Agilent PAL Autosampler Systems

Expand your lab's GC injection capabilities with a multi-technique autosampler system.

The Measure of Confidence

Agilent Technologies

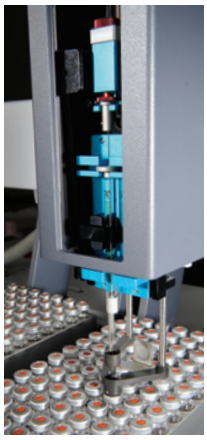
Agilent GC PAL Automated Sample Injectors and Samplers: Avoid the hassles and costs of using separate autosamplers from separate companies.

You perform several types of injections every day. Now, your Agilent PAL Autosamplers can do the same – while letting you control the level of software automation.

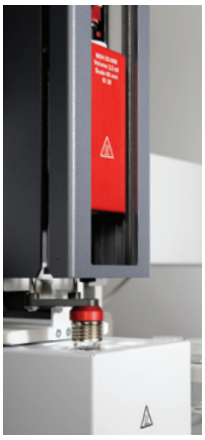
Increase your lab's productivity by expanding your autosampler's capabilities.

The Agilent PAL injection system lets you change injectors quickly, allowing you to perform the following techniques on a single autosampler:

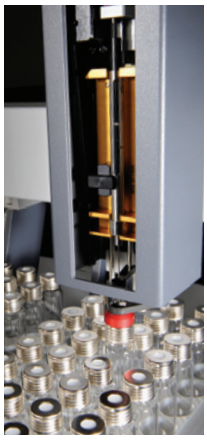
- Low-volume injections with minimal needle discrimination and background interference.
- High-volume injections up to 500 µL without chromatographic degradation. (Requires an appropriately configured GC.)
- Headspace vial processing that promotes simple, transparent analysis for ultimate confidence in your results.
- SPME injections that reduce sample preparation time and eliminate the need for large volumes of extraction solvents.



Liquid Injection



Headspace



SPME

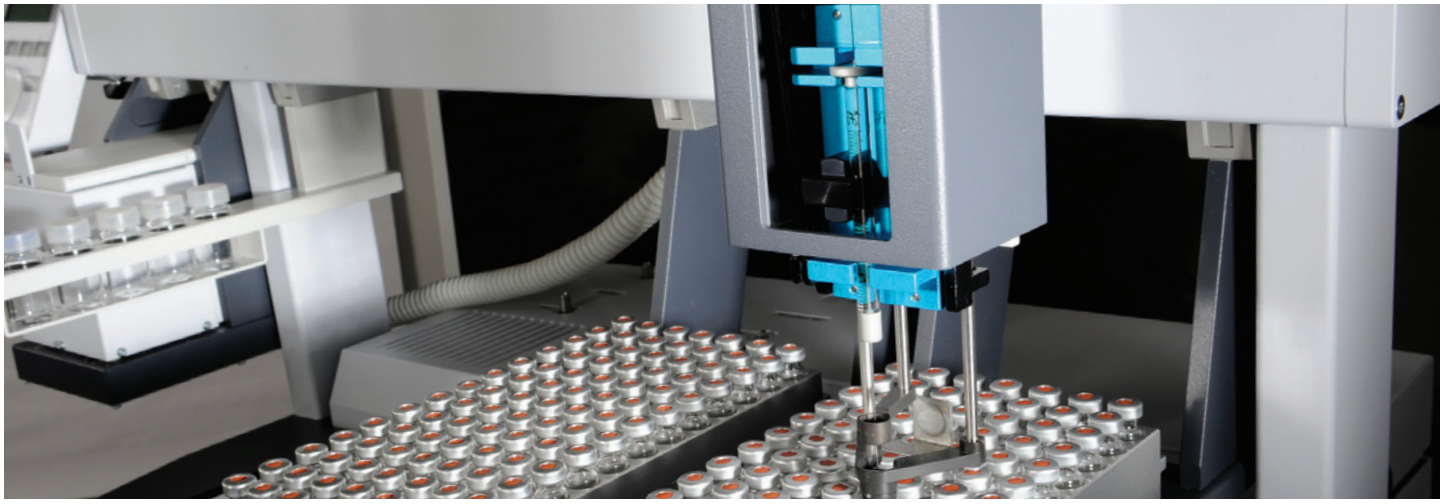
Smooth integration with Agilent GC and GC/MSD systems.

