Agilent 5977A Series GC/MSD

RESOLVE YOUR SEARCH FOR PERFORMANCE

The Measure of Confidence

Agilent Technologies

Resolve your search for sensitivity, speed, and seamless integration

The NEW Agilent 5977A Series GC/MSD

Agilent 5977A Series GC/MSD builds on a 45-year tradition of leadership and innovation, bringing together the technologies of the industry's best GC and MS systems.

This advanced instrument provides everything you need to take your lab to a higher plane of productivity and confidence – including increased sensitivity, superior workflow, and software tools that simplify method optimization and lower your operating costs.

Simply put, the 5977A Series GC/MSD can help you meet your toughest challenges… today and in the future.

The Agilent 5977A Series GC/MSD is the latest addition to the industry's broadest, most feature-rich portfolio of GC and GC/MS systems and software. It has all the newest elements for faster vent times, eco-friendly resource management, and GC/MSD system protection – including the ability to use hydrogen as a carrier gas.

Agilent 5977E GC/MSD

Agilent 5975T LTM GC/MSD

Agilent 7000B Triple Quadrupole GC/MS

Agilent 7200 Q-TOF GC/MS

Agilent 240 Ion Trap GC/MS

Higher sensitivity

Our new Extractor Ion source and tuning protocols increase MSD sensitivity, so you can confidently detect trace-level compounds and routinely achieve lower detection limits.

Maximum productivity

Newly integrated hardware and software features simplify your workflow and help you get more done with fewer resources.

The best software options

You pick the workflow that makes you most productive. Continue to use our versatile and robust ChemStation – or choose our proven MassHunter software.

New hardware and software features ensure reliable results with less operator attention

The most reliable GC ever produced

Agilent's new flexible 7890B GC is designed for MS analysis to optimize system performance. ***Page 4***

The most sensitive MSD

With its new Extractor EI source – plus the *only* quadrupole operating at up to 200 °C – the Agilent 5977A Series GC/MSD consistently delivers stable, superior performance. ***Page 6***

Versatile workflow tools

Optimize your GC and MS methods – and take complete control of your analysis. ***Page 8***

Integrated intelligence

Smart technology protects the MSD from damage, saves time, and optimizes productivity to improve your return on investment. ***Page 10***

Complete inert pathway

From carrier gas introduction... to inlet... through detector... the system's inert path prevents analyte loss and decomposition. ***Page 18***

Complete workflow solutions

Agilent Analyzers and Application Kits let you start generating quality data immediately after installation. ***Page 19***

Reduce dependency on helium

Integrated calculators help you convert helium methods to more available – and less expensive – gases like hydrogen. ***Page 4***

Eco-friendly GC/MSD

Integrated **Sleep/Wake modes** – plus smart features in the new roughing pump – reduce gas and energy usage. You can also switch to lower-cost gases while in standby mode. ***Page 5***

To learn more about the Agilent 5977A Series GC/MSD, visit **www.agilent.com/chem/5977A**

Agilent's New 7890B Gas Chromatograph

Resolve your search for reliability with the next evolutionary step in GC

Building the world's most trusted GC system is an ongoing process. With every step, we improve performance, increase speed, and develop new analytical capabilities – all while never losing sight of *results*.

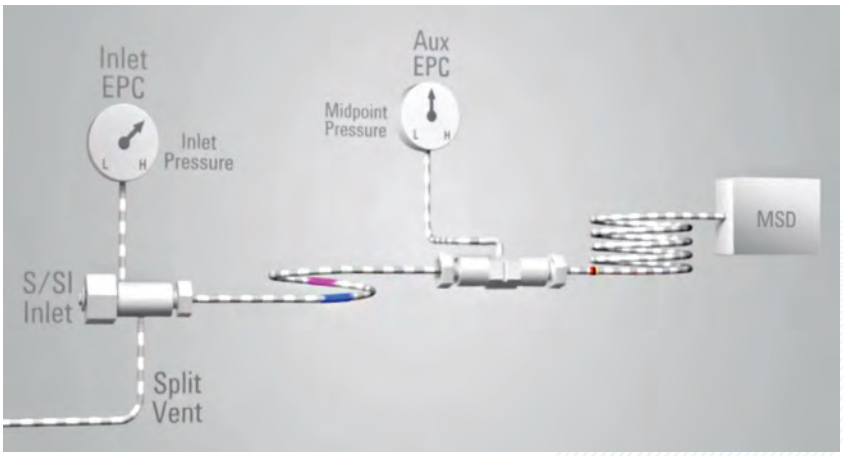
Now, we have achieved a new level of productivity and GC/MSD integration with the new Agilent 7890B GC.

Agilent's flagship 7890B GC system has everything you need to generate data with confidence, while processing more samples in less time at the lowest possible cost. Its precise pneumatics and oven temperature control, combined with Agilent GC columns, give you outstanding inertness and retention time repeatability – the basis for all chromatographic measurement.

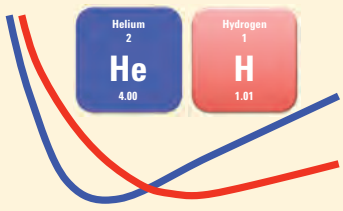
Capillary Flow Technologies enhance performance, productivity, and reliability

Advantages include:

- Improved retention time stability for heavy-matrix samples
- More stable chromatographic baselines
- Shorter analysis times
- Less source cleaning
- Longer column life



Plumbing diagram for the 7890B/5977A GC/MSD's concurrent, mid-point backflush option. *A new factory option lets you start using backflush immediately – supported by our integrated backflush wizard.*



Optimized for H_2 carrier gas

The 7890B/5977A GC/MSD is hydrogen ready. If your gas source is already in place, Agilent can help you make a successful transition.

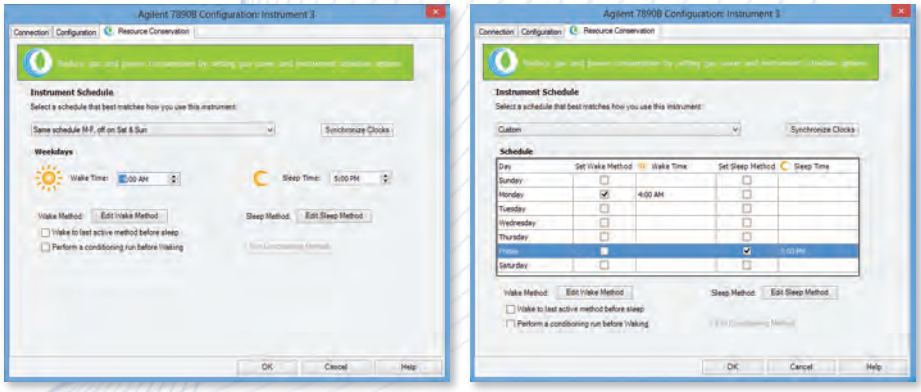
Quickly find and order the Agilent parts you need

Our new **integrated Parts Finder** helps you locate key parts for your 5977A Series GC/MSD. You can even build shopping lists that let you order directly from the Agilent website.

