

The Source of New Possibilities

Agilent 5977B GC/MSD system





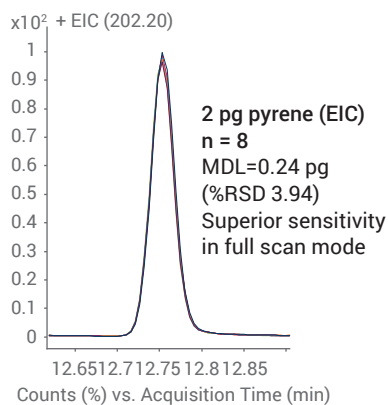
The Agilent 5977B GC/MSD system

Instrument Reliability and Performance: The Keys to a Good Day in the Lab

Improve your sample throughput, analytical performance, and business outcomes with the Agilent 5977B GC/MSD system. It's built for labs that focus on applications such as environmental, chemical, petrochemical, food, forensic, pharmaceutical, and material testing.

This powerful GC/MSD builds on a long track record of innovation, bringing together the technologies of the industry's best GC and MS systems. Agilent has pushed the technological frontier even further by introducing the high-efficiency source (HES).

What's more, the system's proven robustness and reliability mean less maintenance and more uninterrupted productivity. Simply put, the 5977B GC/MSD can help you meet your toughest challenges and your most ambitious business goals... today and in the future.



Take advantage of the improved sensitivity and see detection limits as low as 1.5 fg IDL. The 5977B GC/MSD brings yesterday's triple quadrupole limits of detection into today's single-quadrupole laboratory.



The Agilent 5977B GC/MSD was named "Most Popular Instrument" at the 2017 Conference of China Scientific Instruments. This award is the highest industry recognition in China.

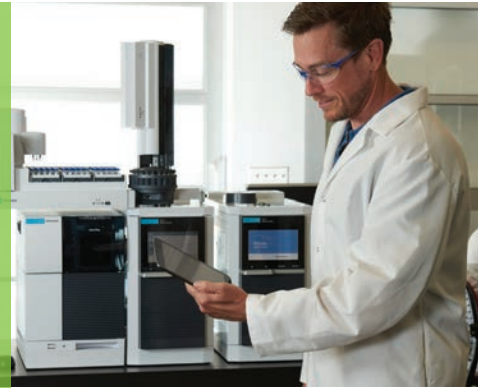
Analytical Challenge	Agilent 5977B HES System Benefits
More to do, fewer people to do it	<ul style="list-style-type: none"> - Design innovations increase performance for high sensitivity and simpler workflows - Less maintenance and increased instrument uptime
Demanding measurement challenges	<ul style="list-style-type: none"> - 10x greater sensitivity - Instrument detection limits as low as 1.5 fg
Lab efficiency and profitability	<ul style="list-style-type: none"> - 10x less sample required - Spend less time on sample preparation and maintenance - Save on shipping costs - Consistent, reliable performance lets you analyze large sample batches over longer periods of time

The accuracy of the instrument detection limit (IDL)

Today's GC/MS detection demands a more rigorous performance standard than classic signal-to-noise ratios. The IDL follows guidelines established by organizations such as the International Union of Pure and Applied Chemistry and the U.S. Environmental Protection Agency. It is measured at realistically low analytical levels and is a practical indicator of sensitivity for your quantitative assays. For more information about IDL, see Agilent publication **5990-8341EN**.

	Agilent 5977B EI MSD	Agilent 5977B Inert Plus EI MSD	Agilent 5977B EI/CI MSD	Agilent 5977B HES MSD
IDL	24 fg	10 fg	10 fg (EI)	1.5 fg
Analytical and business solution	The traditional stainless steel source performs most similar to previous Agilent MSD instruments at a budget-friendly price. Designed for sample-dependent applications.	The inert extractor EI source enables high sensitivity for active compounds that are most likely to interact with noninert surfaces. Designed for routine labs across various industry applications for optimum operational efficiency.	An inert extractor EI source provides high sensitivity. The CI source delivers softer ionization for molecular formula determination and enhanced selectivity.	The inert HES delivers unparalleled sensitivity for ultratrace-level applications. Ideal for high-throughput labs that need to save time and money with extreme operational efficiencies.
Source	Stainless steel	Extractor	Extractor for EI, CI source for CI	HES

Innovative Technologies for High Operational Efficiency



Boost your lab's operational capabilities and achieve your business goals



High-efficiency source

This state-of-the-art ion source incorporates a novel design not seen in previous EI source generations. It increases ionization efficiency and maximizes the ions transferred into the quadrupole analyzer—so you can significantly improve operational efficiency and analytical performance.