Agilent PAL Injectors work with any Agilent 7890A, 6890, or 6850 GC or GC/MSD system. Specialized software controls are also available for GC ChemStation, MSD Productivity ChemStation, MassHunter, and EZ Chrom.

In addition, Agilent PAL Injectors and Samplers are designed to expand your lab's capabilities with features such as...

- A top-mounted design that saves valuable bench space. And there are no cumbersome sample loops, transfer lines, or switching valves.
- Multiple sample vial and well plate options
- Integrated software for easy setup, control, and sequencing.*
- Automated sample preparation and large-volume injection capabilities for greater productivity.
- Large tray capacity for higher sample throughput and increased periods of unattended operation.
- Temperature-controlled Peltier cooling to prevent sample degradation.
- A variety of compatible consumables to support your specific applications.

*Reference specifications at www.agilent.com/chem



Meet today's injection challenges, and prepare for the next generation of sample formatting.

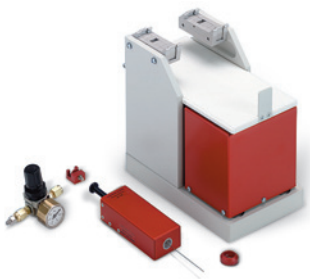
An investment that grows with your needs.

The sample injection system combines liquid, headspace, and SPME injection into one instrument, allowing you to quickly switch from one application to another on the same GC workstation. So whether you process samples in headspace, liquid or SPME mode – if your method requires split/splitless or on column injection – your new instrument setup can be ready in minutes.

The Agilent GC sampler is available with either a 80 cm RAIL (Sampler 80) or for increased capacity, a 120 cm RAIL (Sampler 120).

The CTC-approved syringe is ideal for liquid injections.

Magnetic caps are available for liquid injections.



You can use an injector and heater module for headspace sampling.

Start with liquid mode for simple, transparent sample processing.

Large-volume injection allows you to inject samples up to 500 µL without the usual degradation in chromatographic performance. It also eliminates the need to concentrate samples through evaporation, which can translate into substantial time savings.

Low-volume injection minimizes needle discrimination and reduces background interference, giving you better results with less work. What's more, the fast injection cycle time, together with the nanoliter injection mode, fits perfectly into the field of fast GC.

With either large or low-volume injection type, you can control steps – including fill/inject speed, pre- and post-injection delay times, and pre- and post-injection cleaning – using Agilent's ChemStation software for GC and GC/MSD systems.

To put the Agilent PAL Autosampler system to work for your lab, go to www.agilent.com/chem. Or call 1-800-227-9770 (in the US and Canada).

In other countries, please call your local Agilent Representative or Agilent Authorized Distributor.

Enhance your Sampler 80 or 120 with the Agilent PAL Headspace option for simpler, more transparent operation.

Add the headspace mode for increased speed and precision.

In robotic headspace vial processing, sample vials are transported into a heated incubator for preconditioning. After the vials reach equilibrium, a heated gas-tight syringe moves over the incubator and withdraws the headspace sample. Once sample injection is complete, the hot syringe is automatically cleaned by purging with inert gas.

The advantages of headspace injection include:

- Simple, straightforward sample analysis.
- No dead volume or adsorption effect in sample loops and transfer lines.
- The ability to adjust sample volumes without changing sample loops.
- Vial pressurization eliminates the need to dilute the sample.

Magnetic crimp-top vials and caps provide the highest reproducibility.

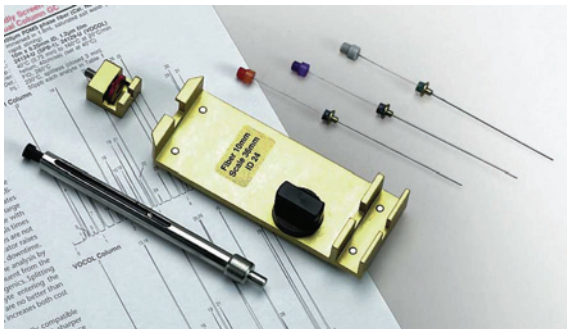
Upgrade to SPME mode for ultimate speed and efficiency.

Solid Phase Micro Extraction (SPME) reduces sample preparation time and eliminates the need for large volumes of extraction solvents.

