



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
DPS1008

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF
JOHN ABBOTT
304-558-2544

VENDOR

RFQ COPY
 TYPE NAME/ADDRESS HERE
 Agilent Technologies Inc
 2850 Centerville Road
 Wilmington, DE 19808

SHIP TO

WEST VIRGINIA STATE POLICE
 4124 KANAWHA TURNPIKE
 SOUTH CHARLESTON, WV
 25309 304-746-2141

DATE PRINTED	TERMS OF SALE	SHIP VIA	FOB	FREIGHT TERMS
11/18/2009				

BID OPENING DATE: **12/03/2009** BID OPENING TIME **01:30PM**

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	LS		490-55		
<p>MASS SPECTROMETERS (LABORATORY)</p> <p>INSTALLATION OF MASS SPECTROMETER AND RELATED EQUIPMENT FOR THE WEST VIRGINIA STATE POLICE, PER THE ATTACHED SPECIFICATIONS.</p> <p>NOTICE</p> <p>A SIGNED BID MUST BE SUBMITTED TO:</p> <p>DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION BUILDING 15 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25305-0130</p> <p>THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:</p> <p>SEALED BID</p> <p>BUYER: JOHN ABBOTT (32) -----</p> <p>RFQ. NO.: DPS1008 -----</p> <p>BID OPENING DATE: 12/3/2009 -----</p>						

RECEIVED
 2009 DEC -2 A 10:16
 PURCHASING DIVISION
 STATE OF WV

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>Sandra Beal</i>	* TELEPHONE 800-227-9770	DATE 11/30/2009
TITLE Business Sales Specialist	FEIN 77-0518772	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

**GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)**

1. Awards will be made in the best interest of the State of West Virginia
2. The State may accept or reject in part, or in whole, any bid
3. All quotations are governed by the *West Virginia Code* and the *Legislative Rules* of the Purchasing Division
4. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125 fee.
5. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods, this Purchase Order/Contract becomes void and of no effect after June 30.
6. Payment may only be made after the delivery and acceptance of goods or services.
7. Interest may be paid for late payment in accordance with the *West Virginia Code*.
8. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
9. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
10. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
11. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern all rights and duties under the Contract, including without limitation the validity of this Purchase Order/Contract.
12. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
13. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.
14. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, and available online at the Purchasing Division's web site (<http://www.state.wv.us/admin/purchase/vrc/hipaa.htm>) is hereby made part of the agreement. Provided that, the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
15. **WEST VIRGINIA ALCOHOL & DRUG-FREE WORKPLACE ACT:** If this Contract constitutes a public improvement construction contract as set forth in Article 1D, Chapter 21 of the West Virginia Code ("The West Virginia Alcohol and Drug-Free Workplace Act"), then the following language shall hereby become part of this Contract: "The contractor and its subcontractors shall implement and maintain a written drug-free workplace policy in compliance with the West Virginia Alcohol and Drug-Free Workplace Act, as set forth in Article 1D, Chapter 21 of the West Virginia Code. The contractor and its subcontractors shall provide a sworn statement in writing, under the penalties of perjury, that they maintain a valid drug-free work place policy in compliance with the West Virginia and Drug-Free Workplace Act. It is understood and agreed that this Contract shall be cancelled by the awarding authority if the Contractor: 1) Fails to implement its drug-free workplace policy; 2) Fails to provide information regarding implementation of the contractor's drug-free workplace policy at the request of the public authority; or 3) Provides to the public authority false information regarding the contractor's drug-free workplace policy."

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division.
2. **SPECIFICATIONS:** Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Complete all sections of the quotation form.
4. Unit prices shall prevail in case of discrepancy.
5. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
6. **BID SUBMISSION:** All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
 DPS1008

PAGE
 2

ADDRESS CORRESPONDENCE TO ATTENTION OF:
 JOHN ABBOTT
 304-558-2544

VENDOR

RFQ COPY
 TYPE NAME/ADDRESS HERE

SHIP TO

WEST VIRGINIA STATE POLICE
 4124 KANAWHA TURNPIKE
 SOUTH CHARLESTON, WV
 25309 304-746-2141

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
11/18/2009				

BID OPENING DATE: 12/03/2009 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
BID OPENING TIME:				1:30 PM-----		
PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:				302-993-5941		
CONTACT PERSON (PLEASE PRINT CLEARLY):				Sandra Beal		
***** THIS IS THE END OF RFQ DPS1008 *****					TOTAL:	\$ 291,075 00
<p>* Agilent Technologies, Inc. is bidding solely in accordance with Quotation 902825 which is attached and hereby incorporated by reference. Agilent's offer is in accordance with Agilent's Terms and Conditions of Sale Exhibit E16 (01-May-2007). Please reference quote number 902825 on any resultant award. The above pricing does not include tax. If tax applies, please add appropriate tax amount to any resultant award.</p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

DPS 1008

Bid Specifications –Mass Spectrometer

The Mass Spectrometer system must be compatible with the current Agilent Technologies GC/MS 6890/5973, Chemstation software, methods and libraries, which are utilized in forensic drug chemistry casework.

This equipment will be interfaced to an Agilent technologies gas chromatograph, autosampler, detector and Chemstation data system.

All vendors must provide instrumentation, software and hardware to the following specification or equivalent.

<u>Catalog Number</u>	<u>Quantity</u>	<u>Description</u>
G3242A	3	5975C inert MSD/DS Std Turbo EI System for use with 7890A,6890 and 6850 GC. Includes G3171A MSD, Chemstation (WIN XP) G1701EA SW, PC, LaserJet Printer. Not Included: G3397A Ion gauge Controller With the following configuration: Ship to Country: USA Delete Printer Oil Free Pump Substitution Installation Familiarization at Installation 1 year SW Update/Phone Assist 1 year PC Repair Recovery Service Detector type must be Triple-Axis HED-EM Analyzer capable of handling a flow Rate of 4ml/min. Inert Ion source must be made of

		<p>Metallic parts that are constructed From inert material. Stainless steel is NOT acceptable nor is coating the Metallic parts with an inert material Acceptable.</p>
G3397A	3	<p>Ion Gauge Controller for use with 5975, MSD With the following configuration: Ship to Country: USA Installation</p>
G3442A	3	<p>Agilent 7890A or equal GC for 5975 Series MSD Includes 100psi split/splitless inlet LAN interface for 5975 Series MSD Retention time repeatability <0.008% Pressure set points must be able to be adjusted by increments of 0.001 psi From 0.00 to 100 psi With the following configuration: Ship to country: USA Installation</p>
G4513A	3	<p>7693A Autoinjector includes transfer Turret, 16 sample turret, mounting Post, parking post for GC, 10ul Syringe and solvent bottles. 100% Higher sample capacity than G2913A With the following configuration: Ship to country: USA Installation</p>
G4514A	3	<p>7693 Tray, 150 vial includes three Removable 50-vial racks and GC Mounting bracket. 50% higher Sample capacity than G2614A With the following configuration Ship to country: USA Installation</p>

DPS1008				
Item #	Description	*Estimated Annual Usage	Unit Price	Extended Price
1	Mass Spectrometer System	3	\$ 64426.00	\$ 193,278.00
2	Ion Gauge Controller	3	\$ 1877.00	\$ 5631.00
3	GC	3	\$ 17,047.00	\$ 51,141.00
4	Autoinjector	3	\$ 6216.00	\$ 18,648.00
5	Tray	3	\$ 7459.00	\$ 22,377.00
			Total	\$ 291,075.00
Failure to use this form may result in disqualification				
Bidder / Vendor Information:				
Name:		Agilent Technologies Inc		
Address:		2850 Centerville Road		
		Wilmington, DE 19808		
Phone# :		800-227-9770		
Email Address:		lscabids@agilent.com		
Contract Coordinator Information:				
Name:		Sandra Beal		
Address:		2850 Centerville Road		
		Wilmington, DE 19808		
Phone# :		800-227-9770 ext 8697		
Email Address:		lscabids@agilent.com		
* Quantities are estimated annual usage for bidding purposes and bidder's information / <u>Failure to include a unit price for all 5 items will result in disqualification</u>				

STATE OF WEST VIRGINIA
Purchasing Division**PURCHASING AFFIDAVIT****VENDOR OWING A DEBT TO THE STATE:**

West Virginia Code §5A-3-10a provides that: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

PUBLIC IMPROVEMENT CONTRACTS & DRUG-FREE WORKPLACE ACT:

If this is a solicitation for a public improvement construction contract, the vendor, by its signature below, affirms that it has a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the *West Virginia Code*. The vendor **must** make said affirmation with its bid submission. Further, public improvement construction contract may not be awarded to a vendor who does not have a written plan for a drug-free workplace policy in compliance with Article 1D, Chapter 21 of the *West Virginia Code* and who has not submitted that plan to the appropriate contracting authority in timely fashion. For a vendor who is a subcontractor, compliance with Section 5, Article 1D, Chapter 21 of the *West Virginia Code* may take place before their work on the public improvement is begun.

ANTITRUST:

In submitting a bid to any agency for the state of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the state of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the state of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the state of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership or person or entity submitting a bid for the same materials, supplies, equipment or services and is in all respects fair and without collusion or fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

LICENSING:

Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agencies or political subdivision. Furthermore, the vendor must provide all necessary releases to obtain information to enable the Director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

CONFIDENTIALITY:

The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf>

Under penalty of law for false swearing (*West Virginia Code* §61-5-3), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

Vendor's Name: Agilent Technologies Inc
Authorized Signature: Sandra Beal Date: 11/30/2009

State of West Virginia

VENDOR PREFERENCE CERTIFICATE

Certification and application* is hereby made for Preference in accordance with West Virginia Code, §5A-3-37 (Does not apply to construction contracts). West Virginia Code, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the West Virginia Code. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Resident Vendor Preference, if applicable.

- 1. Application is made for 2.5% resident vendor preference for the reason checked: Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; or, Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or, Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; or,
2. Application is made for 2.5% resident vendor preference for the reason checked: Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
3. Application is made for 2.5% resident vendor preference for the reason checked: Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
4. Application is made for 5% resident vendor preference for the reason checked: Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; or,
5. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked: Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; or,
6. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked: Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: _____ Signed: _____

Date: _____ Title: _____

*Check any combination of preference consideration(s) indicated above which you are entitled to receive.



Agilent Technologies

John Abbott
 State of West Virginia
 Dept of Administration
 Purchasing Div
 PO Box 50130
 Charleston WV 25305-0130

Quotation

Quote No.	Create Date	Delivery Time	Page
902825	11/30/2009	3 Weeks	1 of 5
Contact		Phone no.	Valid to
Rick Browning		304-840-4752	02/28/2010
To place an order: Call 1-800-227-9770 Option 1 For Instruments Fax : 302-633-8953 For Consumables Fax : 302-633-8901 Email : lscainstrumentsales@agilent.com For additional instructions, see last page			

State of West Virginia DPS1008 12-03-09

Product/Description	Qty/Unit	Unit List Price	Extended Net Price
G3242A 5975C inert MSD/DS Std Turbo EI System for use with 7890A, 6890 and 6850 GC Includes G3171A MSD, ChemStation (Win XP) G1701EA SW, PC, LaserJet printer. Not included: G3397A Ion gauge controller.	3 000 EA	61,101.00 USD	183,303.00
With the following configuration:			
Ship-to Country : USA			
Delete Printer	3 EA	450.00- USD	1,350.00-
Oil Free Pump Substitution	3 EA	3 775.00 USD	11,325.00
Installation (44K)			
Familiarization at Installation (44L)			
1 Year SW Update/Phone Assist (44W)			
1YR PC Repair Recovery Service (0TP)			
		Item Total	193,278.00
G3397A Ion Gauge Controller for use with 5975 MSD	3 000 EA	1,486.00 USD	4,458.00
With the following configuration:			
Ship-to Country : USA			
Installation (44K)	3 EA	391.00 USD	1,173.00
		Item Total	5,631.00



Agilent Technologies

John Abbott
 State of West Virginia
 Dept of Administration
 Purchasing Div
 PO Box 50130
 Charleston WV 25305-0130

Quotation

Quote No.	Create Date	Delivery Time	Page
902825	11/30/2009	3 Weeks	2 of 5
Contact	Phone no.	Valid to	
Rick Browning	304-840-4752	02/28/2010	
To place an order: Call 1-800-227-9770 Option 1 For Instruments Fax : 302-633-8953 For Consumables Fax : 302-633-8901 Email : lscainstrumentsales@agilent.com For additional instructions, see last page			

Product/Description	Qty/Unit	Unit List Price	Extended Net Price
G3442A Agilent 7890A GC for MS with SSL inlet Includes 100psi split-splitless inlet, LAN interface and MS interface (for Agilent 5975 Series MSD or Agilent 7000A Quadrupole GC/MS). With the following configuration: Ship-to Country : USA Installation (44K)	3 000 EA	17,047.00 USD	51,141.00
Item Total			51,141.00
G4513A 7693A Autoinjector Includes transfer turret 16-sample turret, mounting post, parking post for GC 10ul syringe, and solvent bottles. 100% higher sample capacity than G2913A With the following configuration: Ship-to Country : USA Installation (44K)	3 EA	295.00 USD	885.00
Item Total			18,648.00



John Abbott
 State of West Virginia
 Dept of Administration
 Purchasing Div
 PO Box 50130
 Charleston WV 25305-0130

Quotation

Quote No.	Create Date	Delivery Time	Page
902825	11/30/2009	3 Weeks	3 of 5
Contact	Phone no.	Valid to	
Rick Browning	304-840-4752	02/28/2010	
To place an order: Call 1-800-227-9770 Option 1 For Instruments Fax : 302-633-8953 For Consumables Fax : 302-633-8901 Email : lscainstrumentsales@agilent.com For additional instructions, see last page			