Other benefits include:

- Injecting less sample means less frequent liner maintenance, longer column life, and faster sample preparation
- Industry-leading detection limits
- Decreased shipping, storage, disposal, and maintenance costs

Turn cleaning time into productive time



Agilent JetClean self-cleaning ion source

During routine analysis, matrix deposits inevitably build up. In the past, you would have to remove the ion source, scrub the lens, then put it all back together and recalibrate the instrument.

The JetClean self-cleaning ion source eliminates these problems. It uses a carefully controlled hydrogen flow that removes even the most stubborn deposits. That means:

- No more disassembling and reassembling the source
- No more scrubbing lenses and other components
- No need for specialized MS expertise to keep the source clean

JetClean is available as an option on Agilent single quadrupole and triple quadrupole GC/MS systems.

Clean, quiet, reliable, oil-free



Agilent IDP-3 dry scroll pump

The Agilent IDP-3 dry scroll pump is an affordable way to make GC/MS productivity happen and put the hassles of oil-sealed pumps behind you.

Advantages include:

- Oil-free operation, which lowers your cost of ownership and minimizes pump failures
- No more hassles with oil leaks, oil spills, or hazardous waste disposal of used oil
- A quieter and more peaceful lab environment, to keep you focused
- Small footprint and lightweight construction, ideal for any instrument configuration—even inside cabinets
- MSD qualified, and compatible with Agilent 5977, 5975, and 5973 GC/MS systems; instruments that use hydrogen as a carrier gas; and JetClean

Intelligent, intuitive, innovative



Agilent Intuvo 9000 GC system

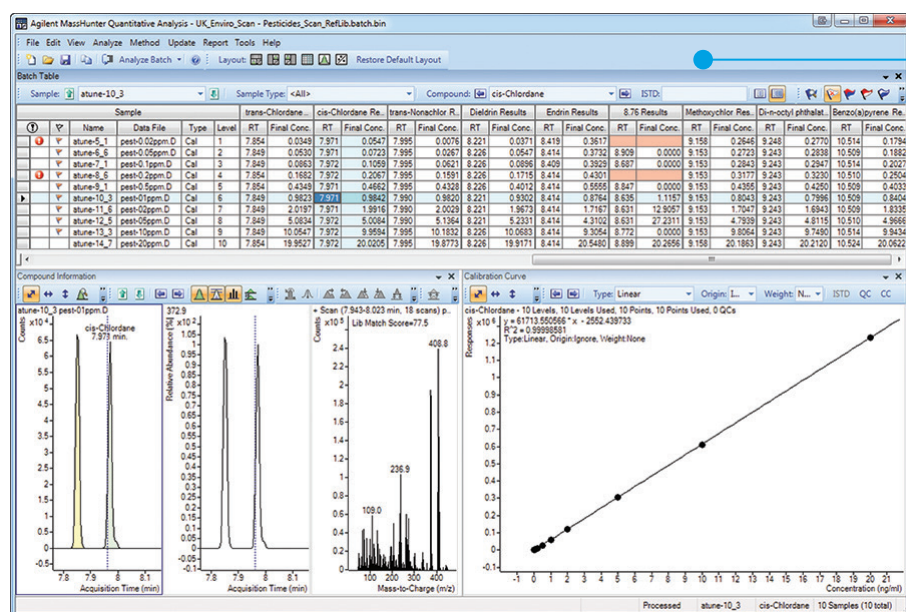
Modern GC labs face constant pressure to solve real problems in practical ways. Issues such as challenging sample matrices, data integrity, and user training needs can drain time and resources. Intuvo proves its worth by providing a fresh new perspective and previously unavailable approaches for overcoming these challenges.

From ferrule-free click-and-run connections and no-trim columns to column-protecting Guard Chips and smart ID keys, the Intuvo 9000 keeps lab technicians running more samples, more easily. All with the data quality you expect.