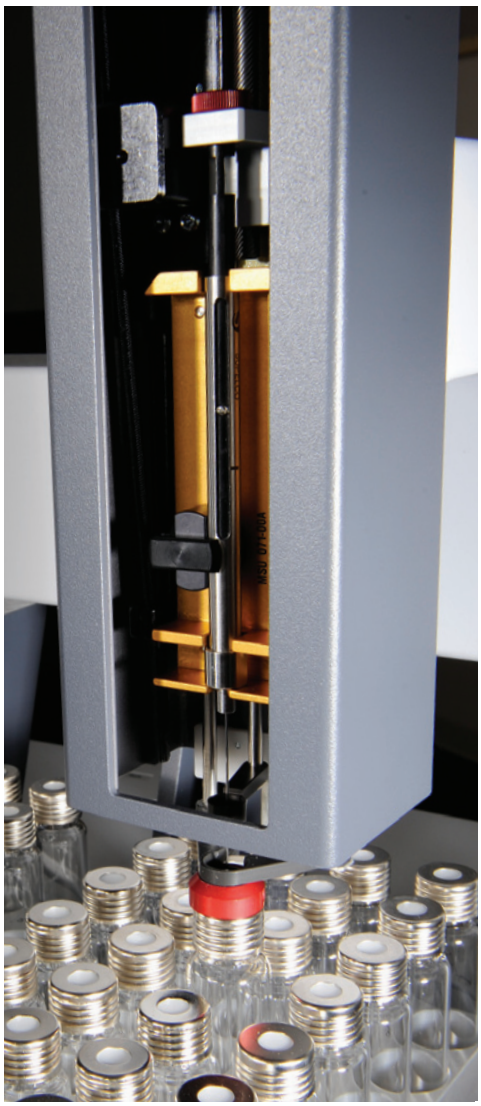
During this fully automated process, analytes first establish equilibria among the sample matrices. The analytes are then adsorbed onto stationary phases coated with fused silica or metal fibers. Finally, the analytes are thermally desorbed from the fibers to a GC inlet, and later, onto a capillary column.

As a result, no solvent injection is necessary. What's more, the analytes are rapidly desorbed onto the column, resulting in improved minimum detection limits and increased resolution.

SPME technology is licensed exclusively to Supelco Inc., U.S. Patent 5,691,206; European Patent 0523092.



SPME mode can be used in many different analyses, including the characterization of environmental, forensic, food/flavor, and pharmaceutical compounds.



To learn more about the Agilent's PAL Autosampler, go to www.agilent.com/chem.
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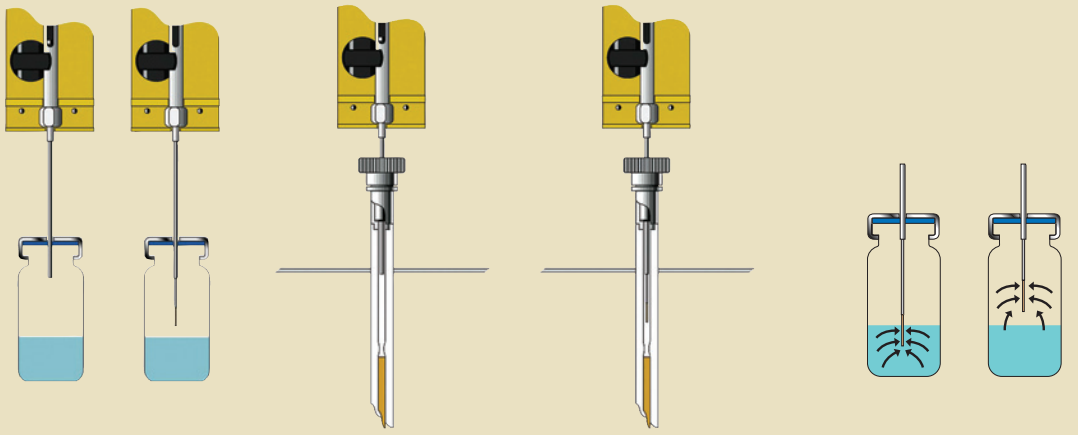
SPME fiber movements – from precondition to adsorption and desorption – are precisely controlled for optimum performance.

- Prior to (and during) extraction, samples can be shaken and heated, which dramatically reduces analysis time for semivolatile compounds.
- Variable vial penetration depth allows you to extract compounds in liquid samples, or in liquid/solid samples above the headspace area.
- After compounds are thermally desorbed in the hot GC injector, the fiber may be fully cleaned again in Agilent's heated and purged Fiber Cleaning and Conditioning Station (available separately).