Conserve valuable resources

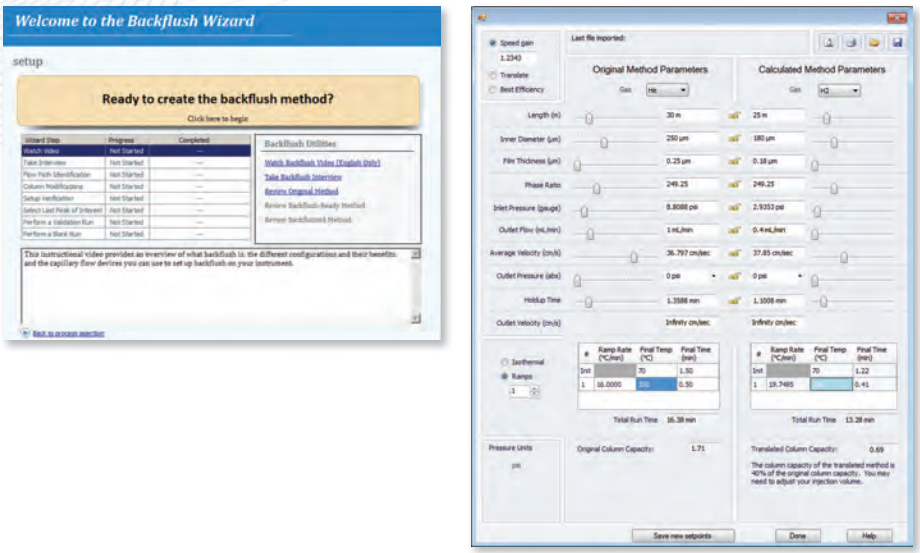
Sleep mode saves energy and gas – and protects your investment by cooling heated zones.

Wake mode prepares your system for use *before* the start of your next workday.



Simplify method setup and system operation

Integrated GC calculators automatically update optimal parameters, simplifying method development and implementation.



To learn more about the Agilent 5977A Series GC/MSD, visit **www.agilent.com/chem/5977A**

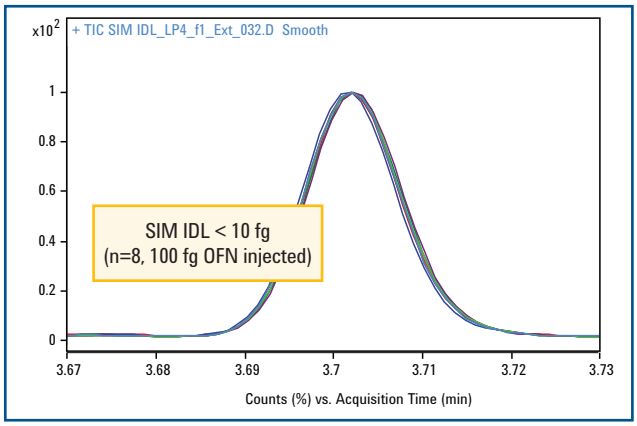
Agilent's 5977A Mass Selective Detector

The gold standard for sensitivity, stability, and spectral fidelity

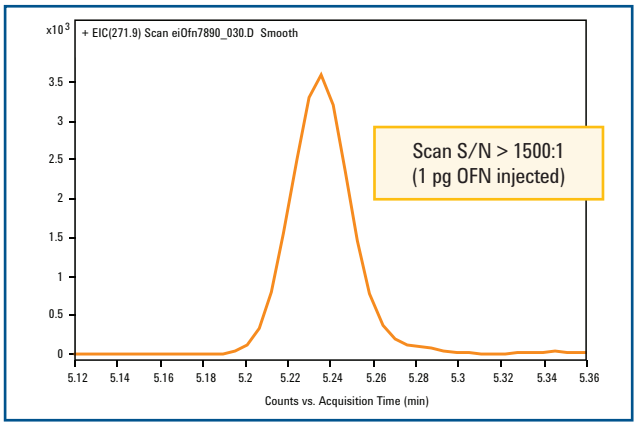
At every step of our GC/MSD evolution, Agilent is committed to continuous improvement with these goals in mind:

- **Unmatched sensitivity** for ultra-trace analysis
- **Sample integrity** preserved by inert components
- **Increased productivity** through innovative GC and MS hardware and software tools

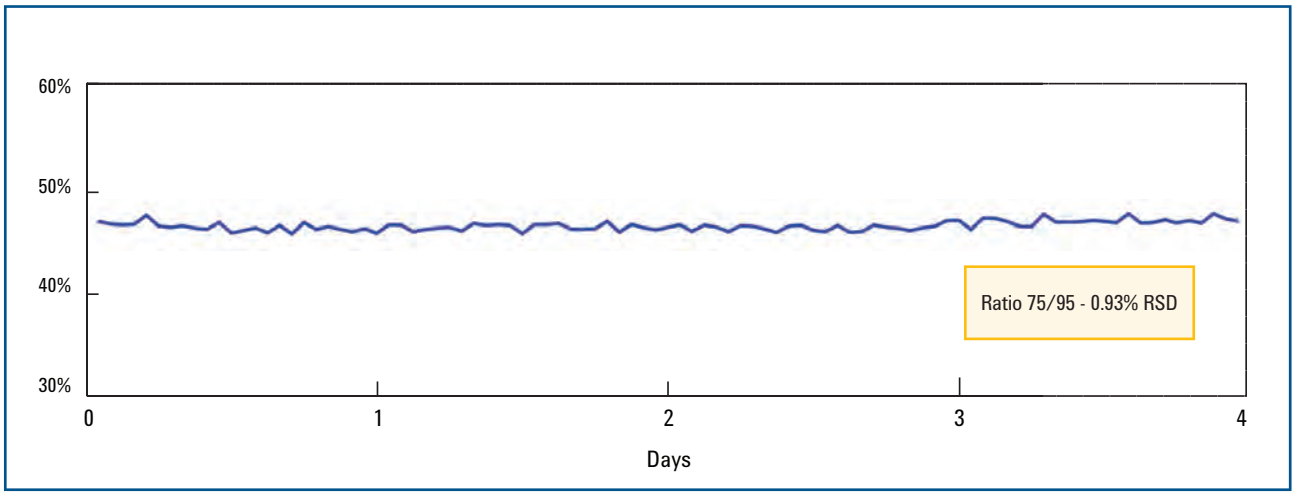
Higher-quality signals improve your trace-level detection – and your confidence



This statistically derived SIM Instrument Detection Limit (IDL) demonstrated at installation, confirms the unmatched performance of the entire GC/MS system.



The high sensitivity of the 5977A MS Detector with Extractor EI source is easily observed by the SCAN S/N specification.



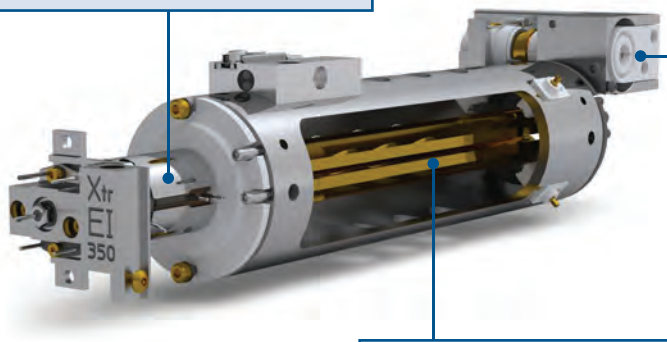
Extremely high spectral stability is demonstrated by a consistent 75/95 ion ratio for bromofluorobenzene (BFB), monitored over four days.

The heart of performance

The combination of the Extractor EI source, heated monolithic gold-plated quartz quadrupole, and Triple-Axis Detector delivers the most sensitive, reliable results.