Product/Description	Qty/Unit	Unit List Price	Extended Net Price
G4514A 7693 Tray, 150 vial includes three removable 50-vial racks and GC mounting bracket 50% higher sample capacity than G2614A.	3 000 EA	7,054.00 USD	21,162.00
With the following configuration: Ship-to Country : USA			
Installation (44K)	3 EA	405.00 USD	1,215.00
		Item Total	22,377.00
		Total	: \$ 291,075.00



Quotation

John Abbott
 State of West Virginia
 Dept of Administration
 Purchasing Div
 PO Box 50130
 Charleston WV 25305-0130

Quote No.	Create Date	Delivery Time	Page
902825	11/30/2009	3 Weeks	4 of 5
Contact	Phone no.	Valid to	
Rick Browning	304-840-4752	02/28/2010	
To place an order: Call 1-800-227-9770 Option 1 For Instruments Fax : 302-633-8953 For Consumables Fax : 302-633-8901 Email : lscainstrumentsales@agilent.com For additional instructions, see last page			

Product/Description	Qty/Unit	Unit List Price	Extended Net Price
<p>TO PLACE AN ORDER, Agilent offers several options:</p> <ol style="list-style-type: none"> 1) Visit http://www.agilent.com/chem/supplies to place online orders using a purchase order or credit card 2) Call 1-800-227-9770 (option 1) any weekday between 8am and 8 pm Eastern time in the U.S., Canada & Puerto Rico 3) To place an order for Consumables please fax the order to 302-633-8901 To place an instrument and/or software order please fax the order to 302-633-8953. 4) Or you can mail your order to: Agilent Technologies North American Customer Contact Center 2850 Centerville Road BU3-2 Wilmington, DE 19808-1610 <p>To place an order, the following information is required: Purchase order number or credit card delivery date ship to, invoice to, end user, and quote number GSA customers please provide GSA contract #</p> <p>EXCLUSIVE OFFERS FOR NEW INSTRUMENT CUSTOMERS, go to www.agilent.com/chem/exclusiveoffers</p> <p>TO CHECK THE STATUS OF AN ORDER:</p> <ol style="list-style-type: none"> 1) Visit http://www.agilent.com/chem/supplies to check the status of your order 2) Call 1-800-227-9770 (option 1) any weekday between 8 am and 8 pm Eastern time in the U.S. Canada & Puerto Rico. You will need to know the purchase order or credit card number the order was placed on. <p>FINANCING AND LEASING - A wide range of options are available from Agilent's preferred financing partner GE Capital Solutions For more information or to discuss how monthly payments could suit your operational or budgetary requirements contact your Agilent Account Manager</p> <p>TERMS AND CONDITIONS:</p> <p>Pricing: Web prices are provided only for the U.S. in U.S. dollars. All phone prices are in local currency and for end use Applicable local taxes are applied. All Sales Tax is subject to change at the time of order. Shipping and Handling Charges: Orders with a value less than \$2000 or those requiring special services such as overnight delivery may be subject to additional shipping & handling fees. Some of these charges may be avoided by ordering via the Web Payment Terms: Net 30 days from invoice date. subject to credit approval</p> <p>* Quotation Validity: This quotation is valid for 90 days unless otherwise indicated * Warranty period for instrumentation is 1 year. The Warranty period for columns and consumables is 90 days.</p> <p>The Delivery Time reflected is based on availability at the time of quotation and is only a guideline for delivery receipt. Order specific Delivery Time will be determined at order placement and is subject to current availability</p> <p>It is Agilent Technologies intent to ship product at the earliest available date unless specified otherwise</p>			



Agilent Technologies

John Abbott
 State of West Virginia
 Dept of Administration
 Purchasing Div
 PO Box 50130
 Charleston WV 25305-0130

Quotation

Quote No.	Create Date	Delivery Time	Page
902825	11/30/2009	3 Weeks	5 of 5
Contact		Phone no.	Valid to
Rick Browning		304-840-4752	02/28/2010
To place an order: Call 1-800-227-9770 Option 1 For Instruments Fax : 302-633-8953 For Consumables Fax : 302-633-8901 Email : lscainstrumentsales@agilent.com For additional instructions, see last page			

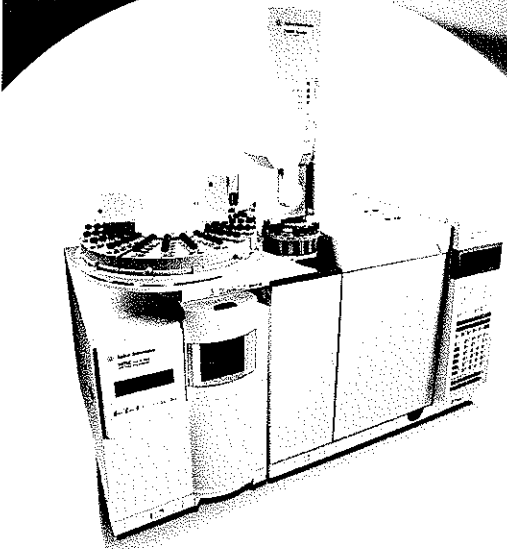
Product/Description	Qty/Unit	Unit List Price	Extended Net Price
<p>The sale of standard Products and Services referenced in this quotation is subject to the then current version of Agilent's Terms of Sale, and any LSCA Supplemental Terms or other applicable terms referenced herein. If any Products or Services are manufactured, configured or adapted to meet Customer's requirements, the sale of all Products and Services referenced in this quotation is subject to the then current version of Agilent's Terms of Sale for Custom Products and any LSCA Supplemental Terms or other applicable terms referenced herein. A copy of Agilent's Terms of Sale, Agilent's Terms of Sale for Custom Products and the LSCA Supplemental Terms is either attached or has been previously provided to you. Please contact us if you have not received a copy or require an additional copy. If you have a separate agreement in effect with Agilent covering the sale of Products and Services referenced in this quotation, the terms of that agreement will apply to those Products and Services. Agilent expressly objects to any different or additional terms in your purchase/sales order documentation, unless agreed to in writing by Agilent. Product and Service availability dates are estimated at the time of the quotation. Actual delivery dates or delivery windows will be specified at the time Agilent acknowledges and accepts your purchase order. The above conditions shall apply to the fullest extent permitted by the law. You may have other statutory or legal rights available. Commodities, technology or software exported from the United States of America ("U.S.") or from other exporting countries will be subject to the U.S. Export Administration Regulations and all exporting countries' export laws and regulations. Diversion contrary to U.S. law and the applicable export laws and regulations is prohibited</p>			



Agilent Technologies
5975C inert XL MSD
with Triple-Axis Detector

Lab Source Temp (C)
Actual=350 Set=350

Agilent



The Agilent 5975C Series GC/MSD
Performance, productivity and confidence.

Our measure is your success.

hardware | applications | software | services

 **Agilent Technologies**

The Agilent 5975C Series GC/MSD

Proven performance, superior productivity—and maximum confidence in your results.

Welcome to the next generation of the industry-proven Agilent 5975C Series MSD—the most popular GC/MS of all time. The Agilent 5975C Series MSD—with Triple-Axis HED-EM Detector—combines innovative design features to boost your lab's productivity and advanced analytical capabilities that help you achieve better results faster. Perfectly complemented by the new 7890A GC, the platform delivers all the elements for perfect chemistry: superior performance, unmatched reliability, greater productivity and enhanced ease of use.



The Agilent 5975C Series GC/MSD is built on a solid foundation of industry leadership, reliability, and performance.

Advanced Analysis Capabilities

The modular mass analyzer incorporates a solid inert ion source, a proprietary quartz quadrupole analyzer and a new higher signal-to-noise Triple-Axis Detector. This powerful combination provides better MS resolution, exceptional spectral integrity and lower limits of detection—for the highest confidence in your results. New Trace Ion Detection technology provides even more capabilities at trace level.

Higher Throughput

Comprehensive automation features, faster separations and shorter detection cycle times enable you to process more samples in less time. Advanced analysis routines let you get maximum information from every run, and new automated spectral deconvolution software enables rapid identification and quantification.

Maximum Uptime

Thoughtful real-world engineering features allow faster, easier routine upkeep, and new system intelligence features enable predictive support, enhanced self-maintenance and powerful remote diagnostics—making it easier than ever to keep your lab up and running at peak performance.

For additional instrument specifications go to:
www.agilent.com/chem/5975C-Specs
5989-6351EN: 5975C Series GC/MSD Data Sheet



350°C inert ion source

Now programmable up to 350 C, delivers enhanced response for active compounds and late-eluters. **Page 4**



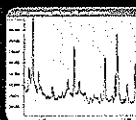
Proprietary gold quartz quadrupole with 1050 u mass range

Optimal resolution and sensitivity across the mass range; lowest mass deviation ensures longer lasting tuning and calibration. **Page 4**



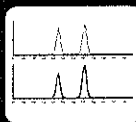
High S/N Triple-Axis Detector

The next generation of off-axis detection minimizes noise and maximizes signal for the lowest detection limits. **Page 5**



Trace Ion Detection technology

Lowers detection limits in complex matrices; together with the high temperature inert ion source, this new technology gives your lab powerful new analytical capabilities. **Page 5**



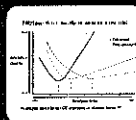
Synchronous SIM/Scan mode

Selectively monitor for ions of interest at high sensitivity while simultaneously acquiring spectra at scan rates up to 12,500 u/s. **Page 6**



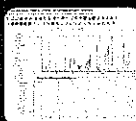
All ionization modes in one automated sequence

PCI, NCI and EI with standard CI ion source; auto CI feature makes CI as easy as EI. **Page 7**



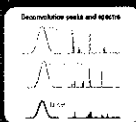
New hydrogen EI signal-to-noise specification

Permits faster analysis under safe conditions—with the lower cost of hydrogen carrier gas. **Page 7**



GC/MS software

Fits your workflow and your application—powerful features and advanced functionality enhance your lab's performance and productivity. **Page 10**



Deconvolution Reporting Software

Our second generation software gives you fast answers with confidence; together with new Retention Time Locking databases, DRS significantly reduces post-run analysis time. **Page 12**



GC/MS columns and supplies

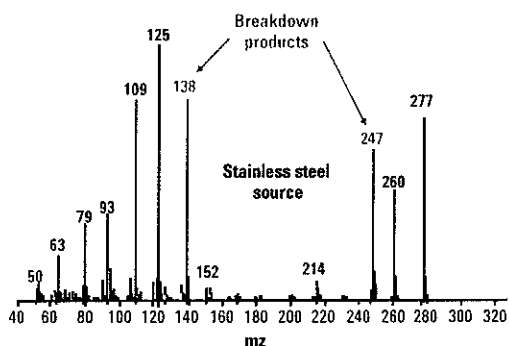
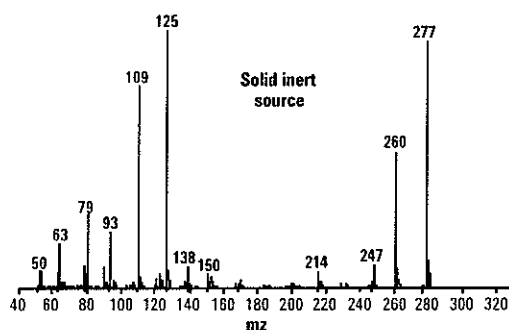
High performance Agilent J&W GC columns and certified supplies maximize your analytical results. **Page 15**

Engineered for performance and productivity, from the source to the detector.

Building the world's most trusted GC/MS solutions is a process of continual improvement. With each new generation, we never lose sight of our goal—to help your lab get better results with higher confidence in the shortest possible time.

High temperature solid inert ion source boosts your system performance

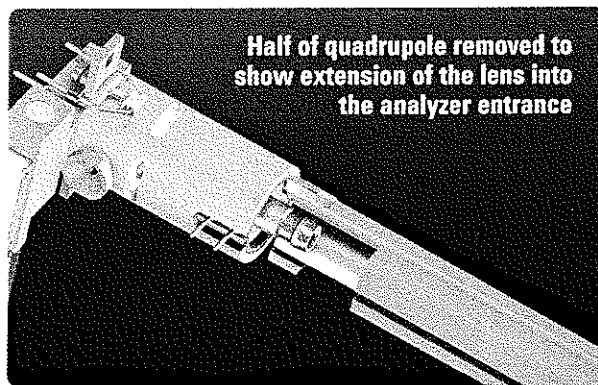
Agilent's proprietary inert source is now programmable up to 350°C to provide enhanced response for active compounds and late-eluters. It delivers improved peak symmetry, higher EI response, fewer degradation ions and more reliable library searches. Higher temperature also means less frequent cleaning—a nice improvement for your lab's productivity. (1)



Improved spectral integrity. New inert source eliminates surface activity reactions, resulting in more reliable library matches.

The gold standard in quadrupole design

The MSD analyzer incorporates a combination of patented, proprietary technologies to deliver superior performance and enhanced reliability.



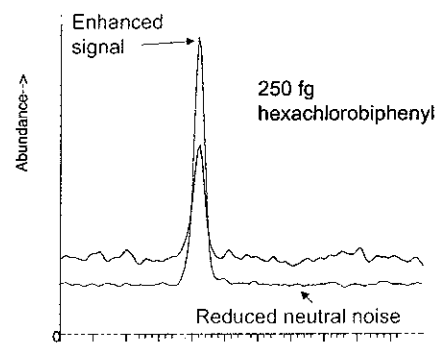
The last lens, which extends into the heated monolithic quadrupole, optimizes coupling of the source to the analyzer. Voltage on this lens is dynamically ramped synchronously with analyzer voltage to focus maximum ion signal for every m/z into the center of the quadrupole field.