Use our SPME Fiber Cleaning and Conditioning Station to maintain optimal system performance.



Fiber adsorption/desorption process

Adsorb

Desorb

Variable vial penetration lets you perform different types of sample extraction.

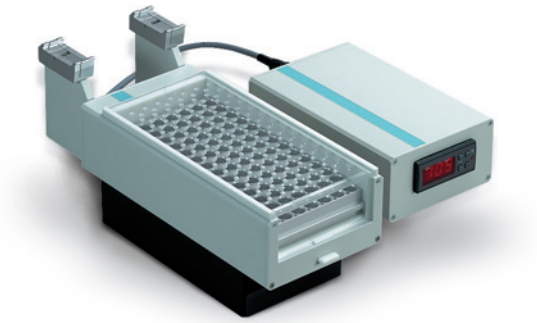
GC Injector 80:
High throughput and large-volume injection in one reliable, economical instrument.

The GC Injector 80 – for liquid injection only – is a good choice for high-throughput laboratories, and offers the following key advantages:

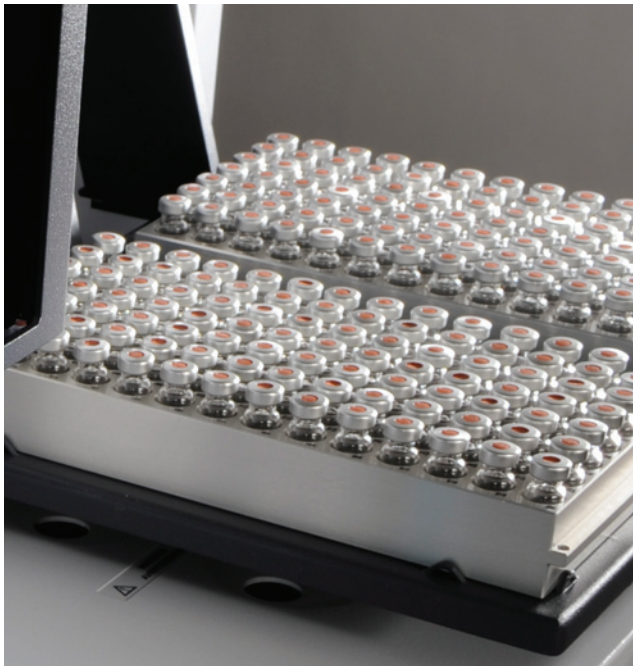
- Seamless interface with any Agilent 7890A, 6890 or 6850 GC – with or without a mass spectrometer.
- The same vial capacity, vial size, well-plate and large-volume injection capability as the GC Sampler system.
- A modular design for worry-free operation and low maintenance costs.
- Open architecture for easy access to the syringe, sample trays, and GC injection ports – as well as quick exchange of septa, sample tray formats, and syringes.

Flexible sample handling

Injection settings (fill/inject speed, pre- and post-injection delay times, and pre- and post-syringe cleaning) are individually controlled through the Agilent ChemStation.



The Peltier-cooled trayholder is ideal for thermally labile samples.



Additionally, the large-volume injection mode allows you to inject samples up to 500 µL in one stroke, without the usual degradation in chromatographic performance (using appropriately configured GC). This large-volume injection capacity also eliminates the need for sample concentration through evaporation, saving you both time and money.

To learn about the advantages of the Agilent PAL Autosampler system, go to www.agilent.com/chem. Or call 1-800-227-9770 (in the US and Canada).

In other countries, please call your local Agilent Representative or Agilent Authorized Distributor.

As your needs evolve, the Agilent PAL Autosampler system evolves, too.

You can expand your Agilent PAL Autosampler capabilities anytime by using one of these options:

- Inject directly from 96/384 well micro- or deep-well plates, as opposed to using micro- or standard sample vials.
- Use temperature-controlled sample storage to cool samples and prevent degradation – or to heat samples for derivatizations or kinetic studies.

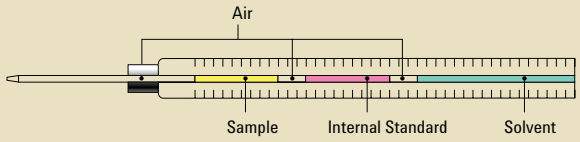
Sampling flexibility beyond liquid injections

The Agilent PAL Autosampler can sample up to 500 µL of the ambient headspace in 2 mL and 10 mL vials. This inexpensive, straightforward procedure can serve as a quick screening tool for unknown volatile samples.