Push-pull Extractor EI source design

Maximizes the number of ions that are successfully transferred out of the ion body and into the quad analyzer.

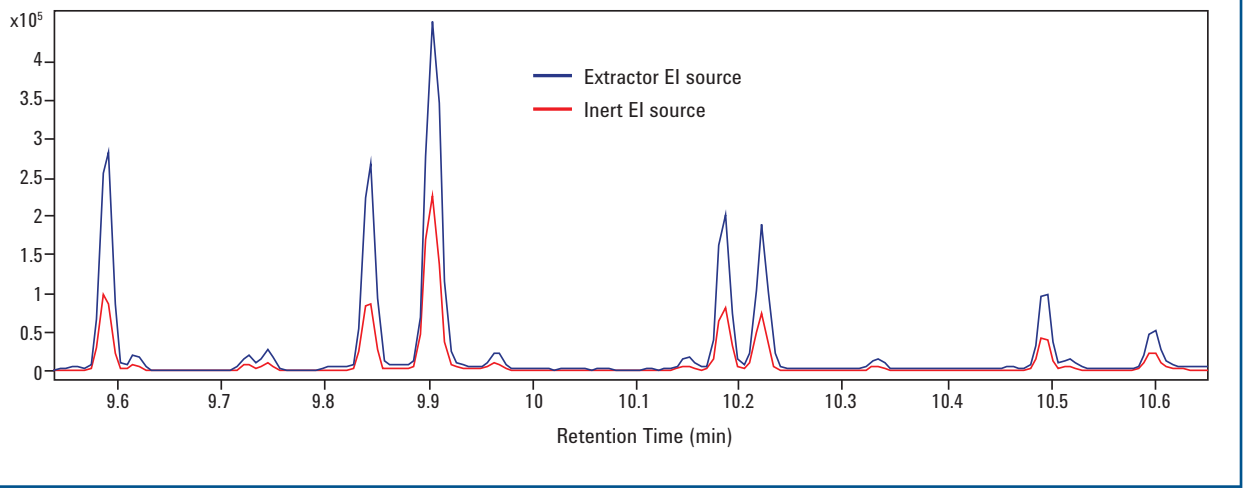


Triple-Axis Detector

Drastically reduces neutral noise, ensuring a cleaner signal and lower detection limits.

High-temperature, gold-plated monolithic quartz quadrupole

The quartz monolith guarantees perfect alignment for hyperbolic surfaces throughout the life of the MSD. Gold surfaces stay clean and maintenance free in high temperatures – up to 200 °C.



The new Extractor EI source produces 2.5 to 3 times higher sensitivity, compared to the Inert EI source.

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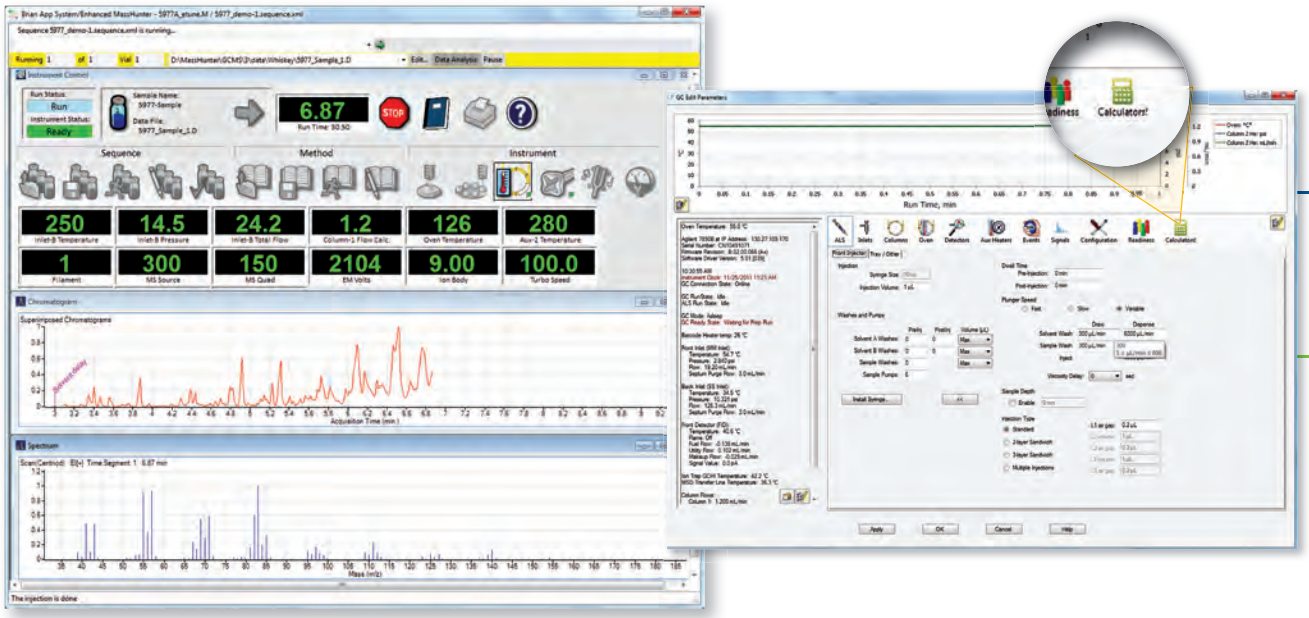
Integrated software

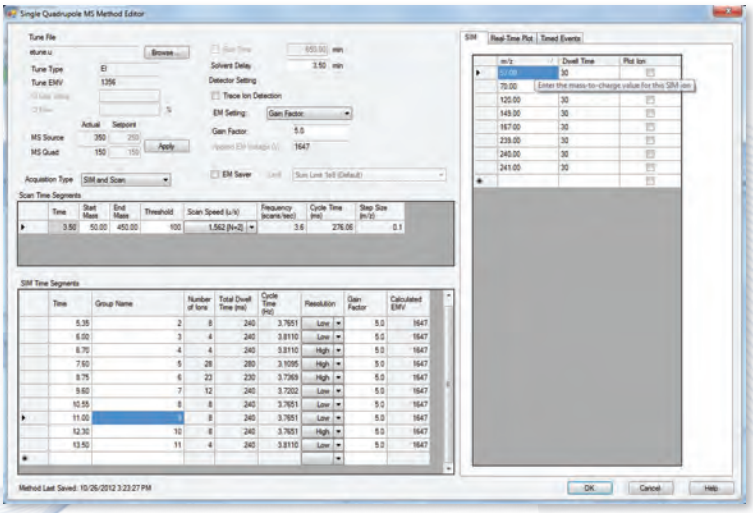
Transform your data into actionable information

GC/MSD instrument control: A single, user-friendly method/acquisition interface



A comprehensive selection of libraries and RTL databases

From general-purpose libraries for compound identification to targeted databases for specific applications, our MS databases simplify compound recognition and increase confidence in your search results. All are supported by both MSD ChemStation and MassHunter.



Compatible with earlier versions of MSD Productivity ChemStation methods – or import sections from other methods to simplify method development across multiple instruments.