The dimensional stability of the single piece quartz analyzer is a fundamental strength of the MSD design. Unlike metal rods, temperature changes from room temperature to 200°C do not alter the quartz dimensions. Higher analyzer temperature allows robust, maintenance-free operation—even with complex, high-boiling samples.

The submicron-layered gold hyperbolic electrode surfaces eliminate field errors of round rod quadrupoles and deliver excellent resolution, mass axis stability, and ion transmission efficiency across the full mass range up to 1050 u. An available high mass checkout kit provides added confidence that high mass is accurately reported. (2)

Triple-Axis Detector for lower detection limits and reduced cost of operation

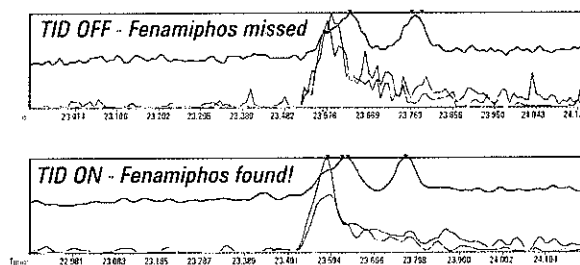
The fundamental goal for the detector module is always the same: collect more ions of interest and eliminate background sources of noise. To achieve these goals, the 5975C detector uses a new ion guide and shield to position a new long-life triple channel electron multiplier (EM) doubly off-axis from the analyzer exit. The optimized ion path increases signal and eliminates noise from energetic neutrals. The result is simply the best signal-to-noise specification in the market and the perfect complement to the inert source and patented hyperbolic analyzer.



Triple-Axis Detector increases signal and decreases noise—the ideal combination for improved detection limits

Trace Ion Detection delivers a real performance improvement for complex matrices

Revolutionary Trace Ion Detection technology gives you a better spectral fidelity, increasing your confidence level when doing library matching. It lets you lower your Method Detection Limit (MDL), as well as your limit of quantitation (LOQ), reducing false negatives and further enhancing the performance of the inert ion source at trace levels. The technology also ensures more reproducible baselines, dramatically reducing the number of manual interventions during peak integration.



Analysis of Fenamiphos. Without Trace Ion Detection enabled (top), fenamiphos was missed as a poorly defined shoulder on a larger peak. When Trace Ion Detection was activated (bottom), noise decreased and a clear hit was achieved.

High sensitivity AutoTune makes it easy to optimize system performance

Take the trial and error out of optimizing operating conditions by automating the process. The 5975C system's AutoTune saves time, boosts performance, and improves instrument-to-instrument consistency. New gain-normalized tune of the EM ensures consistently optimized ion count and prolongs EM life. (3)

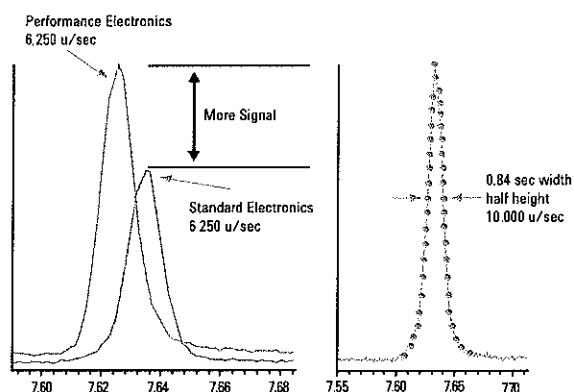
Ask about a detector upgrade for your existing Agilent 5975 Series GC/MSD.

- (1) 5989-6051EN: The 5975C Series MSDs: Guidance in Implementing High Ion Source Temperature
- (2) 5989-3142EN: Applying the 5975 inert MSD to Higher Molecular Weight Polybrominated Diphenyl Ethers (PBDEs)
- (3) 5989-7654EN: Enhancements to Gain Normalized Instrument Tuning

Powerful analytical capabilities improve results and productivity.

Fast electronics enhance performance and enable synchronous SIM/Scan

Fast electronics used in the 5975C Series GC/MSD maximize signal transmission for fast GC/MS in full scan and Selected Ion Monitoring (SIM) modes. They also enable synchronous SIM/Scan functionality—without compromising analytical performance. (4)

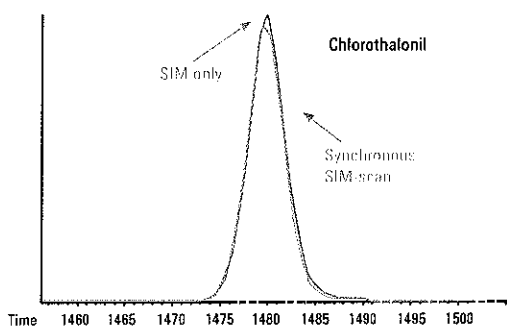


More signal, and more data points. Total ion chromatogram of Heptachlorobiphenyl compares standard electronics (Agilent 5973 Series MSD) to new fast electronics. Both chromatograms were acquired by the same instrument at the same scan speeds (horizontal offset for clarity). High scan rates up to 12,500 u/sec allow accurate peak integration even for narrow bore capillary peaks

High-performance Selected Ion Monitoring (SIM) and full scan

Agilent's synchronous SIM/Scan functionality lets you capture SIM data and full scan data in the same acquisition. Because of the ease of setup and availability of spectral libraries, many labs use full scan for most of their data collection. SIM mode on the other hand offers a significant improvement in sensitivity over full scan data; however SIM data cannot be searched against commercially available spectral libraries for match confirmation.

Now with the 5975C system's synchronous SIM/Scan operation, you can get both—in a single run! Even better you don't have to be a GC/MS expert to do it. Agilent's AutoSIM software capability automatically converts full scan data into SIM or SIM/Scan acquisition parameters for use in synchronous SIM/Scan methods. SIM dwell times can be set in 1 msec increments from as fast as 1 msec to over 100 msec dwell time



No sensitivity loss in SIM during SIM/Scan operation. The overlay above compares SIM-only acquisition (blue) to the SIM signal from a synchronous SIM/Scan acquisition (orange)

(4) 5989-3108EN. Improving Productivity with Synchronous SIM/Scan

(5) 5989-4347EN. The 5975 inert MSD—Benefits of Enhancements in Chemical Ionization Operation

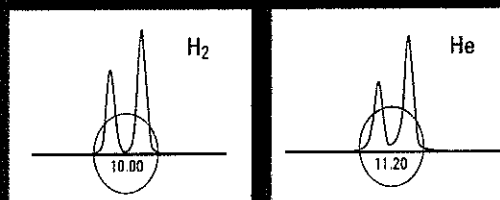
CI as easy as EI

Chemical Ionization (CI) has long been considered an advanced GC/MS technique because of complex setups, reagent gas adjustment and ion source tuning. Now the Agilent 5975C inert GC/MSD makes CI as routine and easy as EI—and EI spectra can be generated without changing to the EI source.

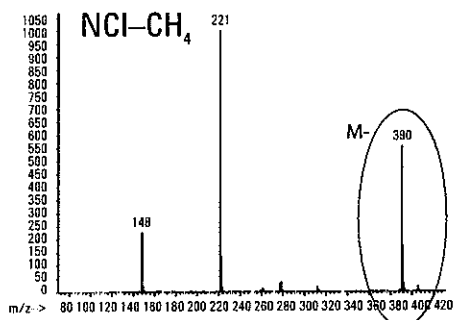
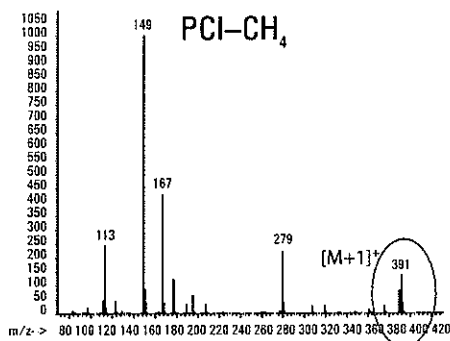
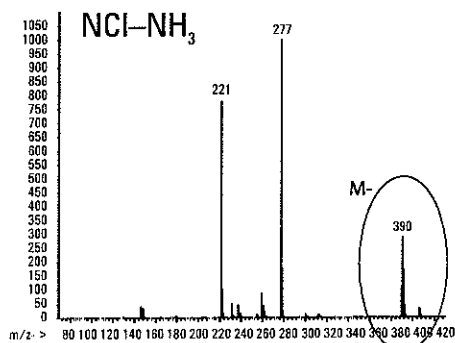
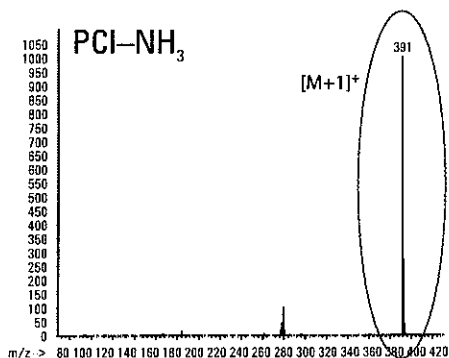
An intuitive user interface and a CI flow control module work together to automatically adjust the CI reagent gas flow for optimum performance. The dual reagent inlets allow easy comparison of complementary reagents like methane and ammonia. Automated calibrant "burn-off" allows the system to be quickly readied for use even in the ultra sensitive NCI mode.

Use hydrogen to lower your cost per analysis

The new hydrogen signal-to-noise specification for the 5975C Series GC/MSD makes Agilent the first and only instrument manufacturer to certify the performance and safety of hydrogen as a carrier gas. In fact, hydrogen often provides faster analysis times and resolution greater than GC/MS systems operating in helium mode.



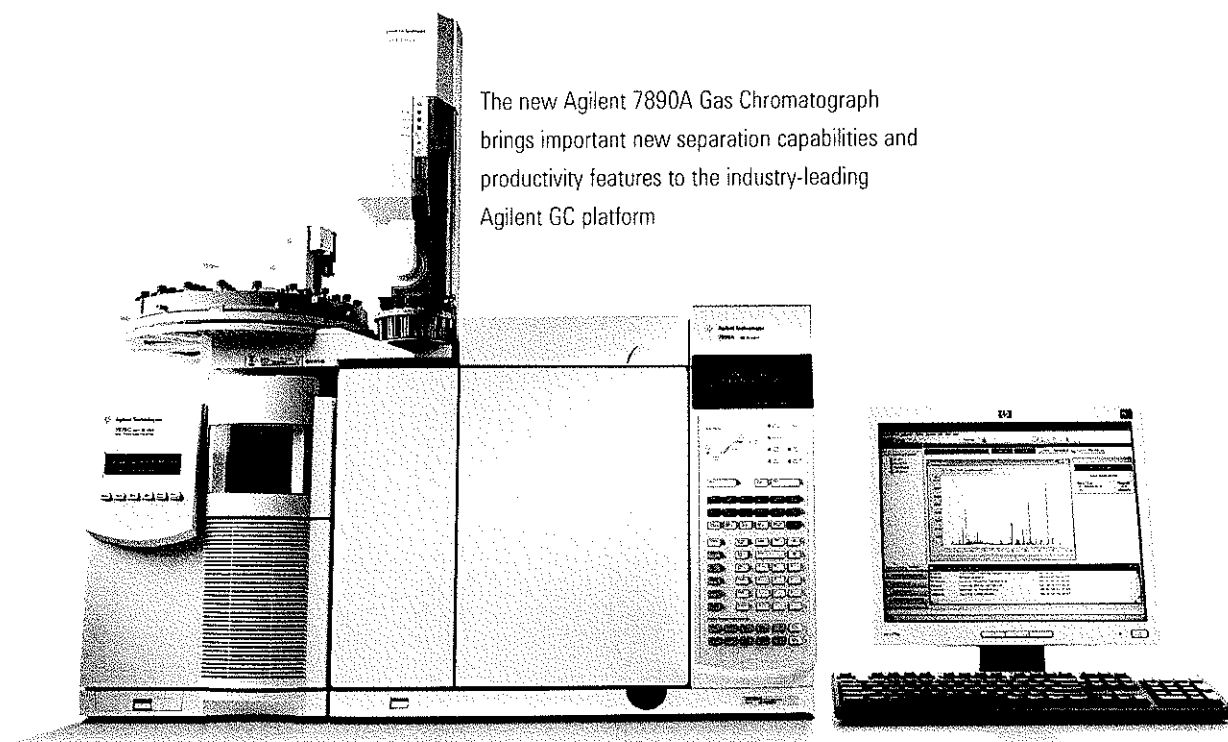
Analysis of polyaromatic hydrocarbons using H₂ and He. In this example, H₂ actually provides better resolution.



Dioctyl phthalate in all CI modes. Many compounds yield little identifying information in EI, for example all phthalates look very similar. CI provides valuable additional spectral information. PCI with ammonia (upper left); PCI with methane (lower left); NCI with methane (lower right); and NCI with ammonia (upper right) (5)

The Agilent 7890A Gas Chromatograph: The next level of GC performance and productivity.

Adding an exciting new chapter to a 40-year history of GC leadership, Agilent's new 7890A flagship GC gives you everything you need to take your lab to the next level of GC/MS performance, including advanced chromatographic capabilities, powerful new productivity features and real-time self-monitoring instrument intelligence. Plus, of course, legendary Agilent reliability



The new Agilent 7890A Gas Chromatograph brings important new separation capabilities and productivity features to the industry-leading Agilent GC platform

Agilent performance and reliability

Fifth-generation electronic pneumatics control (EPC) and digital electronics set a new benchmark for retention time locking (RTL) precision and retention time repeatability and help make the 7890A Agilent's most dependable GC ever.