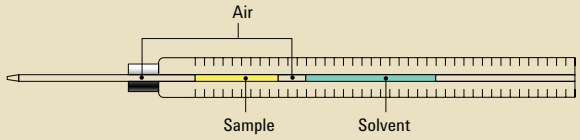
In addition, your system can be configured to allow you to aspirate sample anywhere within a sample vial. You can also reliably process two layers of small-volume sample with the Agilent PAL Autosampler's built-in vial height monitoring system.

Features shared by the GC Sampler and GC Injector systems

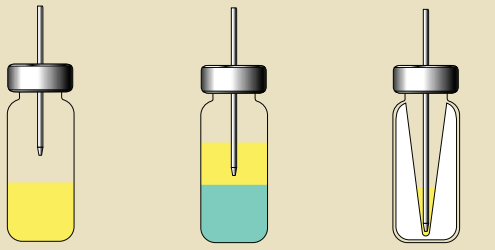
- A top-mounted design that saves valuable bench space.
- Two control options: A handheld controller for easy-to-learn, easy-to-use operation, OR a separate, optional Agilent ChemStation control module.
- Seven syringe sizes, which cover an injection volume range of 0.1 µL to 500 µL. Injection modes include traditional and hot empty needle (which eliminates the effects of boiling point discrimination in low-volume applications).
- Flash EPROM technology for problem-free updates and enhancements.
- Optional add-on features, such as micro- and deep-well plate capabilities.



Internal standard injection mode



Sandwich injection mode



Ambient headspace *Two-layer sampling* *Microvial sampling*

Simplify your operations by using GC ChemStation software controls for Agilent PAL Autosamplers.

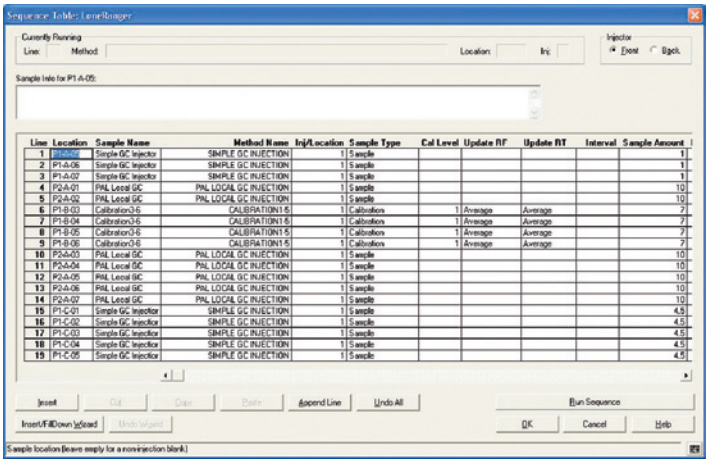
These specially designed software packages can be added to Agilent's ChemStation controls for autosampler setup, operation, and sequencing for:

- GC ChemStation
- MSD Productivity ChemStation
- Intergration into Agilent's EZChrom Elite
- GC/MS MassHunter

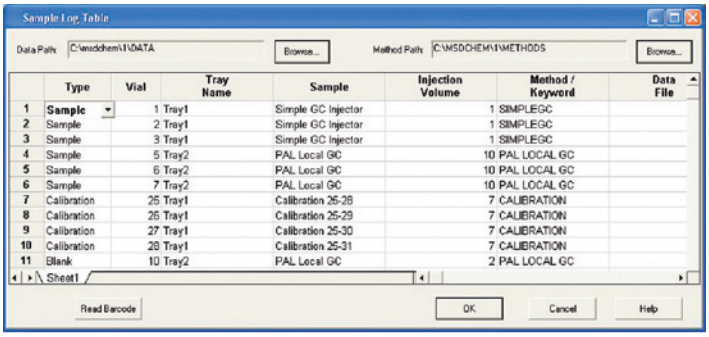
Intelligent automation that is easy to use

The software for Agilent's GC ChemStation and MSD Productivity ChemStation self-installs easily using Microsoft Windows XP/Windows 2000. Once installed, this simple-to-use automation software offers:

- Remote-control capabilities for the entire Agilent PAL autosampler family.
- Point-and-click operation that walks you through the simple steps for configuring instrument setup, methods, and sample lists.
- User-friendly software that controls handling procedures for sample transfer in liquid, headspace and SPME mode.