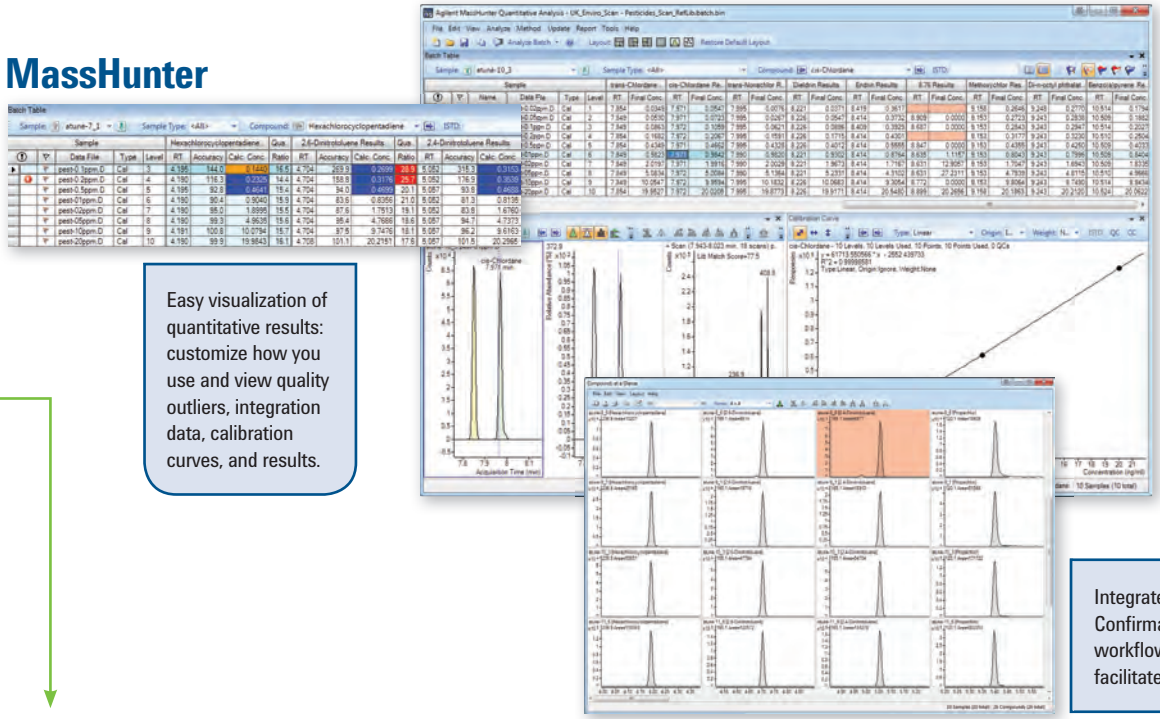
See and edit all your MS method parameters on one screen for easier method development.

Choose the data analysis option that suits the needs of your lab

ChemStation continues a 20-year tradition of helping labs develop, distribute, and share sensitive GC/MS methods and reports.

MassHunter provides a unified platform for all Agilent MS products – and puts the latest MS tools to work in your laboratory.

MassHunter



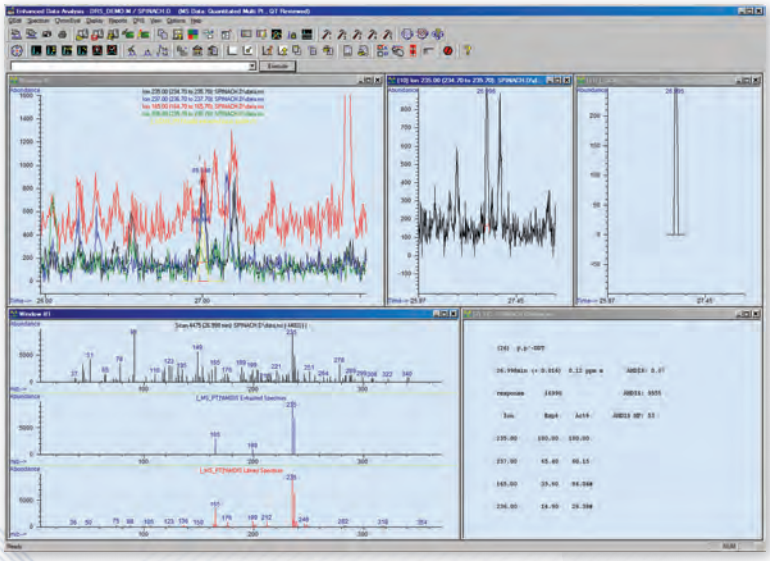
Improve the quality and speed of your data review with automated metrics and Unified Data Analysis for Agilent MS systems.

Easy visualization of quantitative results: customize how you use and view quality outliers, integration data, calibration curves, and results.

Intuitive reporting based on Microsoft Excel®.

Integrated Drug Confirmation Analysis workflow (DrugQuant) facilitates compliance.

ChemStation



The industry standard for two decades.

Integrated US EPA method (EnviroQuant) & Drug Confirmation Analysis (DrugQuant) workflows help you conform to prescribed methodology.

Deconvolution Reporting Software (DRS) enhances screening and confirmation in heavy-matrix applications.

Macro programming language maximizes flexibility.

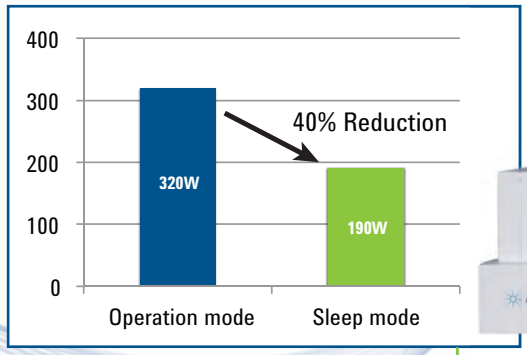
To learn more about the Agilent 5977A Series GC/MSD, visit **www.agilent.com/chem/5977A**

Work *smarter* with integrated GC, MSD, and software technologies

Integrated GC↔MSD communication and safety controls

- Direct communication between GC and MS helps detect faults – protecting both instruments
- Designed for hydrogen carrier gas, so you can switch from helium to less expensive carrier gases for faster analysis and greater chromatographic resolution

40% less power*

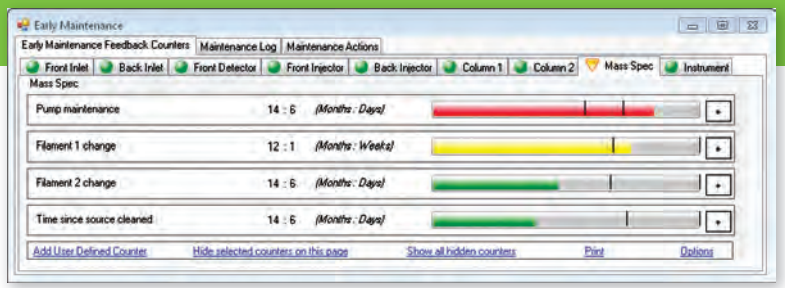


**Turbo molecular pump with DS42i power-saving option. May vary based on method conditions.*

Eco-friendly operation

- Smart roughing pump saves electricity in standby mode
- Sleep/Wake modes can easily be set to suit your schedule