Higher productivity

Faster oven cool down, robust backflush capability, advanced automation features and faster GC/MS oven ramps let you get more done in less time, at the lowest possible cost per sample—all easily incorporated into your existing methods

Simultaneous GC detector operation

For non-target compounds, a sensitive, selective GC detector is a powerful complement to MS. That small, unexpected peak on the ECD baseline might provide the only clue to a critical compound. The GC/MSD Productivity ChemStation will simultaneously acquire signals from two GC detectors and MSD SIM/Scan signals. (6)

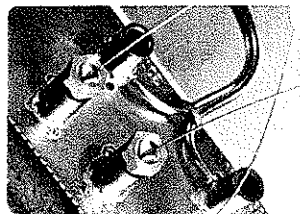
(6) 5989-7670EN – Replacing multiple 50-minute FPD/ELCD/SIM analysis with one 15-minute full-scan analysis for 10x productivity gain

The Agilent 7890A GC works right into your current 6890 workflow, with no major changes to your methods

You can increase your productivity and take advantage of the new capabilities of the 7890A system with no disruption to your lab's smooth operation. Right out of the box, operators will be immediately comfortable with the familiar controls and user interface—and because the 7890A system is built upon proven 6890 GC inlets, detectors and GC oven, you can transfer methods to your new 7890A GC with complete confidence

Breakthrough Capillary Flow technology

Agilent's innovative Capillary Flow modules enable reliable, leak-free in-oven connections. Available in a number of useful configurations,

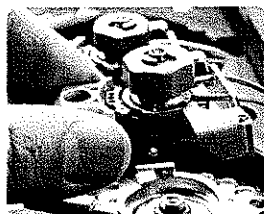


these inert, low-mass, low-dead volume devices not only make it easy to make secure connections, they give you the ability to precisely divert your gas flow where and when

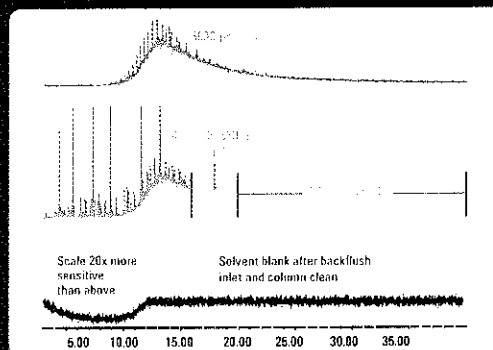
you want. This opens the door to highly useful techniques such as flow splitting, backflushing and Deans switching that can improve your analytical results, as well as saving time and resources.

Perform SSL inlet maintenance in seconds!

Convenient new Turn-Top design is built into each split/splitless (SSL) inlet, allowing you to change liners and columns more quickly and easily than ever before—without special tools or training.



7890A GC gives you a net improvement in productivity

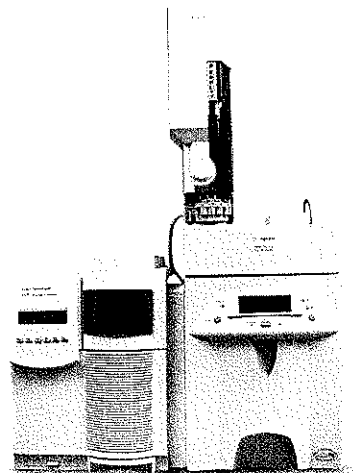


Semivolatile analysis (5 ppm) of hazardous waste (simulated sample with high boiling interference).

Top (blue): Peaks of interest elute by 16 minutes, but a 24-minute bake-out at 320°C is required to elute heavy components.

Middle (orange): Using the 7890A system's backflush capability with a turbo-based 5975C MSD, the sample was rerun with a 4-minute backflush—saving 20 minutes per run (50% total cycle time savings). ALS Overlap and faster cool down save an additional 4 minutes per cycle.

Bottom (green): A solvent blank monitored at a more sensitive scale confirms the efficiency of the backflush.



The Agilent 6850 Series II GC—small, rugged, easy to use

Is your lab doing simple, routine applications or at-line analysis? The Agilent 6850 GC, combined with the 5975C VL MSD, is the perfect choice if you need just a single inlet and detector. The small-footprint system offers a surprising number of advanced features—as well as legendary Agilent reliability.

GC/MS software that matches your workflow and maximizes your productivity.

The Agilent MSD Productivity ChemStation makes it easy even for non-expert operators to take advantage of all the advanced capabilities of the Agilent 5975C inert GC/MSD system. You will find everything designed to help you make the most of every run, and every workday.

Advanced instrument control

- Control of two GC/MS systems from a single PC
- Improved tuning procedures for accurate, consistent results and extended life of the EM (Gain Normalization)
- Simultaneous acquisition of SIM and Scan data for high sensitivity quantitation and library searchable spectra
- Integrated control of Liquid Samplers, G1888 Headspace Sampler and PAL Autosamplers
- Simultaneously acquired MSD and GC detector signals
- Automatic alerts about pending maintenance

Simplified configuration of methods

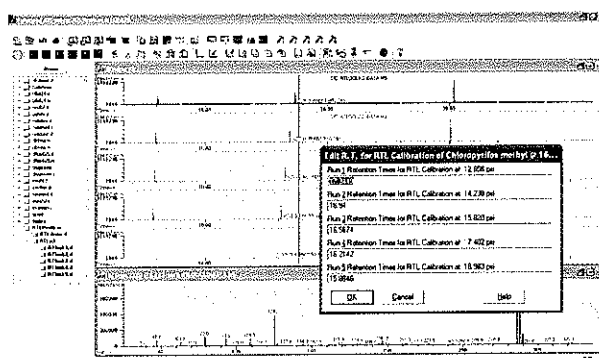
- Import/export of shared methods (eMethods)
- Import LIMS Sample Work Lists
- Guided setup of new calibration tables based upon automatic integration and library search results (AutoQuant)
- Automatic conversion of any full scan method to a high sensitivity SIM or SIM/Scan method (AutoSIM)
- Multi-instrument consistency for retention time locking (RTL)

High productivity data analysis

- Quantitative power for over 2000 compounds at 20 levels of calibration with 4 curve fit options
- Reprocess a previously run sequence while acquiring data
- Sequentially search up to 3 different libraries
- Direct comparison of multiple data files from multiple detectors (MS and/or GC)
- Simultaneous analysis of multiple data files (Enhance Data Analysis Plus)

Retention Time Locking (RTL)

- Reproducible retention times instrument to instrument and lab to lab anywhere in the world
- Confirmation of mass spectra identified compounds based on locked retention times
- Fifth generation EPC control to 0.001 psi



Retention Time Locking (RTL) is permanent, universal and flexible. The retention time for each of the chromatograms can be edited manually when the RTL method is being calibrated.

Reporting and customization

- General purpose and tailored report packages: Enhanced, EnviroQuant (USEPA), DrugQuant and Aromatics in Gasoline (ASTM)
- Custom reports with up to 240 graphic elements and corresponding databases for summary view and charting
- Export of reports in XLS, HTML or XML format
- PDF reports with index for searching and electronic signatures
- Macro programs to automate repetitive steps (mouse actions, menu choices and typed entries) and customize processes
- MSD Security ChemStation to address data security, integrity and traceability mandated by FDA's 21 CFR Part 11

SemiQuant. Quickly and easily estimate the concentration of non-calibrated compounds

Agilent's SemiQuant capability works together with Retention Time Locking (RTL) databases to increase confidence in your compound identification and speed up the quantification process

When an unknown peak appears, a library search provides only a possible match with the sample spectrum. Using the appropriate RTL database, you can increase certainty by matching the retention time of your compound with a fixed retention time, in addition to spectral data. Should you wish to quantify the compound, SemiQuant helps by estimating the concentration, so that you can inject the appropriate level of the standard. (7)

Quantitation Report (Not Reviewed)

```

Data Path : C:\msdchem\1\data\
Data File : 061dew0.d
Acq On : 7 Sep 1999 13:59
Operator : D. Peterson
Sample : demscan sample
Misc : 10 ng per component
NLS Vial : 1 Sample Multiplier: 1

Injant time: Mar 10 15:29:59 PM06
Quant Method : C:\msdchem\1\METHODS\LEU0ALDEMO-SQ-UR.M
Quant Title : Semi-quant tests
QList Update : Thu Mar 09 10:51:45 2000
Response via : Initial Calibration
    
```

Internal Standards	R.T.	Area	Response	Conc	Units	Dev(%)
1) Dodecane	5.280	57	9737444	1000.00	ng	0.88
Target Compounds						Quality
2) Biphenyl	6.431	15%	2758384	1000.00	ng	99
3) 4-Chlorobiphenyl	7.791	18%	18794921	1000.00	ng	99

```

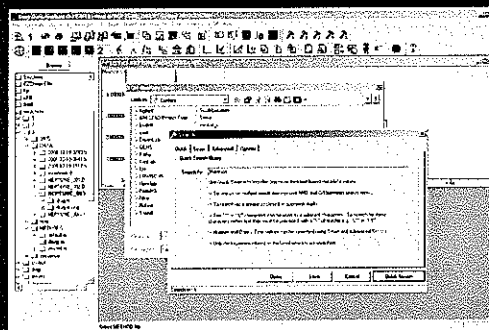
Peak Quant: 4/1/99 10:14:01 AM 131361617
1) 061dew0.d 001 01 9.275 70 14402592 0.1 ng
    
```

SemiQuant compounds are highlighted at the bottom of the Quantitation Report.

eMethods. Replicate, share and distribute methods

With Agilent eMethods, recreating and replicating a new GC/MS method is now a quick and fully automated process. You can bring a new GC/MS online in the shortest possible time and maximize lab productivity by standardizing on methods—whether your instruments are across the hall or across the world.

Integration with Agilent OpenLAB Enterprise Content Manager (ECM) streamlines data handling and organization.



Agilent OpenLAB Enterprise Content Manager is a Web-based application that provides a secure, centralized repository for all of the electronic data generated in your organization. (8) Comprehensive search and collaboration tools allow users to effectively find, use and re-use the information they need to make intelligent business decisions. Agilent OpenLAB ECM makes your lab more efficient, productive and confident by enabling the collection and conversion of the broadest range of analytical data into accurate and actionable information.

(7) 5989-4997EN: SemiQuant. New GC/MS Software Approaches to Estimating Compound Quantities

(8) 5989-6104EN: Integration of GC/MSD ChemStation with Agilent OpenLAB ECM

Rapid deconvolution, identification and quantification in complex matrices.

Agilent's simple easy-to-use Deconvolution Reporting Software (DRS) is an optional software feature that saves hours of analysis and review. Based on industry standard AMDIS, our second-generation deconvolution software quickly finds compounds missed by other data analysis packages. In fact, it reduces data review time from hours of tedious work to minutes of unattended computer analysis.

The revolutionary solution fully integrates three different software packages:

- Agilent's GC/MSD ChemStation
- The National Institute of Standards and Technology (NIST) Mass Spectral Search Program with the NIST MS Library
- NIST's Automated Mass Spectral Deconvolution and Identification Software (AMDIS)

The DRS automates the following operations:

- Quantitation by the MSD target ion or the AMDIS deconvoluted ion via GC/MSD ChemStation QEdit
- Spectral Deconvolution, or "cleaning" of full scan spectra
- Library searching of cleaned spectra
- Graphic and text reports that summarize both MSD and AMDIS deconvolution results for efficient review

Wide choice of custom RTL databases

Rapid accurate identification and quantification is ensured with one of Agilent's RTL databases (spectra and retention time). Databases for PAHs, PCBs, Flavors, FAMES, VOCs, Semi-VOCs, Pesticides and Endocrine Disruptors, Hazardous Chemicals, Organotins and Indoor Air Toxics have been expanded to include:

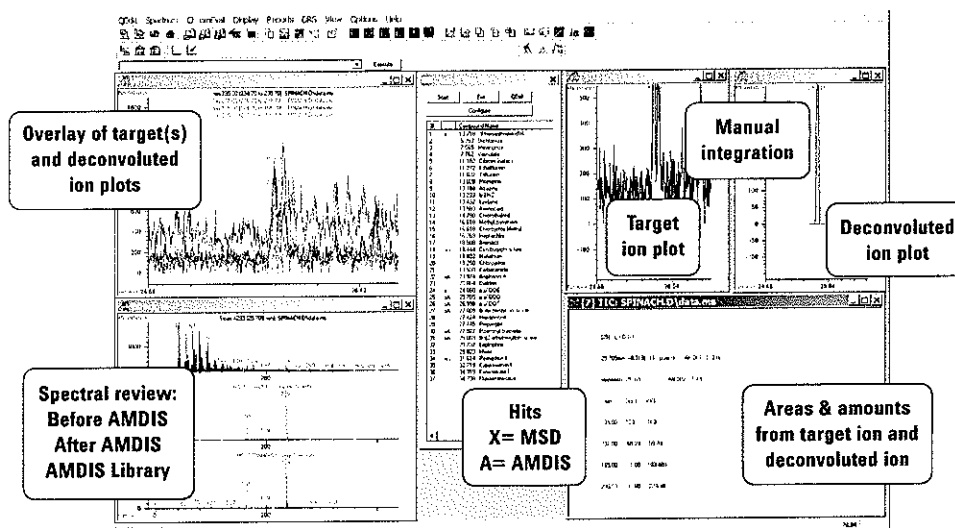
- Japanese Positive List Pesticides
- Forensic Toxicology
- Metabolomics

	California Department of Food and Agriculture (CDFA)	Deconvolution Reporting Software (DRS)
Number of pesticide hits	37	Same 37 plus 99 additional
Number of false positives	1	0
Time required to process	8 hours	32 minutes

Comparison of the time to process 17 surface water samples.