A Faster Route to Insight



Get the most out of your system with Agilent software

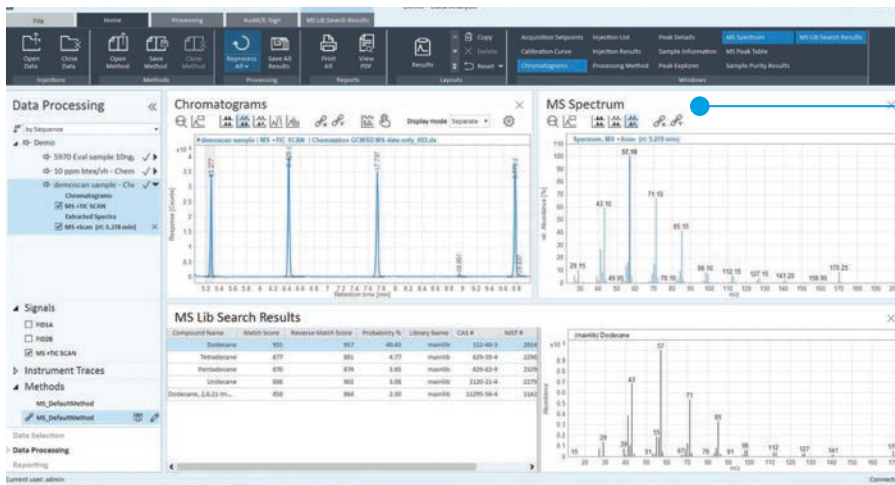


MassHunter is the right choice for high-throughput quantitation and compound identification in food, environmental, forensics, and research labs.

Make MS analysis easier and more productive

Agilent MassHunter software transforms data into insight with qualitative and quantitative analysis, using tools such as Mass Profiler and Mass Profiler Professional. Together, they bring you:

- Time-saving features, such as batch-at-a-glance and compounds-at-a-glance that facilitate review-by-exception.
- Almost 50 integrated quality test criteria, and a parameter-less integrator with built-in peak validation. So, you can focus exclusively on problem peaks and minimize the need for manual integration.
- One-click results, as all associated peaks, spectra, and calibration data are immediately displayed. More pop-up information is available.



OpenLab CDS is best for quality control testing in the pharmaceutical, chemical, and energy markets.

Confident, efficient mass detection in chromatography laboratories

Implement the highest data integrity standards and automate time-consuming tasks to improve speed and accuracy. Agilent OpenLab CDS has a simple interface, so your staff can quickly create methods and analyze results on the Agilent 5977B GC/MSD system.

- Built-in technical controls make it easy to achieve the highest levels of data integrity.
- Templates, intuitive report creation, and custom calculation capabilities make generating complex reports faster and easier.
- Cutting-edge data analysis enables you to process and review large data sets quickly.





Reliable and Unparalleled GC Separation with Gold-Standard Performance

Building the world's most trusted GC system is an ongoing process. With every step, we increase speed, improve functionality, and incorporate new analytical capabilities, while never losing sight of the most important objective—business results.



Agilent Intuvo: Unlock your lab's revenue potential

The Agilent Intuvo 9000 GC stands in a class by itself. The innovative compact design offers fast direct heating, ferrule-free fittings, Guard Chip technology, and no-trim columns to provide faster sample runs as well as fewer and faster column changes. Intuvo continues Agilent's legacy of reliability and gold-standard performance in a compact and powerful complete package.



Agilent 8890 GC: Meet your analytical needs today—and tomorrow

The Agilent 8890 GC system offers flexibility to meet your analytical needs. As the next evolution of the trusted and proven line of GCs from Agilent, the 8890 continues to drive productivity, deliver high-quality data, and provide an unparalleled level of confidence to all users.

- Configure with any GC/MS system and combine with a wide range of GC detector options.
- Helium conservation module and integrated hydrogen sensor provide cost-saving carrier gas options.
- Analyzers provide preconfigured and tested systems for a wide range of specific applications.



Agilent 8860 GC: A new outlook on routine GC

The Agilent 8860 GC system provides simplified operation with the proven reliability expected from Agilent GC systems. The 8860 can be configured with a wide range of GC detectors and can be upgraded for use with the 5977B GC/MSD with stainless steel source to reliably deliver high-quality data. The 8860 GC enables user-initiated diagnostics and has an easy-to-learn touch screen interface that gives instant viewing of GC setpoints and status.