Easy, cost-effective maintenance

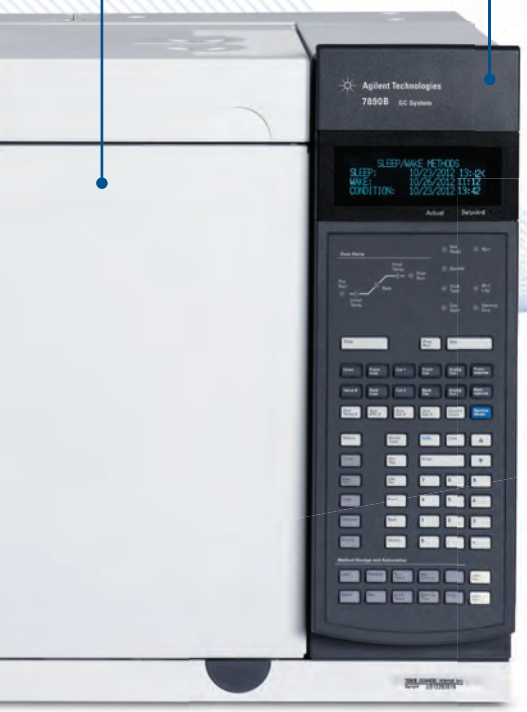


Long-term supportability and performance

- Modular analyzer design simplifies routine maintenance
- Early Maintenance Feedback (EMF) alerts you to minor problems before they lead to a major breakdown

The industry's best software platform

- Choice of MassHunter and ChemStation lets you select the workflow you need to generate answers quickly and confidently
- Built-in GC calculators and translators reduce method development time
- New Parts Finder tool quickly identifies parts and part numbers for easy re-ordering



Higher productivity and lower cost of operation

- New Quick Vent lets you spend less time on maintenance, and more time running samples
- Backflush Wizard makes backflush optimization fast and easy

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More than just hardware and software...

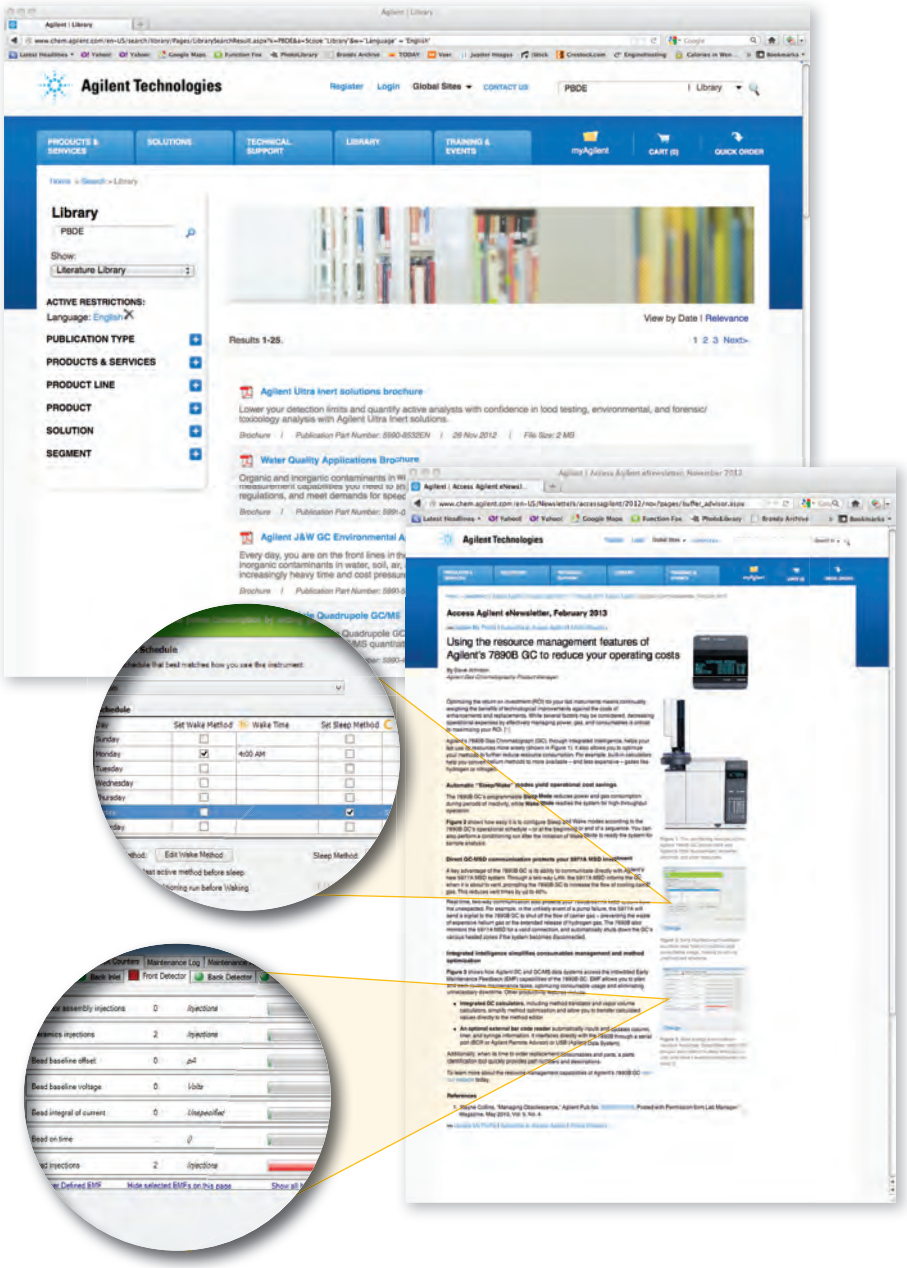
Application leadership that benefits individual labs – both small and large

The Agilent MSD changed the face of benchtop mass spectrometry, setting a new standard for performance and reliability that has yet to be duplicated. However, the most essential element in our customers' success is Agilent's ability to solve analytical challenges.

Agilent is prepared to put time, talent, and resources toward finding and developing new applications. And only Agilent has created a lab-bench-to-lab-bench collaborative process for meeting current and future application challenges.

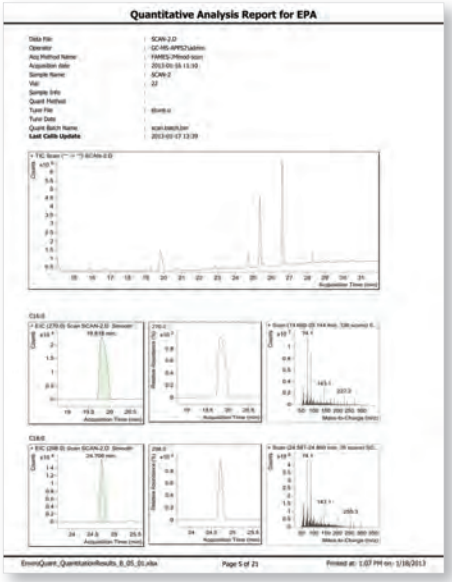
Agilent supports your lab's applications with:

- **Application Compendia** that put GC/MS methods, sample preparation guidelines, and searchable mass-spectral libraries at your fingertips
- ***Access Agilent* e-Newsletters** that deliver in-depth articles, practical tips, and links to the latest literature – all based on *your* individual preferences
- **Analyzers and Application Kits** provide tools to help you configure existing systems to new methodologies
- **RTL Databases** that incorporate MS information to help you identify target compounds in very complex mixtures
- **SubscribeNet Electronic Software Delivery** that takes the hassle out of obtaining downloads, licenses, patches, and more



Superior performance for the most rigorous methods

Whether you are analyzing volatiles in water or semi-volatiles in soil, Agilent's 5977A Series GC/MSD satisfies your method requirements with unmatched sensitivity, precision, and linearity – along with tools that reduce costs and analysis cycle time.



