delivery to the chip, high-pressure switching of flows, and automated chip loading and positioning in the MS source are accomplished by Agilent's HPLC-Chip Cube MS interface.

An embedded RF tag tracks usage and operating parameters.

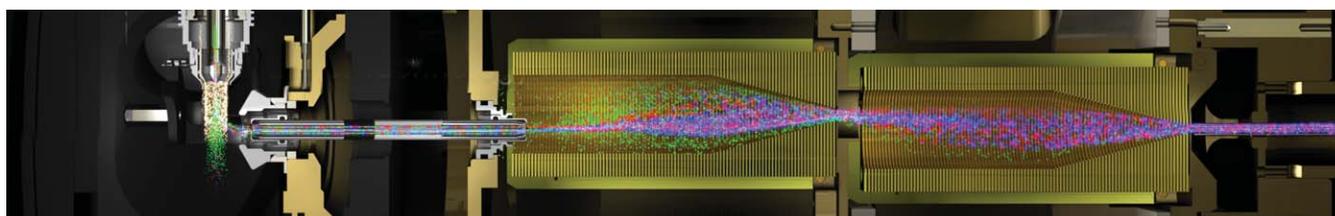
- High sensitivity ensures low-level sample fidelity
- Narrower, better-defined chromatographic peaks allow confident MS identification
- Reusable chips with multiple functionalities enable easy, interchangeable workflows with maximum uptime and productivity



Agilent HPLC-Chip and Chip Cube interface

## TAKE YOUR ANALYSIS TO NEW LIMITS

Pioneering developments from Agilent push the performance envelope of LC/MS into new realms of sensitivity and productivity.



Agilent iFunnel technology

### Proven iFunnel Technology

Agilent's proprietary iFunnel Technology combines three Agilent innovations: Jet Stream sample introduction, providing high-efficiency ESI ion generation and focusing; a hexapole capillary; and a unique dual-stage ion funnel assembly. Together, these technologies reduce neutrals and increase ion sampling to dramatically improve overall signal within the system, delivering significant increases in sensitivity compared with conventional instruments.

### Cross-platform Technology

All Agilent LC/MS instruments share common interface which allows users of one instrument type to rapidly become familiar with new instruments. Other features help ensure cross-platform compatibility; the collision cell in the Q-TOF and triple-quad instruments lets you set up MRM experiments on one instrument and simply transfer them to another, while interchangeable ion sources assure repeatable, consistent ion formation on any platform.

## SIMPLIFY AND STREAMLINE YOUR DATA ANALYSIS

From instrument tuning to final report, Agilent's MassHunter Workstation software was designed to make MS analyses faster, easier, and more productive. Its familiar, intuitive user interface is common to all Agilent MS platforms.

### Integration with Applications and Workflows

Compound-centric data processing and intuitive, workflow driven navigation shorten the path between acquiring raw analytical data and getting answers. MassHunter's Qualitative Analysis and Quantitative Analysis software modules have a customizable user interface, provide for unprecedented automation, and integrate seamlessly with other application-specific MassHunter software.

**Mass Profiler Professional**—Uses powerful statistical and mathematical models to analyze multiple MS data types, enabling you to easily identify differences between sample groups.

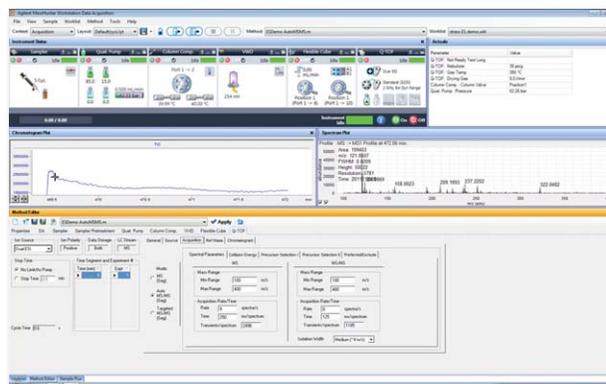
**MassHunter Study Manager and Optimizer software Modules**—Automate the complete analysis process from compound optimization through reporting. MassHunter software can optionally be integrated with WATSON or other LIMS systems.

**MassHunter BioConfirm software**—Couples feature finding and deconvolution algorithms with sequence matching tools for fast, accurate characterization of proteins, synthetic peptides, nucleotides, and their variants.

**Spectrum Mill for MassHunter Workstation**—Quickly identifies proteins and peptides through fast database searches and provides automatic and manual match validation; also supports label-free and stable-isotope-based quantitation strategies.

### Software and Services

MassHunter software provides comprehensive tools to help you address the requirements of GLP/GMP and 21 CFR Part 11 compliance for quantitative analysis. Agilent qualification services shorten the time between installation and productive operation.



MassHunter Software

## FAST-TRACK YOUR PRODUCTIVITY

Agilent's Pesticide, Forensic Toxicology, and Veterinary Drug LC/MS Application Kits are designed to help you spend less time on setup and configuration and more time generating the highest quality results from new technologies. Customers report that they can save days or even weeks of typical start-up time and effort in the lab.

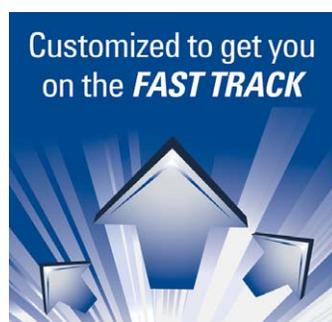
### Minimize the Need for Tedious Manual Method Development with Predeveloped Databases and Libraries

Multiresidue analysis of pesticides, veterinary drugs, and forensic toxicology compounds is challenging for two reasons: low concentrations and a large number of analytes to be monitored and quantified. With so many variables to consider, it can be difficult to find a solid starting point for method development.

### A Faster, Easier Way to Develop Customized Screening Methods

Agilent's Pesticide, Forensic Toxicology, and Veterinary Drug LC/MS Application Kits are truly unique, because much of the development work has already been completed. The kits feature easy-to-use examples that show you how to set up screening methods on your triple quadrupole, TOF, or Q-TOF instrument, and quickly adapt them to your specific needs. It also includes:

- An accurate mass or tMRM database and library for hundreds or thousands of compounds.
- Pre-tested analytical methods are provided for targeted or untargeted screening of analytes that are routinely monitored around the world.



Learn more

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