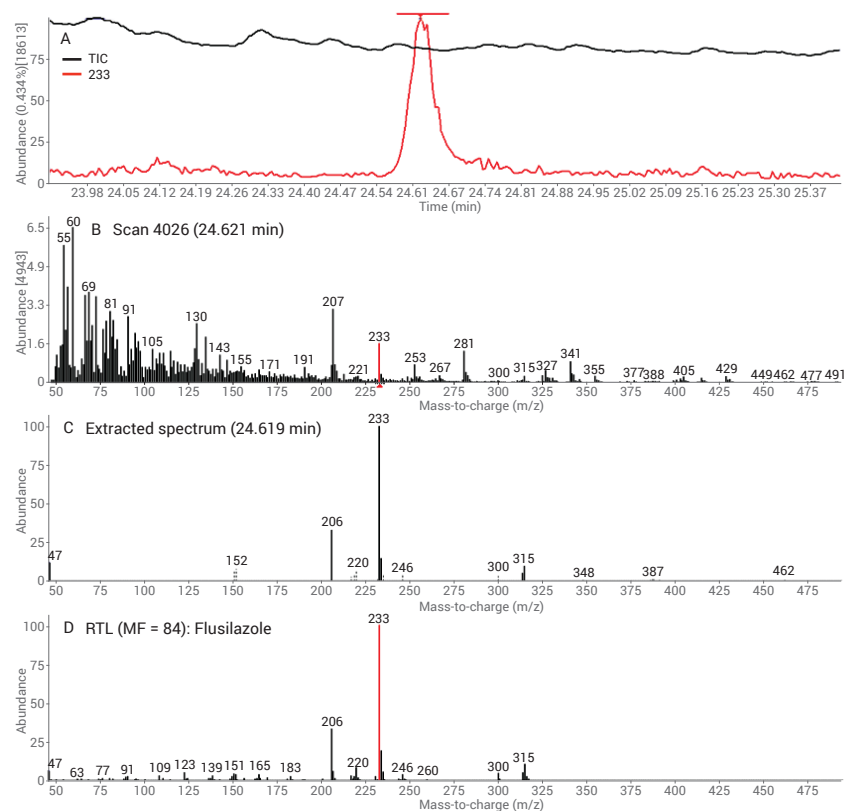
Lower Detection Limits and Streamlined Workflows for Food and Environmental Testing



Identify more pesticides, faster

You need to rapidly set up your full-scan GC/MS method and confirm that it produces accurate results for hundreds of pesticides in complex matrices. Our solution combines the Agilent 5977B GC/MSD with deconvolution reporting software and a database of pesticides and endocrine disruptors.

Together, they accelerate reporting and increase the number of targets screened. When configured with our high-efficiency source (HES), this analyzer lets you identify more pesticides in less time.



Analysis of 10 pg flusilazole in tomato using AMDIS.
A) Overlay of extracted ion m/z 233 (red) and TIC (black);
B) raw spectrum;
C) extracted spectrum for the component;
D) library spectrum, AMDIS match factor = 84.
The reported NIST reverse match score is 73.

Lower detection limits for semivolatile compounds in water

Semivolatile organic compounds (SVOCs) can be successfully analyzed by selected ion monitoring (SIM) in GC/MS. However, surveying samples by scanning GC/MS enables full-scan spectra for compound confirmation—tentatively identifying unexpected unknowns in samples that would escape SIM. The high-efficiency source (HES) of the Agilent 5977B GC/MSD represents a revolution in ion source design. You can exploit its enhanced sensitivity to produce picogram or sub-picogram detection limits for SVOCs that, previously, were only approached by SIM.

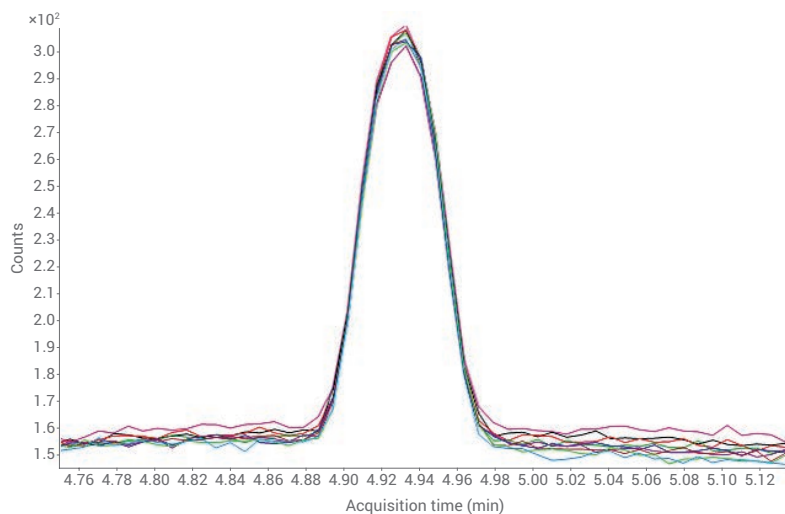
Improved volatiles analysis using static headspace and the Agilent 5977B HES GC/MSD

The revolutionary design of the HES produces a higher ion current yield for many compounds. This greater sensitivity gives you the flexibility to lower detection limits, reduce sample size, and speed up your analysis.

We analyzed a mixture of volatile organic aromatic (VOA) compounds spiked into reverse osmosis (RO) water over a calibration range of 0.02–20 µg/L. The analysis was performed in selected ion monitoring mode. Replicate injections were made at 0.04 µg/L to assess the method detection limits (MDLs). A study of local tap water replicates was used to demonstrate long-term stability for some naturally occurring compounds. The results suggest that a significant improvement in detection limits is possible in VOA applications using the HES of the 5977B GC/MSD.