The Agilent 5977A Series GC/MSD delivers high spectral integrity for Purge & Trap analysis of volatile organic compounds (VOCs) – one of the most widely used water methodologies.

Our proprietary inert source material eliminates surface activity, resulting in more reliable library matches – and greater confidence in your data.

Agilent Analyzer and Application Kits are your shortest path to collecting high-quality data

Agilent VOC and SVOC Analyzer and Application Kits include all the tools and components you need to get your application started quickly – and shorten your time-to-results.

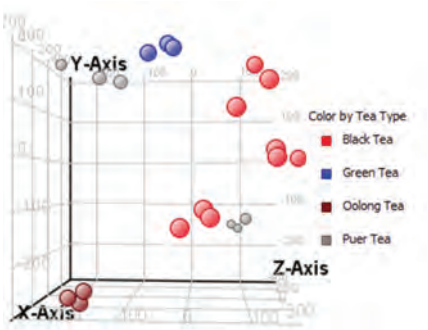
To learn more about the Agilent 5977A Series GC/MSD, visit **www.agilent.com/chem/5977A**

Advanced tools for confirming quality and consistency

Sensory test: classification of teas

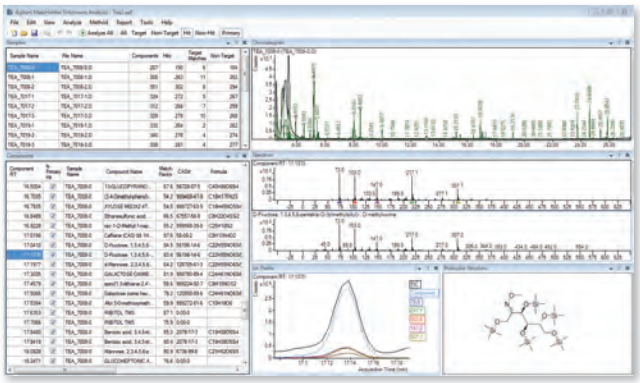
Tea extracts contain a large number of compounds, some of which have more bearing on flavor and aroma than others.

In this example, we used Mass Profiler Professional (MPP) software to construct a data model that could classify tea samples based on their chemical composition. The sensitivity and linearity of Agilent's 5977A Series GC/MSD allowed low- and high-intensity peaks to be included in the model for a thorough assessment of product quality.



Principal Component Analysis (PCA) in MPP, showing how the data cluster. Differences in chemical composition can be used to clearly differentiate the types of tea.

The MPP Prediction Model predicts an unknown tea sample, and can possibly be used to identify adulteration.



The integration of MassHunter Unknowns Analysis promotes an iterative workflow that increases analytical efficiency and quality.

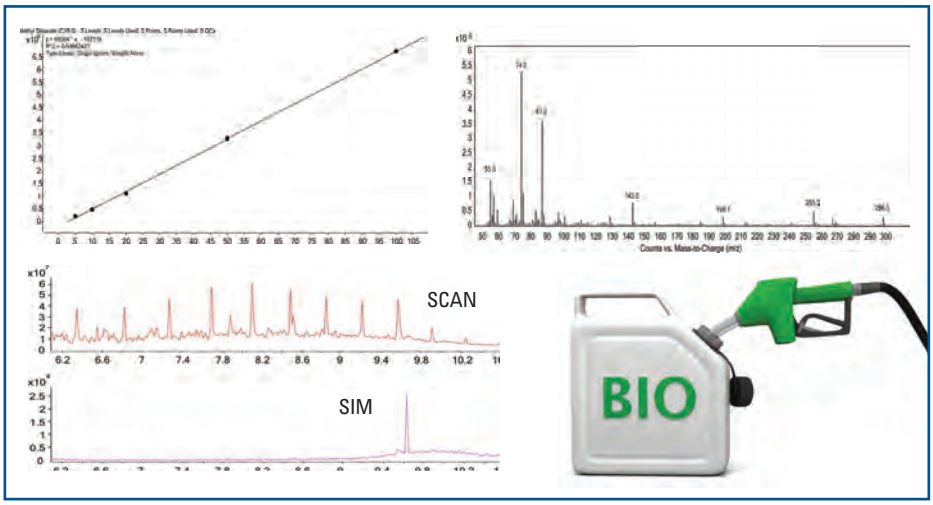
You can significantly reduce method development using one of Agilent's many Analyzer and Application Kits.

Perform reliable detection, identification, and quantification

Biofuel characterization

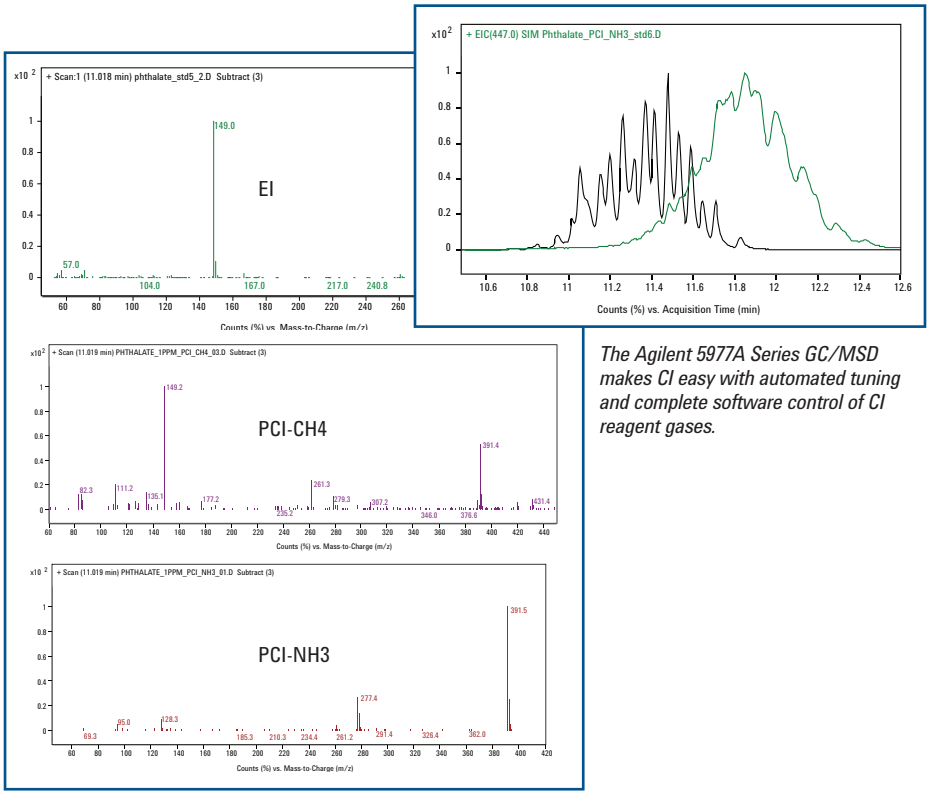
Agilent 5977A Series GC/MSD exceeds the criteria for accurate, sensitive biofuel analysis. The system's Inert Flow Path, high-efficiency Extractor Ion source, and heated gold-plated quartz quadrupole combine to deliver robust, high-sensitivity analysis for the full range of biofuel analytes.

The system is easily set up for simultaneous SIM/SCAN data acquisition to maximize sensitivity and selectivity, while providing full spectra for qualitative analysis.