CDFA: A skilled analyst processing the 17 samples took about 8 hours to review results and eliminate false positives

Agilent DRS: Fully automated process took about 30 minutes and found an additional 99 compounds. (9)

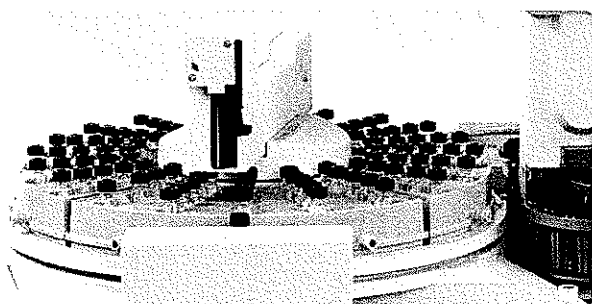


GC/MSD ChemStation QEdit fully integrates deconvoluted data from AMDIS including EICs and spectra

Accessories and options make your 5975C even more versatile and productive.

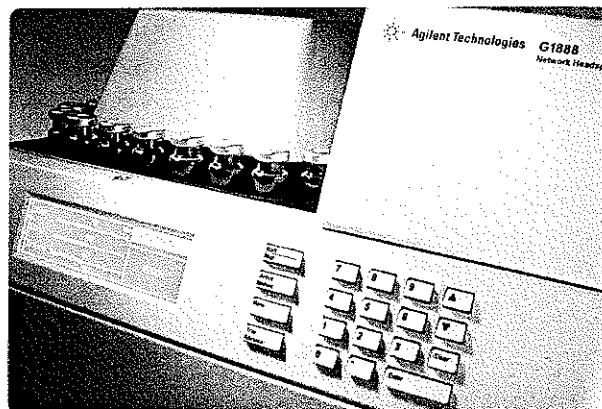
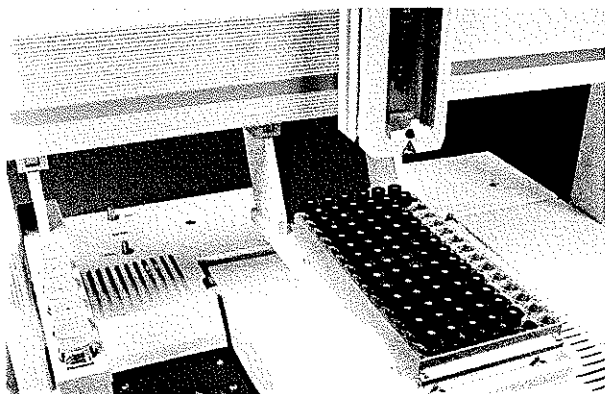
Automatic Liquid Samplers—perfect productivity partners for your 5975C Series GC/MSD

Add an Agilent 7683 Series Automatic Liquid Sampler. Offering the fastest injection times of any GC autosampler, greater solvent capacity, multiple sampling options—dual simultaneous injection certified autosampler vials—and more—the 7683 ALS is ready to go to work



Boost your lab's output with automated sample preparation

Choose the versatile CombiPAL sample injector for liquid injection, headspace and solid-phase microextraction (SPME). The economical GC PAL platform is configured for liquid injection only, but offers many of the other capabilities of the CombiPAL including large volume injection (LVI), multiple vial and syringe sizes and extended sample vial capacity

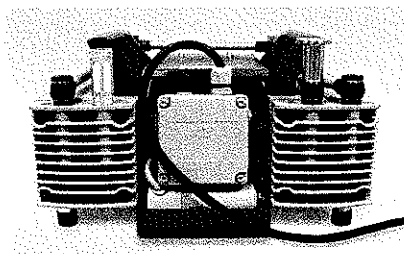


Agilent G1888A Headspace Sampler adds to your analysis capabilities

Automatically introduce volatile compounds from virtually any sample matrix directly into a GC or GC/MS. An inert sample pathway from vial through column to source provides superior chemical performance without analyte degradation or loss

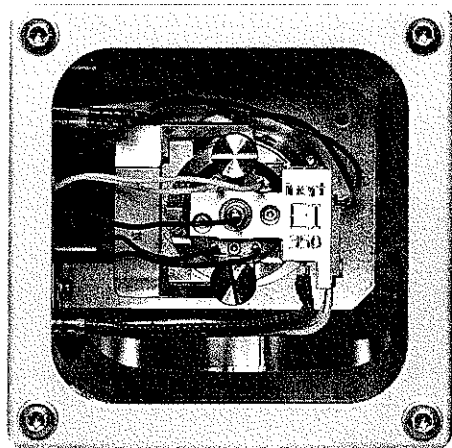
Oil-free pump—clean and virtually maintenance free

Agilent is the first mass spectrometer manufacturer to offer this unique pump, which requires virtually no routine maintenance. There's no oil, so no danger of oil contamination or leaking.



Designed for supportability and maintenance.

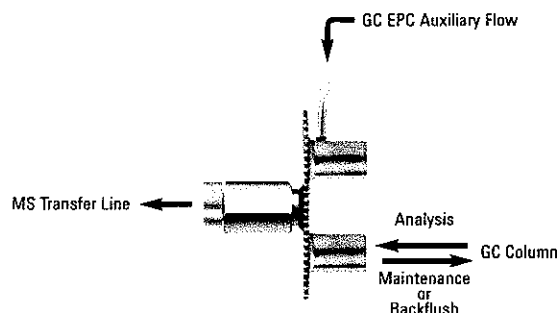
Agilent GC/MSD systems have always been designed for easy serviceability and maintenance—and the Agilent 5975C Series GC/MSD takes this design philosophy to a whole new level.



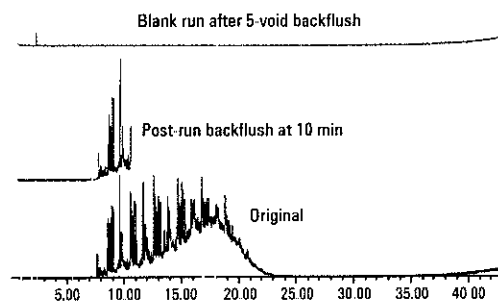
- **Modular analyzer assembly** offers complete access to the filament ion source and electron multiplier for faster routine maintenance—in fact, the entire analyzer assembly can be removed in less than two minutes, without tools! A modular self-contained electronics module minimizes problems with cables and wiring harnesses
- **Front glass window** provides simple source identification, as well as a complete view of critical connections—so you can see for sure the column is connected properly
- **High-reliability vacuum system** assures maximum long-term performance; available oil-free pumping system virtually eliminates pump maintenance and reduces noise, and can be used with corrosive gases such as ammonia
- **Triple-Axis Detector with new triple-channel electron multiplier (EM)** more than doubles EM life. The Electron Multiplier Saver feature further extends EM life during SIM operation with highly concentrated peaks
- **Optional ion gauge** helps to troubleshoot and isolate leaks as quickly as possible

(10) 5989-6018EN. Improving Productivity and Extending Column Life with Backflush

QuickSwap Capillary Flow device saves time and money with every column change and system maintenance



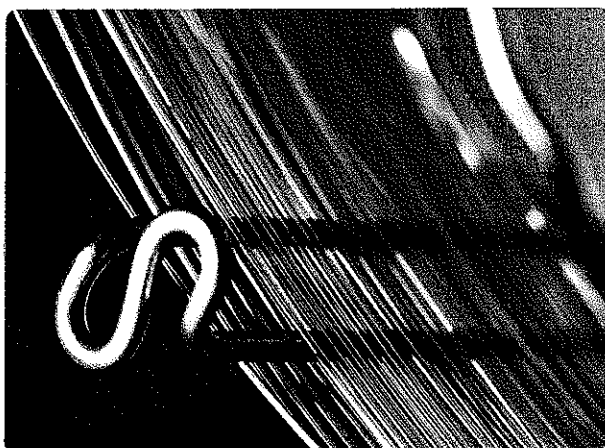
Tired of waiting around for a mass spec to vent before you can change a column out or perform routine inlet maintenance? Using a "QuickSwap" Capillary Flow device, you can safely disconnect the column without venting, and without losing vacuum—in about 30 seconds!



The QuickSwap device can also be used for column backflushing, reducing MSD contamination by high-boiling sample components shortening analysis time and decreasing the frequency of cleaning the ion source. (Note: Backflush operation requires pumping capacity of a turbomolecular pump) (10)

High-performance Agilent J&W columns and supplies for the Agilent 5975C Series GC/MSD.

To help you achieve better results faster, Agilent is continuously improving the cleanliness, convenience and reliability of columns and supplies for Agilent GC/MSD systems. From market-leading J&W columns—with rigorous quality control and QC testing that ensure reproducibility, efficiency and inertness—to GC flow path supplies designed, manufactured and packaged to maintain the integrity of your sample, Agilent columns, supplies and accessories will improve your lab's performance, productivity and confidence.



Performance

Choose Agilent J&W columns and supplies for a leak-free, inert flow path to ensure lowest bleed and best signal-to-noise performance in Agilent GC/MSD systems.

From among the full suite of Agilent low-bleed J&W columns, the inert HP-5MSi column was selected to ship with the new 5975C. Specially tested to ensure maximum area response performance of strong acid and base compounds, this column is also compatible with Agilent Pesticide Libraries for MS.

Tight inlet seals are needed to keep MS system performance at its peak. Agilent pre-cleaned liners and conditioned liner O-rings—matched with our new, proprietary, injection-molded gold-plated seal—prevent the tiniest leaks that cause column bleed and signal deterioration.

Productivity

Agilent supplies help keep routine maintenance routine. Our capillary column ferrules, O-rings and septa are packaged to remain clean and ready for use, and conveniently dispense one at a time as needed for fast inlet maintenance.

Agilent's new J&W High Efficiency Capillary GC columns in 0.18 mm id allow for potentially 50% or more faster analysis than conventional GC/MS without loss of resolution. The improved sample throughput enables lower cost per analysis in conjunction with reduced carrier flow requirements.

Confidence

Agilent J&W columns and supplies ensure your Agilent 5975C system delivers as promised. In fact, our GC and GC/MS instrument specifications are determined using industry-leading Agilent J&W columns and Agilent brand chromatography supplies. Eliminate concerns about lost samples or productivity from unexpected sequence interruptions by using Agilent certified autosampler vials, septa and caps, and Gold Standard syringes. Each comes with a Certificate of Conformance to assure you all specifications are met.

Agilent J&W GC columns and our portfolio of chromatographic supplies are available through Agilent and authorized Agilent distributors.

Agilent services let you focus on what you do best.

Agilent's service organization is the most respected in the industry. Whether you need support for a single instrument or a multilaboratory operation, we can help you solve problems quickly, increase your uptime and optimize your lab's resources. On our full line of GC/MS systems, we offer:

- On-site preventive maintenance to ensure dependable operation and minimize unplanned downtime
- Troubleshooting, maintenance and repair for Agilent as well as non-Agilent instruments
- Remote diagnostic and monitoring services to maximize instrument uptime and lab productivity
- Industry-leading regulatory compliance services and education
- Expert consulting and training

The Agilent Value Promise— 10 years of guaranteed value.

In addition to continually evolving products, we offer something else unique to the industry—our 10-year value guarantee. The Agilent Value Promise guarantees you at least 10 years of instrument use from your date of purchase, or we will credit you with the residual value of that system toward an upgraded model. Not only does Agilent ensure a safe purchase now, we help ensure your investment is as valuable to you in the long run.

The Agilent Service Guarantee



Should your Agilent instrument require 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 laboratory running at maximum productivity.

For more information

Learn more:

www.agilent.com/chem/5975C

Buy online:

www.agilent.com/chem/store

Find an Agilent customer center in your country:

www.agilent.com/chem/contactus

U.S. and Canada

1-800-227-9770

agilent_inquiries@agilent.com

Europe

info_agilent@agilent.com

Asia Pacific

adinquiry_aplsc@agilent.com

Research use only. Information, descriptions and specifications in this publication are subject to change without notice.

Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

© Agilent Technologies, Inc. 2008

Printed in USA May 6, 2008

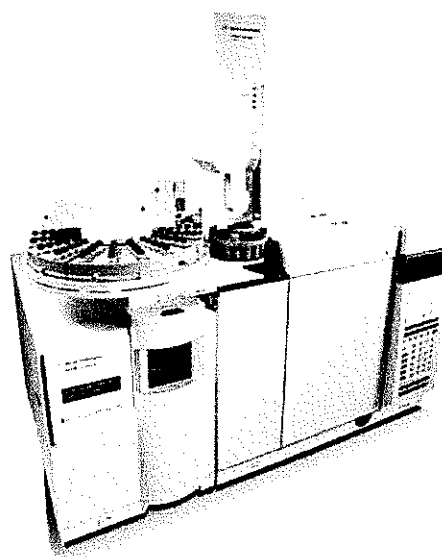
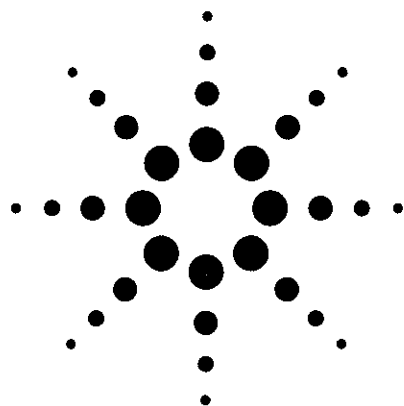
5989-7827EN



Agilent Technologies

Agilent 5975C Series GC/MSD System

Data Sheet



GC/MSD

The Agilent 5975C Series Gas Chromatograph/Mass Selective Detector (GC/MSD) with the Triple-Axis HED-EM Detector provides flexibility, capabilities, and performance demanded by modern applications in all industries. The mass selective detector (MSD) can be configured for electron ionization or chemical ionization. Chemical ionization has been made as routine as electron ionization with automatic setup, including tuning and gas flow control. The system can run routine ammonia chemical ionization with an optional rough pump designed for corrosive chemicals.