Routine qualitative water screening in minutes

The Agilent SureTarget GC/MS Water Pollutants Screener confidently identifies pollutants in water samples. An automated workflow reduces data analysis time by over 90%. Plus, it rapidly screens for over 1,000 pollutants, with minimal data processing time and fast report generation.



Overlay of the EIC for nine replicate injections of vinyl chloride at 0.04 µg/L.

Perform Reliable Chemical, Petrochemical, and Materials Identification and Quantitation



Phthalate plasticizers

Positive chemical ionization (PCI) lets you unambiguously identify different phthalates based on an intense molecular ion response. You can configure the 5977B GC/MSD hardware to handle CI reagents, including hydrocarbons (such as isobutane and methane) and softer reagents (such as CO_2 and NH_3)—all with trace-level sensitivity.

Biofuel characterization

The 5977B GC/MSD exceeds the criteria for accurate, sensitive biofuel analysis. Its inert flow path, high-efficiency 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.

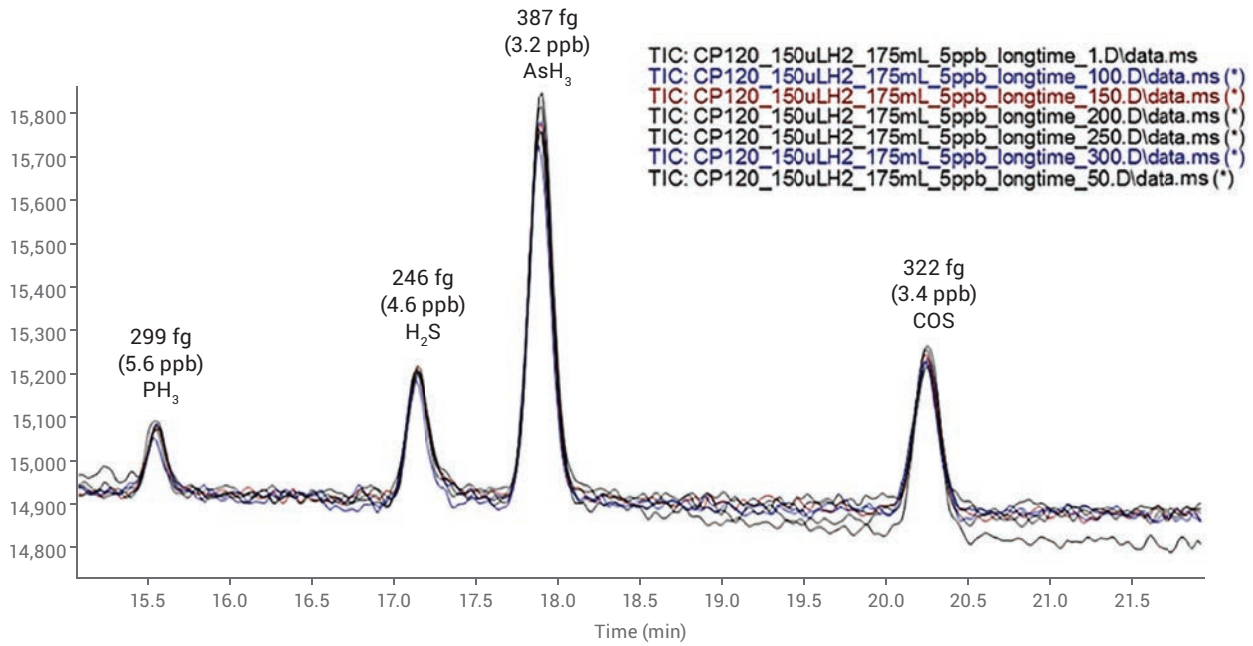
Measure impurities with confidence, in-house

The Agilent Arsine Phosphine GC/MS analyzer enables single-digit ppb monitoring of arsine and phosphine impurities in olefin production. Based on 7890 GC and 5977B MS platforms, each system is factory pretested and preconfigured to perform sensitive analysis in monomer-grade ethylene and propylene.



Ensure regulatory compliance across the energy and chemical supply chain

Together with our industry-leading supplies and services, the 5977B GC/MSD helps you meet rigorous standards for quality, safety, and environmental stewardship.



Overlay of the total ion chromatograms (TICs) for every 50th run out of 300 runs completed over 4.5 days with ~5 ppb concentration analytes in helium. Runs 1, 50, 100, 150, 200, 250, and 300 are shown.