GC ChemStation and MSD Productivity ChemStation enables easy setup, editing, and method running for simple and complex applications.



GC sample sequencing list

For more information about Agilent PAL Autosampler system software, go to www.agilent.com/chem. Or call 1-800-227-9770 (in the US and Canada).

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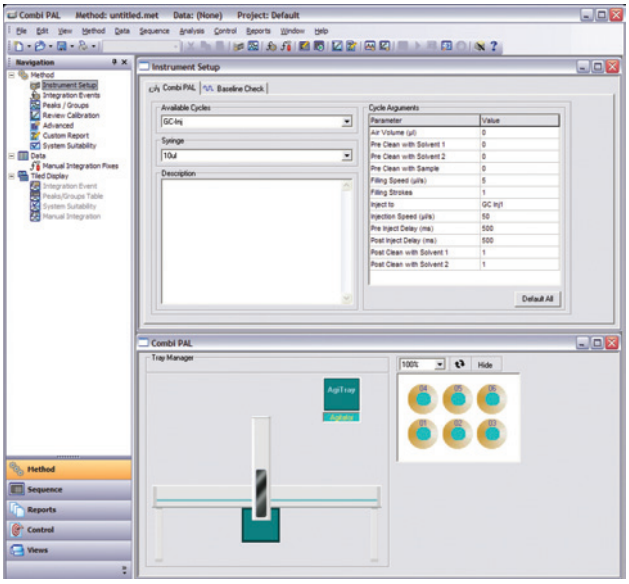
Total control at your fingertips. Agilent PAL Autosampler Control Software works seamlessly with Agilent EZChrom Elite and OpenLAB.

No matter which Agilent PAL Autosampler model (or associated GC or LC system) you use, Agilent PAL Autosampler Control Software lets you take advantage of a simple, streamlined interface.

The software also allows you to develop software methods for all Agilent PAL Autosampler models, create sequences for multiple runs, and specify data analysis treatments for all injections. And it lets you control virtually every GC injection parameter including:

- Pre- and post-injection syringe wash strokes for two different solvents
- Pre-injection syringe wash strokes with sample
- Plunger speed used to aspirate/eject sample
- Number of filling strokes to aspirate sample
- Air gap after sample aspiration
- Delay time between sample pull-up and ejection
- Delay time prior to and after sample injection
- Injector selection
- Plunger speed used during sample injection

To learn more about this software, consult Agilent publication 5989-4292EN, which you can download from www.agilent.com/chem by typing the publication number into the search field.



A graphical tray interface provides a simple visual representation of the installed trays, so it is easy for users to select locations for a sequence of injections – and to view sample status during runs.

LC users:
Agilent also distributes 1290 Infinity LC Injector HTC and HTs for high-throughput liquid chromatography. To learn more, see Agilent publication 5989-5035EN or visit www.agilent.com/chem/infinity.

Agilent PAL Autosampler Supplies
They may be small... but they have a BIG effect on your productivity and results.

Vials, caps, syringes, and other accessories are the least expensive components of your LC or GC System; however, they can contribute to huge problems such as coring, injector damage, evaporative loss, ghost peaks, and analyte degradation.

Like Agilent, CTC Analytics understands how critical these parts are to your results – which is why all supplies designed for use with Agilent GC Autosamplers must meet the most stringent standards and specifications.

Now, Agilent has teamed up with CTC Analytics to offer you a complete selection of vials, caps, syringes, well plates, and more – including:

- Headspace vials and magnetic caps.
- Autosampler syringes (1.2 µL to 500 µL).
- Caps (screw-, crimp-, and snap-top).
- 2 µL and micro vials.
- Well plate sample trays and closing mats.

All are approved by CTC Analytics to work with the GC sampler 80 and 120, and GC Injector.

Spend less time ordering supplies and more time focusing on method development and analysis.

Go to www.agilent.com/chem.
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When you buy instruments and supplies from Agilent, you get more than just reliability.

You also get...

- Over 40 years of chromatography expertise.
- Unmatched technical support – on the Web, by phone or in person.
- Ten years of guaranteed performance.

The 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.

For more information

To learn more about GC systems – or Agilent products and services – visit us online or call toll free:

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option 3, then option 3 again (in the US and Canada)

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Printed in the U.S.A. July 16, 2010
5989-7553EN

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