The gas chromatograph and autosampler systems can be selected to meet laboratory requirements. For laboratories where space is limited, the MSD can be used with the compact Agilent 6850 GC. To save even more space, two GC/MS systems can be controlled by a single ChemStation. Other laboratories will want the full capabilities of the Agilent 6890 GC or the new high-performance 7890A GC configured with both the MSD and conventional GC detectors. Injection systems can range from an injector tower to a flexible CTC-PAL autosampling system. Other sampling devices are available from Agilent and third parties.

The 5975C Series GC/MSD gives you high performance and high productivity with features that will improve your analysis.

Trace Ion Detection technology will help in the detection of low-level compounds in complex matrices. In combination with the Deconvolution Reporting Software

add-on, it is now possible to detect even lower level compounds that coelute—the type of analysis that was difficult without the help of Trace Ion Detection technology.

The programmable 350 °C source will increase the signal intensity for later eluting compounds. This improvement in signal is compound dependent.

The Gain Normalization Autotune will set the MSD in the best operating conditions, and these conditions will be consistent across instruments. The electronics of the 5975C systems allow a combination of both SIM and scan acquisitions, even for sub-one-second chromatographic peaks. To make this capability practical, the SIM ions and switching times can be automatically set up with the ChemStation software.

Retention time locking (RTL) maintains the retention times so that method maintenance is minimized when columns are clipped or the methods are transferred to other instruments. Method transfers are further simplified with the eMethod capabilities. Multi-site laboratories can easily transfer and run the same methods with the same retention times no matter what detector is used on the gas chromatograph. Optimized methods from the latest Agilent applications can be downloaded from the Web site and run in your laboratory.

The ChemStation software provides an extensive set of tools for all laboratories. In addition to basic quantitative capabilities, high volume laboratories in drug and environmental testing can generate reports specifically designed for their industry. The latest software even



Agilent Technologies

allows estimating concentrations of non-calibrated compounds based on calibrated compounds (SemiQuant). Laboratories doing qualitative analysis have access to extensive data manipulation tools developed based on customer requests. For complex samples, our Deconvolution Reporting Software (DRS) combined with our unique DRS libraries provide quick screening capabilities for classes of compounds. For users who want to customize their operations, an extensive macro language is provided along with a flexible report writer.

Agilent GC/MSDs are known for their reliability, ruggedness, and long life. The Agilent 10-year use guarantee provides greater assurance for a low cost-of-ownership throughout its life.

The Agilent 5975C Series MSD System features:

- Proven ruggedness and reliability
- eMethods for simple method transfer
- SemiQuant for estimating concentrations of non-calibrated compounds
- Expanded qualitative analysis capabilities
- Inert electron ionization (EI) source for better performance on active compounds
- Higher sensitivity with the Triple-Axis HED-EM Detector
- Mass range up to 1050 u
- High performance SIM/scan with automated SIM setup
- Mass stability—better than 0.10 u over 48 hours
- Performance electronics for 12,500 u/s scan speed (8,000 u/s write-to-disk)
- DRS and RTL ready
- Compatible with microfluidics flow controller and Quickswap
- Compatible with flip-top inlet sealing system for 6890 and 6850 and with turn-top for 7890A GC
- Proprietary hyperbolic gold-coated quadrupole
- Heatable quadrupole to 200 °C
- Easy access to full ion optics
- Two-MS control per PC
- Four simultaneous signal acquisitions (up to two MS)
- Intelligent sequencing for samples
- Compatibility with many third party sampling devices
- AutoCI for full automation of CI reagent gas and source tuning
- Choice of oil-free mechanical pumps (optional)
- Ten-year use guarantee

Agilent 5975C Series MSD System Specifications

Mass Spectrometer	
Mode (standard)	EI
Modes (optional)	PCI, NCI, and EI with CI source
Ion source type	Noncoated inert EI source (optional for diffusion pump system)
Sources	EI source provided with all systems; CI source for PCI, NCI, and EI added to CI systems
Ionization energy	5–241.5 eV
Ionization current	0–315 µA
CI gases	Dual gas inlet
Transfer line temperature	100–350 °C
Ion source temperature	150–350 °C
Quadrupole temperature	106–200 °C
Filaments	Dual for EI, single for CI
Mass filter	Monolithic hyperbolic quadrupole
Mass filter protection	Entrance lens
Maximum mass	1050 u
Mass resolution	Unit mass adjustable by tune
Mass axis stability	Better than 0.10 u/48 h
Detector	Triple-Axis Detector with long life EM
Dynamic range (electronic)	10e6
Scan rate (electronic)	Up to 12,500 u/s
Write-to-disk	Up to 8,000 u/s
SIM	60 ions × 100 groups
Pumping system	65 L/s for the diffusion pump and 70 L/s or 262 L/s turbomolecular pump with 2.5 m ³ /hr mechanical pump
Total flow	1.5 mL/min (diffusion) 2 mL/min (standard turbo) 4 mL/min (performance turbo)
Instrument control	Data system and local user interface
Maintenance access	Source, filaments, lenses, mass filter, and detector on removable plate
Maintenance scheduling	Early maintenance feedback
Gas Chromatograph	
Gas chromatograph	6850, 6890, or 7890A GC
Autosampler	G2880A, 7683, CombiPAL, or G1888A (and more)
Liner replacement	Compatible with optional flip-top inlet sealing system for 6850 and 6890; turn-top system standard with 7890A GC

Injector	Split-splitless (standard). others available
Oven temperature	Ambient +4– 450 °C (6890 and 7890A GC) Ambient +5– 350 °C (6850)
Oven ramps/plateaus	6/7 for 6850 and 6890 20/21 for 7890A GC with negative ramps allowed
Carrier gases	Helium and hydrogen (nitrogen and argon for GC detectors)
Electronic pneumatic control (EPC)	Auto pressure regulation for split/splitless. septum purge
Carrier gas control modes	Constant pressure and flow modes; pressure and flow programmable
Pressure range	0–100 psi (standard), 0–150 psi (optional) with 0.01 psi resolution. pressure and temperature corrected for the 6850 and the 6890 and 0.001 psi resolution for the 7890A GC
Retention-time locking	RTL ready
Flow control	Compatible with optional capillary flow device controller

Data System

eMethods	Transfer methods between the 6850, 6890, and 7890A Series MSDs
Simultaneous MS and GC	Four signals (up to two MS) detector data acquisitions
SIM/Scan	Automated SIM setup and synchronous SIM/scan operation
Ionization mode autotunes	EI, PCI, NCI
Chemical ionization setup	Electronic mass flow control of reagent gases
High-mass confirmation	Verification test kit (optional)
Application autotunes	One-click autotune for BFB, DFTPP
Quantitation setup	Automated
Application reports	Environmental, drugs of abuse, aromatics in gasoline
File import/export	Sequence file/quant and custom report
Customization	Macro language, report writer
Security	Password and audit trail
Spectral libraries (optional)	NIST, Wiley, Pflieger-Mauer Drug Stan pesticide
Spectral DRS and RTL databases (optional)	Pesticides and endocrine disruptors, volatiles, PCBs, toxicology, FAMES, flavors, organotin compounds, hazardous chemicals, indoor air toxics, Japan Positive List, forensic toxicology, and environment semi-volatiles
21CFR11 Compliance	Optional software available
Other capabilities (optional)	Deconvolution linked with RTL database
Support life	Ten-year use guarantee

Installation Checkout Specifications

All tests performed using an autosampler, split-splitless injector, and a 30 m × 0.25 mm × 0.25 µm HP-5MS column. All scan determinations use continuous linear scanning across the entire mass range. Noise selection, peak integration, and RMS S/N (signal-to-noise) calculation performed by automated macro. Specifications are not comparable to those using different conditions. The system will exceed the following specifications at installation:

EI scan sensitivity	1-µL injection of a 1-pg/µL OFN standard scanning from 50–300 u will give 400:1 and 200:1 S/N for turbo pump and diffusion systems, respectively at nominal <i>m/z</i> 272 ion
PCI scan sensitivity (methane)	1-µL injection of a 100-pg/µL BZP standard scanning from 80–230 u will give 125:1 S/N at nominal <i>m/z</i> 183 ion
NCI scan sensitivity (methane)	2-µL injection of a 100-fg/µL OFN standard scanning from 50–300 u will give 600:1 S/N at nominal <i>m/z</i> 272 ion

Other Sensitivity Specifications

EI scan sensitivity (hydrogen)	1-µL injection of a 1-pg/µL OFN standard scanning from 50 to 300 u will give at nominal <i>m/z</i> 272 ion 100:1 for turbo systems and 50:1 for the diffusion system
EI SIM sensitivity	1-µL injection of a 20-fg/µL OFN standard will give 10:1 S/N at nominal <i>m/z</i> 272 ion
PCI SIM sensitivity	1-µL injection of a 1-pg/µL BZP standard will give 10:1 S/N at nominal <i>m/z</i> 183 ion
NCI SIM sensitivity	1-µL injection of a 1-fg/µL OFN standard will give 10:1 S/N at nominal <i>m/z</i> 272 ion
PCI scan sensitivity (ammonia)	1-µL injection of a 100-pg/µL BZP standard scanning from 80–230 u will give 500:1 S/N at nominal <i>m/z</i> 183 ion
NCI scan sensitivity (ammonia)	2-µL injection of a 100-fg/µL OFN standard scanning from 50–300 u will give 300:1 S/N at nominal <i>m/z</i> 272 ion

Trace Repeatability

Results are for three replicate splitless injections of 1-pg OFN using MS detection and automated integration and processing. Specifications using a different compound, concentration, detectors, or conditions, are not comparable.

Trace RT repeatability	<0.0012 min
Trace area repeatability	<2.0% RSD

Automation Features

- The system can automatically tune and adjust gas flows for chemical ionization operation.
- The system can automatically create a SIM method from a scan datafile of an injected standard.

- The system can automatically screen for 926 entries in the pesticides and endocrine disruptors database based on spectra and RTs
- With the optional DRS, the system can produce a combined report showing library search results based on deconvoluted spectra along with quantitative results

Ease-of-Maintenance

- The GC inlet liner can be replaced in less than 1 minute without the use of tools when using the optional flip-top inlet sealing system for the 6850 and 6890N GCs. The 7890A GC comes standard with a turn-top inlet that will give you the same benefits
- A glass window simplifies column positioning. It also shows ion source type, filament operation, and electrical connections.
- The source, filaments, lenses, quadrupole, and EM can be removed from the instrument as one unit in less than 1 minute after venting
- The optional micro ion gauge controller can be replaced without removal of the mass spectrometer covers

Safety, Regulatory Compliance, and Operational Conditions

The instrument is designed and manufactured under a quality system registered to ISO 9001. The instrument complies with international regulatory, safety, and electromagnetic compatibility requirements. In addition, further testing was done under Agilent standards to ensure operation after delivery and long-term usage.

See the 5975 page at <http://www.agilent.com/Scripts/PDS.asp?IPage=34426> for further information and typical product testing videos.

Safety	Canadian Standards Association (CSA): CAN/CSA-C22.2 No. 61010-1-04
	CSA/Nationally Recognized Test Laboratory (NRTL): UL 61010-1
	International Electrotechnical Commission (IEC): 61010-1
	EuroNorm (EN): 61010-1
Electromagnetic compatibility	CISPR11/EN55011: Group 1, Class A

Sound emission	EN 27779:1991 - sound pressure $L_p < 70$ db
Power	110–130 VAC $\pm 5\%$, 60 Hz only 200–210 VAC $\pm 5\%$, 50/60 Hz 220–240 VAC $\pm 5\%$, 50/60 Hz
Operating environment	15–35 °C, 40–80% relative humidity – noncondensing (operational) -20–70 °C, 0–95% relative humidity – noncondensing (storage)

Physical Requirements (with the Agilent 6890 or 7890A GC)

Dimensions (GC/MS)	88 cm (w) \times 56 cm (d) \times 50 cm (h) Additional space should be added for the data system and printer
Weight (GC/MS)	81 to 96 kg (depending on configuration)