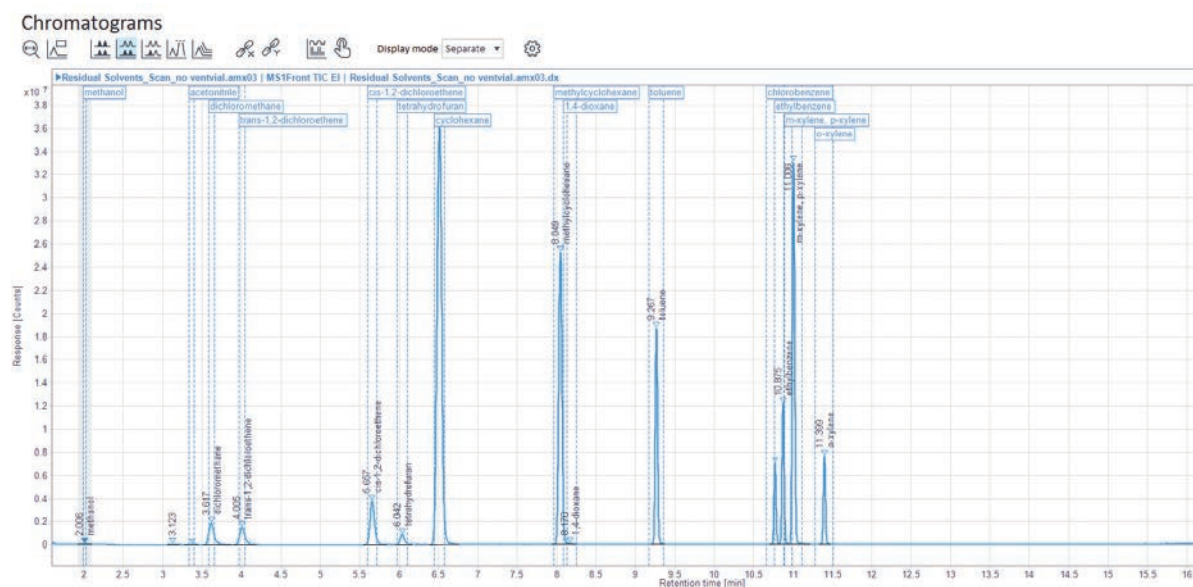


Improve Your Compliance-Based Pharmaceutical Residual Solvent Analysis



Accurate, sensitive, and trouble-free GC analysis with headspace sampling

The Agilent 7697A Headspace Sampler is an ideal companion for your Agilent 5977B GC/MSD. Its features include independent vial pressurization, automatic vial leak check, bar code reader, flexible vial sizes, and energy conservation mode. In addition, Agilent OpenLab CDS software helps you meet compliance requirements for residual solvent analysis and other relevant applications.



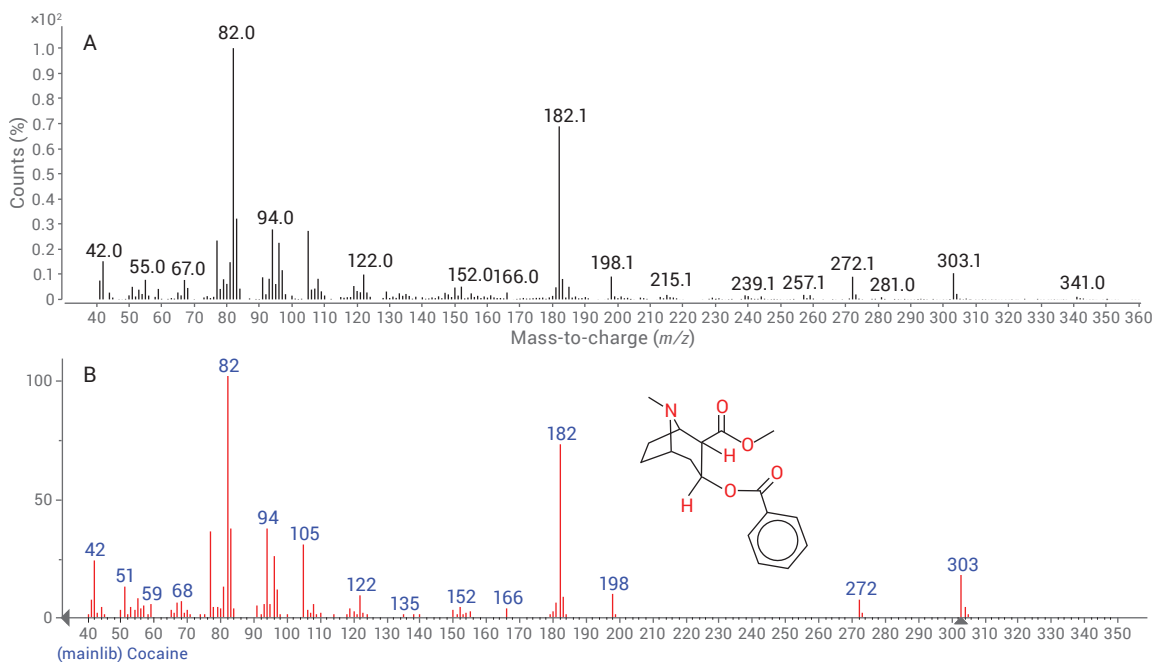
Reference chromatogram for Class 2 (Mix A) residual solvents. Solvents were collected using the Agilent 7697A Headspace Sampler and the Agilent 5977B GC/MSD on OpenLab CDS. The software gives you multiple ways to interact and present your GC/MS data, while ensuring the high degree of data integrity expected in FDA regulated labs.