Phthalate plasticizers

Positive chemical ionization (PCI) allows unambiguous identification of different phthalates based on an intense molecular ion response. You can configure the 5977A Series GC/MSD's hardware to handle a wide range of CI reagents – including hydrocarbons (like isobutane and methane) and "softer" reagents (like CO_2 and NH_3) – with trace-level sensitivity.



The Agilent 5977A Series GC/MSD makes CI easy with automated tuning and complete software control of CI reagent gases.

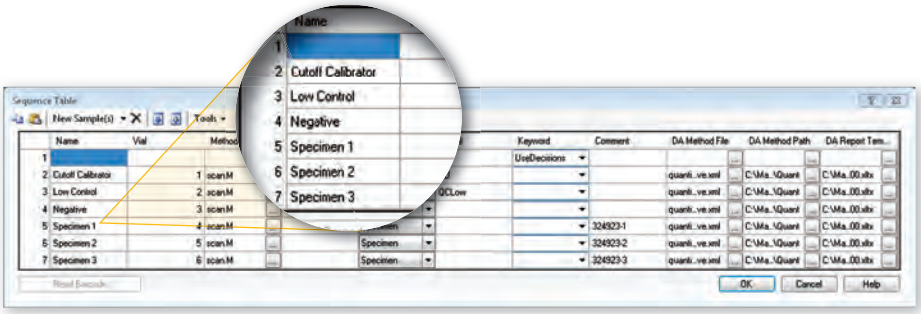
To learn more about the Agilent 5977A Series GC/MSD, visit **www.agilent.com/chem/5977A**

Optimize your workflow for routine drug confirmation with powerful tools for targeted analysis and reporting

MassHunter DrugQuant makes the specialized workflow of routine drug confirmation more productive and cost-effective than ever. Method quality guidelines can be followed *without* having to constantly monitor the run (or batch) for regulated compounds.

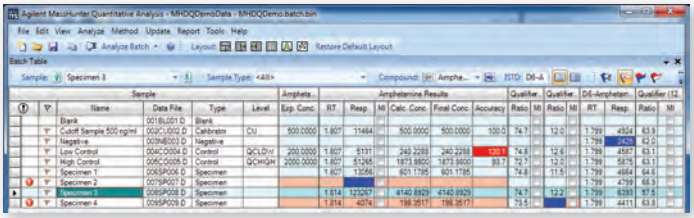
Intelligent sequencing

This tool defines the criteria for handling situations that may arise during batch runs – such as contaminated blanks, non-compliance with ISTD criteria, and analyte concentrations outside normal limits. Intelligent sequencing can also inject additional blanks, re-inject samples, and pause or abort the batch.



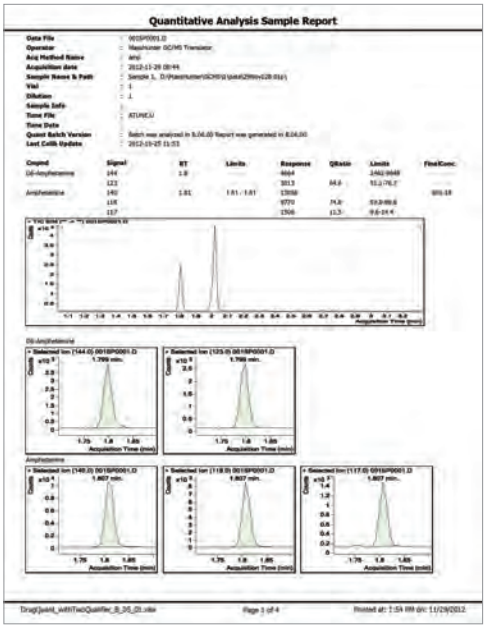
Easily review data and evaluate results

During automated quality checks, MassHunter software color-codes outliers to help you confidently verify results.



DrugQuant reports

Now available for both MassHunter quantitative analysis and classic MSD ChemStation Data Analysis (Drug Analysis mode), providing a familiar reporting format across all Agilent GC/MS systems.

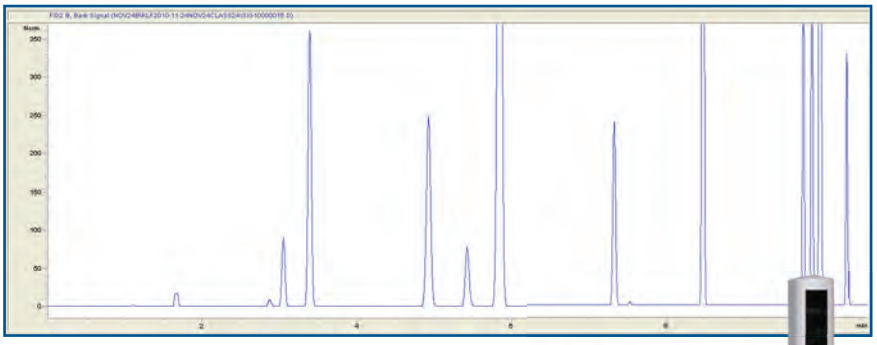


Reliably confirm targets and identify unknowns

Improve your compliance-based residual solvent analysis

For pharmaceutical quality-control labs performing GC analysis with headspace sampling, the Agilent 5977A Series GC/MSD ensures trouble-free operation, superior sensitivity, and high accuracy.

In addition, our MassHunter software lets you interactively archive your results to OpenLAB ECM, and helps you meet compliance requirements for residual solvent applications.

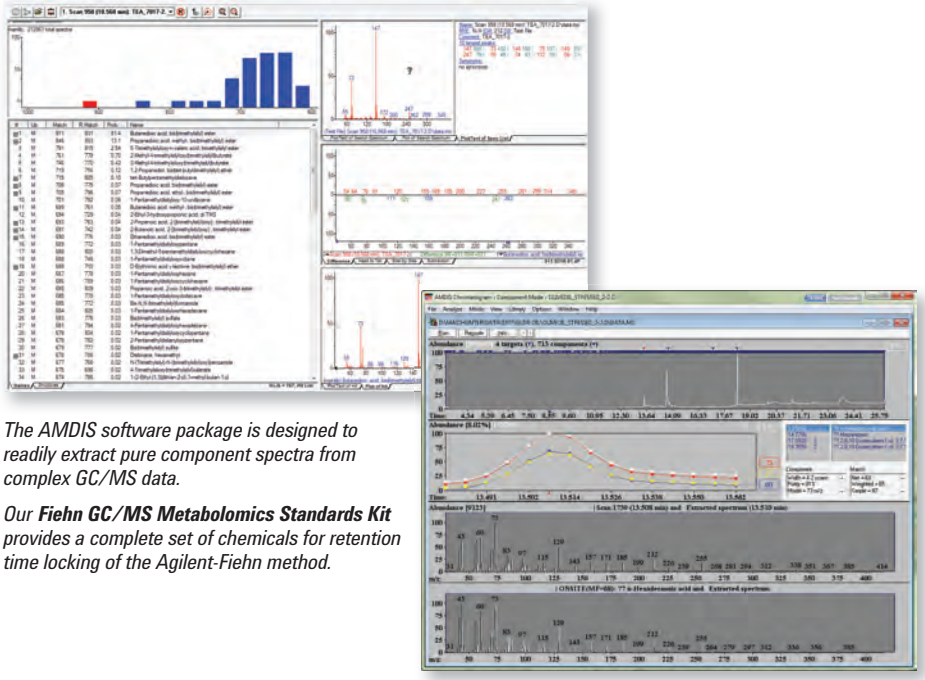


MassHunter software works in a 21CFR, part 11 environment, ensuring compliance for FDA-regulated labs.