For More Information

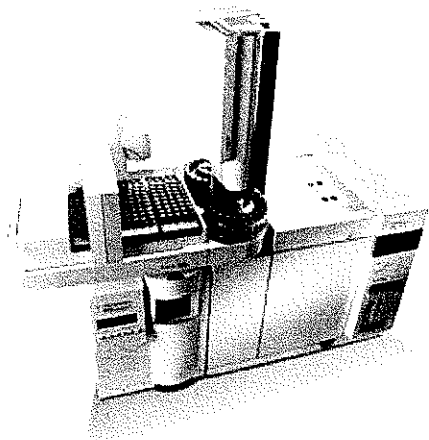
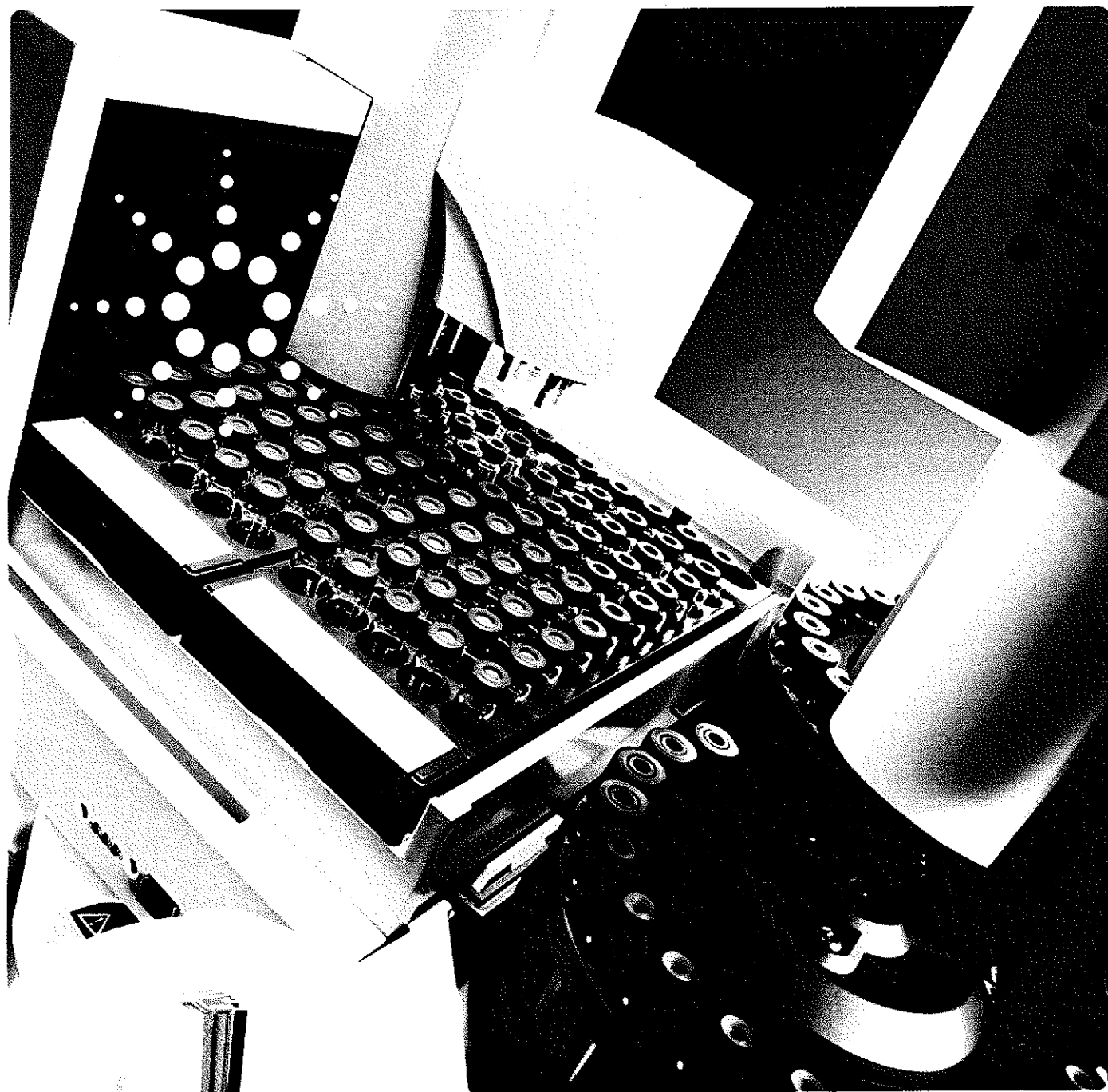
For more information on our products and services, visit our Web site at www.agilent.com/chem

Agilent shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material. Information, descriptions, and specifications in this publication are subject to change without notice.

© Agilent Technologies, Inc. 2008

Printed in the USA
February 7, 2008
5989-6427EN





Agilent 7693A Series Automatic Liquid Sampler
Inject new performance into your gas chromatography.

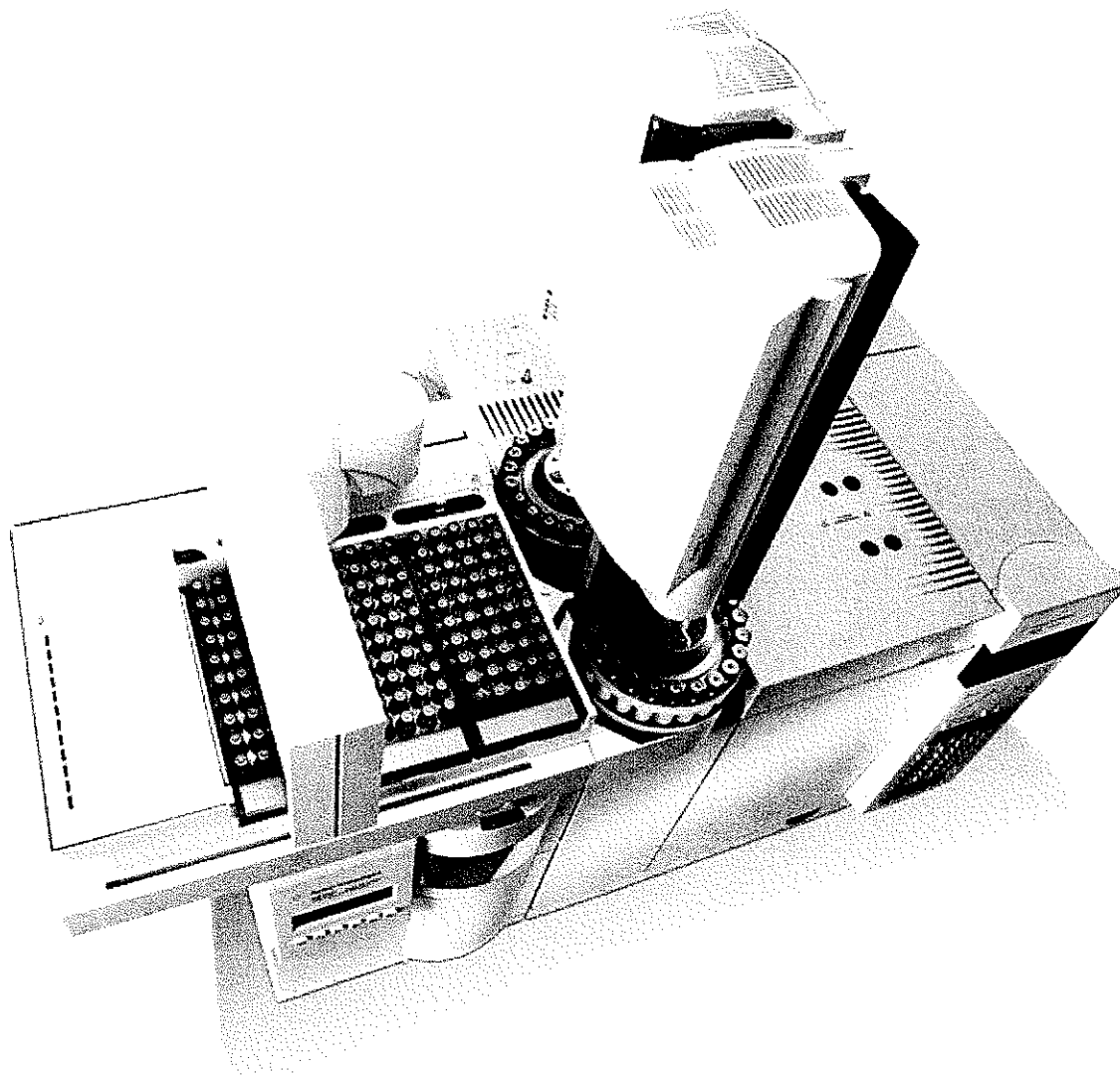
Our measure is your success

Agilent 7693A Series Automatic Liquid Sampler

Introducing a new standard of productivity and flexibility.

How do you improve on the most popular GC sample introduction system ever? We started with what we've learned in nearly 40 years of GC leadership—and built from there.

Agilent's all-new 7693A Automatic Liquid Sampler is a complete redesign of our 7683B ALS, the long-time industry leader. The new system takes advantage of today's latest technology to deliver even greater reliability, performance and flexibility. So whether you have hundreds of samples to analyze, or just a few, the 7693A system gives you sample handling and injection capabilities that are best-in-class.



Enhanced performance and productivity

From small-volume injection to large-volume injection, to multi-phase sampling, the 7693A system can help you process samples more quickly—and get better data, too.

Agilent's exclusive dual simultaneous injection feature saves time by doubling your sample throughput. And our exclusive fast-injection technology—two times faster than any competitive ALS—minimizes needle discrimination and sample degradation. It also ensures the best possible peak shape while maximizing the accuracy of your results.

Unmatched flexibility

No built-in autosampler can match the flexibility you get with the modular design of the 7693A ALS. The system works seamlessly with all currently available benchtop Agilent gas chromatographs, including the 6890A GC*; the 7693A injection tower is also supported on Agilent 7820A* and 6850 GC systems.

Your 7693A system can easily adapt to your lab's changing needs. For example, you can start with a basic injector with a 16-sample turret; later, add a second injector, a 150-sample tray, and a vial Heater/Mixer/Bar Code Reader.

* 6890A/7820A requires optional controller.

Maximum uptime

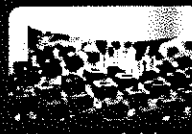
The self-aligning, plug-and-play injector mounts in seconds without tools. It can be easily moved from one inlet to another or quickly and easily transferred between GCs when workloads change. The lightweight, removable design also permits easy inlet maintenance.

Greater solvent capacity (>20 mL) and an ability to load up to 150 samples means longer unattended operation. And built-in Agilent reliability means your system can be up and running day and night with minimum operator attention and without the need for calibration or adjustment.



Sample capacity to meet any requirement

Offering an expanded 16-vial turret, the 7693A's standard configuration provides up to 8 hours of analysis. Need more configuration capacity? The 150-vial tray is up to the task.



Active gripper

Active fingers in the gripper hold the vial by the sides to provide greater flexibility in handling a wider range of vials and cap types. Sensors also detect whether or not a vial has been grasped.

A choice of injection modes

Agilent's fast injection enhances chromatographic results by ensuring minimal needle discrimination and sample decomposition. Plunger speed can be precisely regulated, enabling true optimization for large volume injections or challenging applications.

New Heater/Mixer/Bar Code Reader

An optional Heater/Mixer/Bar Code Reader and second injector can be used to prepare highly viscous or slightly soluble samples, as well as for dilution, mixing, derivatization, and bar-coded sample tracking. All functions are controlled via easy-to-use software.

Next sample overlap support

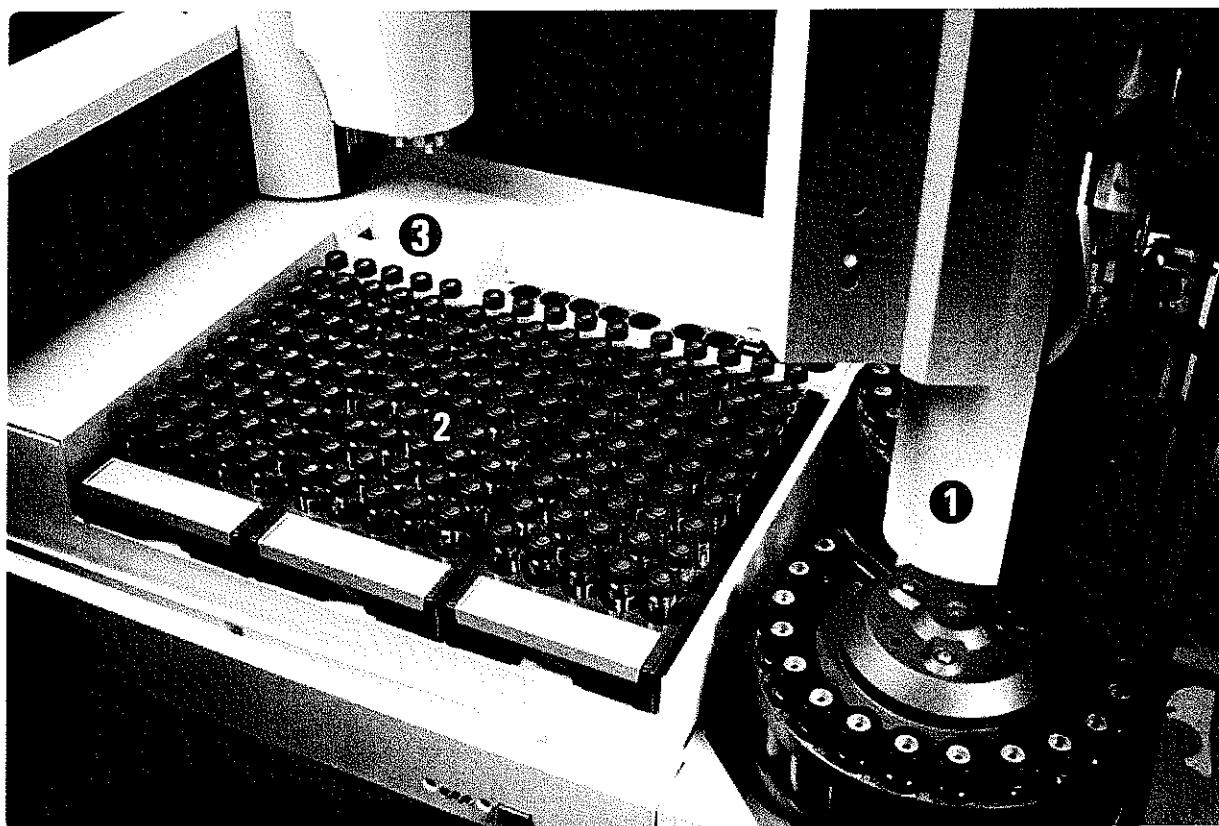
Decrease analysis time and increase throughput by performing pre-run rinses and picking up the next sample before the current run is complete.