Quantify Drugs and Metabolites More Quickly and Reliably



Screen more drugs with the Agilent GC/MS Toxicology Analyzer

Broad-range screening for drugs in biological samples requires full-spectrum identification and confirmation for an unlimited number of targets. It also demands spectral identification of nontargets. The Agilent GC/MS Toxicology Analyzer combines the 5977B with deconvolution reporting software and a forensic toxicology database. Together, these technologies screen a greater number of targets at low-concentrate ions while reducing analysis time. Resulting spectra are classical and NIST searchable.



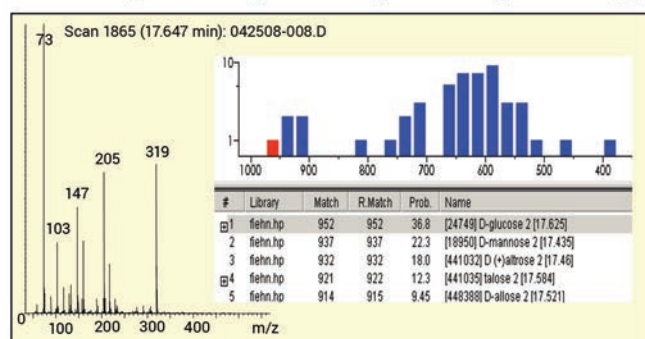
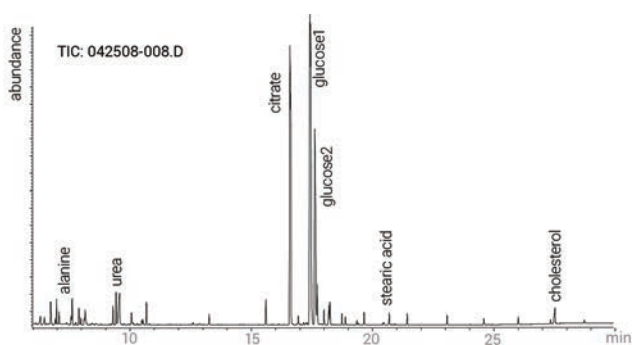
Reliably Confirm Metabolites and Gain Deeper Insights into Biological Systems



Enhance your research, gain new perspectives on metabolism, and answer challenging biological questions

Metabolomics typically involves global metabolite profiling by hyphenated MS techniques, followed by a familiar software workflow to process the GC/MS data files. Agilent offers software workflows for performing global metabolite profiling by GC/MS. In these workflows, features are found across all data files, and the results are analyzed using multivariate techniques. Important differential features are identified and visualized on pathways to aid biological interpretation.

This advanced analysis software relies on the highly reproducible data produced by the 5977B GC/MSD system—particularly when using Agilent MassHunter Profinder to identify complex metabolomics data. After statistical analysis using Mass Profiler Professional, compounds are identified using the Fiehn retention time locked EI library. The data is then visualized on pathways using Pathway Architect.



Metabolite identification in human blood plasma by GC/MS after methoximation and trimethylsilylation. The Agilent Fiehn library was also used. Left panel: Total ion chromatogram, split 1:10 injection. Right panel: Identification of glucose using the NIST MS search and retention time information.

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.

Each analyzer arrives ready to perform with preset chromatography and checkout samples to verify separation capabilities. That means your team can work toward system validation immediately after installation, and reduce method development costs by up to 80%. As always, our support team is available, should any problems arise.