With features such as independent vial pressurization, automatic vial leak check, bar code reader, flexible vial sizes, and energy conservation mode, Agilent's 7697A Headspace Sampler is an ideal companion for your 5977A Series GC/MSD system.

Gain deeper insights into biological systems

Agilent can be your partner in metabolomics research by providing tools such as retention time locked databases, high-performance SIM/scan mode, integrated deconvolution software, and data mining with Mass Profiler Professional. Learn more at **www.agilent.com/chem/mpp**



The AMDIS software package is designed to readily extract pure component spectra from complex GC/MS data.

*Our **Fiehn GC/MS Metabolomics Standards Kit** provides a complete set of chemicals for retention time locking of the Agilent-Fiehn method.*

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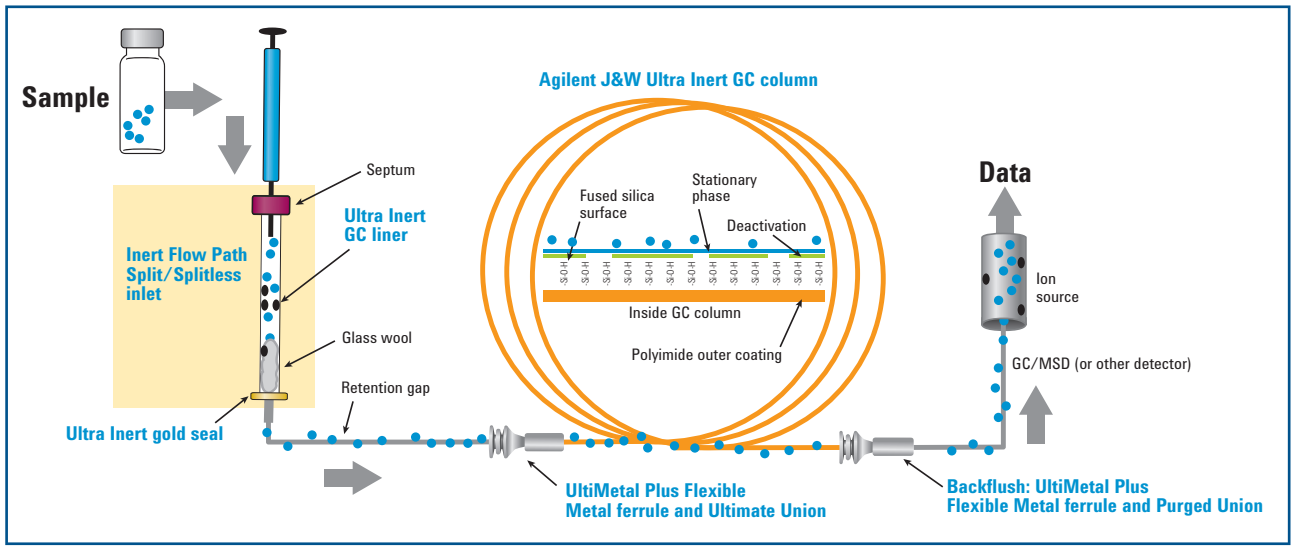
Ensuring an inert flow path has never been more critical

As samples become smaller, increasingly active, and more complex, you simply cannot afford losses caused by flow path activity.

For starters, having to repeat or verify suspect analyses wastes valuable resources, hinders productivity, and hurts your bottom line. And with trace amounts of active analytes, you might not even get a second chance, because there may be no more sample left to analyze.

Agilent's Inert Flow Path Split/Splitless inlet option ensures the inertness of flow path surfaces, allowing analytes to safely pass from injector to detector.



An integrated approach to inertness: The Agilent advantage

As the GC industry's premier measurement company, Agilent is uniquely positioned to help ensure the inertness of every surface that touches your sample, so you can achieve the parts-per-billion – or parts-per trillion – detection levels that today's analyses demand.

- **Agilent J&W Ultra Inert GC columns** are tested with the industry's toughest test probe mixture to ensure consistent column inertness and exceptionally low column bleed.
- **Ultra Inert liners** deliver a robust, reproducible and reliable inert flow path – with or without glass wool.
- **Inert Flow Path Split/Splitless inlet option** provides an extra measure of inertness to the sample pathway.
- **Ultra Inert gold seals** feature deactivation chemistry applied *on top* of their gold plating for the most inert surface and highest-quality seal.
- **UltiMetal Plus Flexible Metal ferrules** are compatible with Capillary Flow Technology fittings, promoting a leak-free seal that requires less torque – and reduces the risk of column breakage.
- **Gas Clean filter systems** deliver the cleanest possible gas, reducing column damage, sensitivity loss, and downtime.

For more information about creating an inert GC flow path, **visit www.agilent.com/chem/inert**

GC/MS Analyzers let you focus on system validation and data generation… not method development

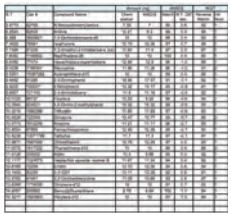
Agilent GC/MS Analyzers are factory configured and chemically tested to meet method requirements for materials, food safety, environmental and forensic/toxicology testing applications. These workflow solutions get you on the "Fast Track" to producing quality data and processing sample backlogs.

More than just instruments, Agilent Analyzers are *complete workflow solutions* that incorporate advanced technologies, such as Capillary Flow Technology and target compound databases, that allow us to optimize your system for your unique application.

Each Analyzer arrives ready to perform with pre-set chromatography and checkout samples to verify separation capabilities. That means your team can work toward system validation as soon as installation is complete – and reduce method development costs by up to 80%. And as always, our support team is available, should any problems arise.

Application-optimized columns and supplies

Application setup



Customized reporting

Training and consulting

The broadest portfolio of samplers

Agilent's 7890B GC supports all of your sample introduction needs with a wide range of devices for liquids, headspace, purge-and-trap, gases – and even solids.

Agilent Thermal Separation Probe (TSP)

PAL Autosampler

Agilent 7697A Headspace Sampler

Agilent 7693 Automatic Liquid Sampler (ALS)

To learn more about the Agilent 5977A Series GC/MSD, visit **www.agilent.com/chem/5977A**

The Agilent 5977A Series GC/MSD

Unprecedented sensitivity, performance, and system intelligence

- **Improved MSD sensitivity** lowers detection limits and gives you ultimate confidence in your trace-level analysis.
- **Direct GC↔MSD communication** minimizes downtime while conserving power and gas.
- **Workflow flexibility** gives you the option of using either MSD ChemStation or MassHunter software.
- **Inert Flow Path solutions** ensure a reliably inert GC flow path for higher sensitivity, accuracy, and reproducibility – especially at trace levels.
- **Integrated parts database** makes it easy to find and order columns, supplies, and parts.
- **Early Maintenance Feedback** keeps the system performing at its best.
- **Eco-friendly features**, such as Sleep/Wake modes, conserve electricity and other resources.
- **Agilent service and support** maximizes your uptime, and your instrument investment.

Agilent Value Promise

We guarantee you at least 10 years of instrument use from your date of purchase, or we will credit you with the residual value of the system toward an upgraded model.

360° Interactive View

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For more information

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© Agilent Technologies, Inc. 2013
Printed in the USA February 25, 2013
5991-1835EN

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