Application-optimized columns and supplies



Application setup

R.T.	Cas #	Compound Name	Amount (ng)		AMDIS		NIST	
			Chem station	AMDIS	Match	R.T. Diff sec.	Reverse Match	Hit Num.
3.8773	82759	N-Nitrosodimethylamine	7.33	7	96	0.6	92	1
6.2624	82533	Aniline	10.21	8.4	99	0.3	96	1
6.569	3855821	1,4-Dichlorobenzene-d4	10	10	98	0.4	93	1
7.3429	78591	Isophorone	10.19	10.36	97	0.7	96	1
7.7494	81209	1,3-dimethyl-2-nitrobenzene (ss)	10.64	11.4	97	0.3	97	1
7.8060	1148652	Naphthalene-d8	10	10	100	0.4	90	1
8.9450	77474	Hexachlorocyclopentadiene	12.89	12.8	98	-1.0	85	1
9.0438	7786347	Mevinphos	11.96	11.36	96	-1.0	91	2
9.5301	15067282	Acenaphthene-d10	10	10	99	0.4	85	1
9.5652	51285	2,4-Dinitrophenol	18.88	17.57	91	-1.1	92	1
9.6000	100027	4-Nitrophenol	12.32	13.17	95	-0.8	91	1
9.6937	121142	2,4-dinitrotoluene	11.6	11.18	97	-0.9	92	1
10.0725	86737	Fluorene	10.33	9.22	98	-0.6	94	1
10.0944	534521	4,6-Dinitro-2-methylphenol	15.32	15.32	98	-0.6	93	1
10.2014	1582098	Trifluralin	11.65	11.93	97	-0.6	93	1
10.8528	122349	Simazine	12.47	10.77	93	-0.7	86	2
10.8773	1912249	Atrazine	11.21	11.11	98	-0.7	93	1
10.8004	87865	Pentachlorophenol	12.56	12.26	95	-0.1	90	1

Customized reporting

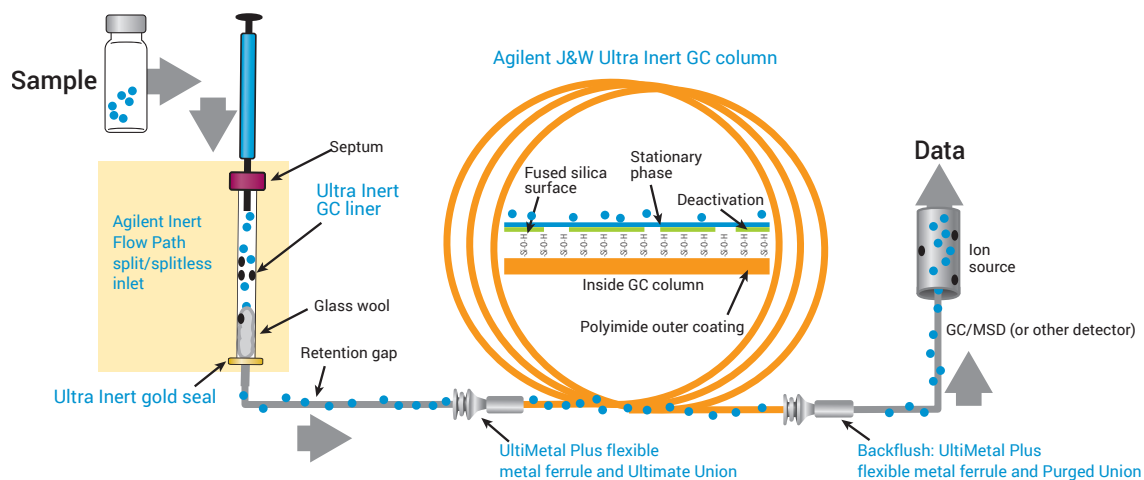


Training and consulting

Ensuring an Inert Flow Path Has Never Been More Critical



As samples become smaller, increasingly active, and more complex, you cannot afford losses caused by flow path activity. Having to repeat or verify suspect analyses wastes valuable resources, hinders productivity, and hurts your bottom line. With trace amounts of active analytes, you might not even get a second chance, because there may be no more sample left to analyze.



Don't miss a thing in your GC/MS analysis

From analyzing active environmental samples to screening for drugs of abuse, Agilent Inert Flow Path solutions help ensure higher sensitivity, accuracy, linearity, and reproducibility.

An integrated approach to inertness: The Agilent advantage

As the GC industry's premier measurement company, Agilent can 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 inlet 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. They promote 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



Serving the entire analytical lab

End-to-end laboratory support from Agilent CrossLab service experts delivers valuable insights and keeps your instruments running at peak performance with minimal downtime. We offer transition services, application consulting, repair, preventive maintenance, compliance verification, education, and more. Ask us how we can support your laboratory today.

Learn more:

www.agilent.com/chem/5977b

GC column selection tool:

selectgc.chem.agilent.com

Inert flow path:

www.agilent.com/en/promotions/inertflowpath

Buy online:

www.agilent.com/chem/store

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USA and Canada:

1-800-227-9770

agilent_inquiries@agilent.com

Europe:

info_agilent@agilent.com

Asia Pacific:

inquiry_lsca@agilent.com

This information is subject to change without notice.