Modular design for easy service and support

Should service be required, repair options include return to Agilent for quick exchange or repair. On-site repair is also available depending on the lab's repair needs.

The better the injection, the better the chromatography.

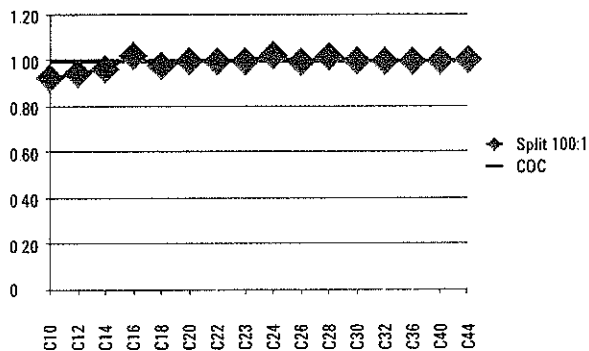
Like its predecessor, the Agilent 7693A has been engineered for maximum performance and reliability while providing added flexibility to meet your lab's changing needs.



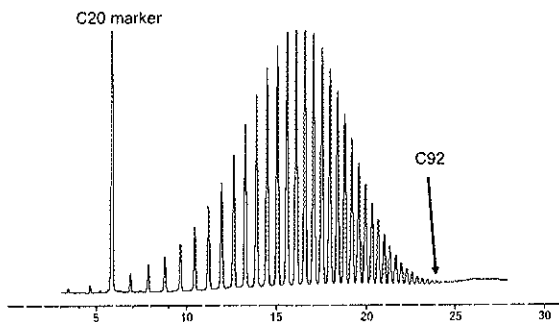
The 7693A consists of three modular sections:

- 1 Injection Tower**—Automates the analyses of up to sixteen samples; capacity for two solvent bottles and one waste bottle. When used with the Vial Tray, the Injection Tower has a capacity for ten solvent vials and five waste vials, as well as three sample vial transfer positions—giving the system unprecedented sample handling flexibility.
- 2 Sample Tray**—New vial handling system uses three separate 50-vial racks for a total capacity of 150 samples. In addition, a full tray heater/cooler is available for use with a separately supplied recirculating temperature bath.
- 3 Heater/Mixer/Bar Code Reader**—To give you even more sample handling capabilities, an optional module allows heating, mixing, and bar code reading of samples immediately prior to injection.

Agilent exclusive fast injection—under 100 milliseconds!



Agilent's 100-millisecond injection—almost twice as fast as the nearest competitor—eliminates a major source of sample discrimination and ensures that your injections are as representative of the sample as possible. Fast injection also simplifies quantitation by enabling the use of external standards.



Preparation and run of high temperature SIMDIS calibration standard Polywax 655. Optional single-vial Heater/Mixer/Bar Code Reader lets you automatically heat samples up to 80°C and mix them prior to injection, significantly improving high molecular weight performance and chromatographic results.

Best-in-class precision

Carbon #	Split Area % RSD	Splitless Area % RSD	On Column Area % RSD
10	0.20	0.26	0.33
12	0.20	0.27	0.36
14	0.20	0.27	0.40
16	0.21	0.30	0.41
18	0.23	0.28	0.27
20	0.25	0.28	0.41
22	0.28	0.28	0.41
24	0.30	0.28	0.42
32	0.39	0.30	0.41
36	0.29	0.35	0.41
40	0.34	0.27	0.42
44	0.27	0.33	0.42

Table refers to results of ten 1 µL injections.

Whether you're detecting emerging contaminants in drinking water or testing drugs for purity, your results have to be correct, precise and irrefutable. And the 7693A helps to ensure your best chromatography with advanced injection features:

- Multiple wash solvent capability for pre- and post-injection needle rinsing reduces sample carryover. Agilent's new premium syringes further help to eliminate the possibility of carryover.
- Pre-injection sample pumps and pre-injection washes further reduce the possibility of carryover.
- Sample trays are mounted away from GC oven to prevent exposure to high temperatures that could cause degradation or condensation in the sample vial.
- Single stroke injection volume as small as 0.05 µL and as large as 250 µL let you precisely match injections to the exact needs of your analyses.
- New line of Agilent syringes offers longer plunger lifetime, lower carryover and greater accuracy over a wider range of injection volumes.
- New advanced automation capabilities eliminate sources of GC operator variability and human error to minimize rework.

Pre-injection sample handling saves steps, boosts productivity.

In addition to conventional and fast injection modes, the 7693A system offers pre-injection sample handling capabilities that can further enhance your lab's flexibility, productivity and performance. Ideal for routine sample handling in a wide range of industries and applications—including forensics, food and environmental analysis—this can often eliminate or minimize separate sample prep work, saving both time and resources.

The addition of a second injection tower, optional Heater/Mixer/Bar Code Reader and easy-to-use Agilent software gives you the flexibility you need to optimize for performance, cost-efficiency or unique analytical requirements. You can automatically add a derivatization agent, for example, or heat the sample vial, add a second solvent, mix it and then inject into the system—all automatically!

Case Study: Advanced automation capabilities minimize analyst-to-analyst variability, accelerate sample prep, and reduce rework

Here's the problem. An analysis of Free and Total Glycerin in biodiesel involves complicated, time-consuming sample preparation plus the use of five multi-component calibration solutions and two internal standards, followed by derivatization. Several different bench chemists run this analysis, adding person-to-person variables to the results.

Here's how one smart lab is dealing with it.

By taking advantage of the built-in capabilities of the Agilent 7693A ALS system, the entire process can be automated—including preparation of calibration standards, standards addition, derivatization and sample injection.

The step-by-step setup is simple and intuitive. The benefits are immediate and dramatic: No more analyst-to-analyst variability, reduced analyst time, 90% lower solvent and waste expense and minimal operator exposure to potentially harmful reagents.

And rework is a thing of the past.



Ambient Headspace Sampling



In-Vial Extraction



Small-Volume Sampling



In-Vial Derivatization



Dilution



Internal Standard Addition



Heating/Mixing/Bar Code

Extended sampling flexibility and new automation options. Variable needle depths allow you to sample anywhere within the vial. New, optional sample handling capabilities further enhance your lab's productivity.

Easy, intuitive sample handling software.

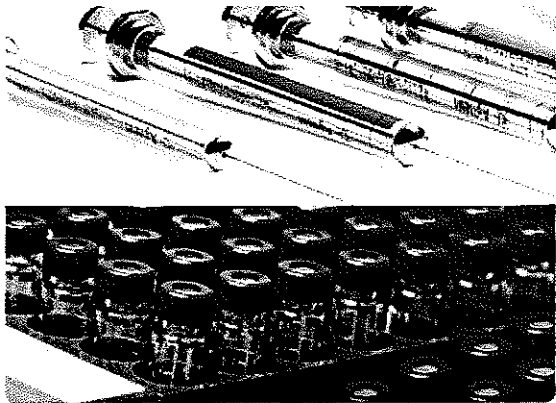
Agilent's standard injector programming provides a simple, straightforward way to tap into the full power of the 7693A autosampler's flexible sample prep capabilities. Using a familiar menu-driven interface, you can quickly create powerful, custom sample handling routines for virtually any application.

The screenshot displays the software interface for configuring a 'Heat' command. On the left, a 'Commands' menu lists various actions, with 'Heat' selected. The 'Program step setpoints' section includes 'Temperature' options: 'Do not change temp', 'Off', and 'Use specified temperature' (selected), with a text input field set to '60 °C'. The 'Time' section offers 'No wait' and 'Use specified time' (selected), with a text input field set to '300 sec'. Below these are 'Comment', 'Unit', and 'Replace' buttons. The 'Sampler program steps' list contains the following instructions:

- Move vial from front sample vial to back turret position #1
- Move vial from tray vial #4 to back turret position #3
- Move vial from tray vial #2 to back turret position #2
- Dispense 400% from vial Sample 3 to vial Sample 1 on the Back tower
- Dispense 5% from vial Sample 2 to vial Sample 1 on the Back tower
- Move vial from back turret position #1 to mixer
- Move vial from back turret position #3 to tray vial #4
- Move vial from back turret position #2 to tray vial #2
- Mix at 2000 rpm 5 times for 20 seconds
- Move vial from mixer to heater
- Heat vial at 60 degrees C for 300 seconds
- Move vial from heater to tray vial #1

At the bottom of the steps list are 'Cut', 'Copy', 'Paste', 'Move Up', and 'Move Down' buttons.

Menu-Driven Sample Prep. Agilent's standard software utility allows you to take full advantage of the advanced injection and sample handling capabilities of the 7693A autosampler system. Intuitive drop-down menus and online help guide you through the process from start to finish.



Agilent vials, caps and syringes ensure maximum uptime and peak performance

Agilent parts and supplies play a big role in achieving consistent results and optimal system performance—all day every day

Our certified vials, caps, syringes and other ALS supplies are engineered and packaged with the same care and reliability that's built into Agilent instruments, and they're specifically designed to complement your Agilent 7693A system. Choose from premium high purity septa screw cap vials to economical shell vials and caps. We also provide trays, labels, cold/hot trays, large-volume injection carriages and electronic crimpers. And our new line of premium syringes offers longer service life, lower carryover, improved accuracy—and a wider range of sizes, including a new 500 µL large volume size.

Agilent GC supplies help keep routine maintenance routine

Our capillary column ferrules, O-rings and septa are packaged to remain clean and ready for use. An exclusive non-stick plasma coating on our premium inlet septa and pre-cleaned O-rings makes maintenance quicker and easier—no unscheduled inlet maintenance due to residue on the inlet surface and shorter bakeout times after preventive maintenance, so you can start running samples sooner.

The Agilent Value Promise— 10 years of guaranteed value

In addition to continually evolving products, we offer something else unique to the industry—our 10-year value guarantee. The Agilent Value Promise guarantees you at least 10 years of instrument use from your date of purchase, or we will credit you with the residual value of that system toward an upgraded model. Not only does Agilent ensure a safe purchase now, we help ensure your investment is as valuable to you in the long run.

The Agilent Service Guarantee

Should your Agilent instrument require 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 laboratory running at maximum productivity.



For more information

Learn more:

www.agilent.com/chem/7693A

Buy online:

www.agilent.com/chem/store

Find an Agilent customer center in your country:

www.agilent.com/chem/contactus

U.S. and Canada

1-800-227-9770

agilent_inquiries@agilent.com

Europe

info_agilent@agilent.com

Asia Pacific

adinquiry_aplsca@agilent.com

Research use only. Information, descriptions and specifications in this publication are subject to change without notice. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

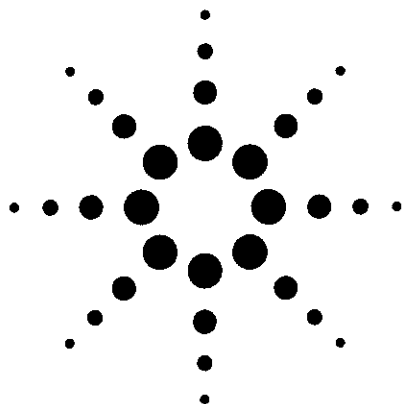
© Agilent Technologies, Inc. 2009

Printed in USA February 9, 2009

5990 3336EN



Agilent Technologies



Agilent 7693A Automated Liquid Sampler

Specifications

Overview

The Agilent 7693A is a state-of-the-art sample handling and injection system that provides the highest levels of precision and reliability for gas chromatographic sampling. The 7693A is a complete redesign of the most popular gas chromatographic sample introduction system in history. It takes advantage of the latest technology to offer greater reliability and performance.

The 7693A system consists of:

- Injection tower
- Sample tray
- Heater/mixer/bar code reader
- Enhanced Sample Handling Syringe Carriage
- Heater/chiller module
- Controller board for use with 6890 Plus
- Controller for use with 6890A

Compatibility

Agilent 7890A gas chromatograph system

Agilent 6890N, 6890 Plus, and 6890A gas chromatographs

Agilent 6850N and 6850A gas chromatographs (injector only)

Agilent 7820 gas chromatograph (injector only)



Agilent Technologies

Chromatographic Performance

- Sample discrimination $\leq 10\%$ ¹
- Better than 0.3% RSD area reproducibility²
- Less than 5% RSD in response factor variation³
- Less than 1 part in 100,000 carryover⁴

Injection Features

- Fast and on-column default injection types
- Fully programmable dispense rate, draw rate and injection rate
- Fast injections are performed in less than 100 ms
- Support of 250- and 500- μL syringes with optional Enhanced Sample Handling Syringe Carriage
- User-definable sandwich injection mode
- Transfer turret can hold up to three 2-mL vials at once for use with advanced sampler capabilities
- Active vial-gripping mechanism
- Sensors in the vial-gripper mechanism detect that a sample vial has been grasped
- Sensors in the injector turret detect that the sample vial has been transferred to the injector
- Sensors to detect the presence of Enhanced Sample Handling Syringe Carriage
- Sensors to detect the injection port location for easy movement between front and rear inlet ports
- Illuminated syringe for easy viewing
- User-changeable syringe carriage
- Self-aligning injector and tray
- Available solvent-saving mode extends solvent capacity by up to eightfold

¹From cool on-column analysis of C10–C42; meets or exceeds ASTM 2887

²Chromatographic conditions for C10–C16

1 μL injection (5 μL syringe)

10 injections

1 sample wash; 6 sample pumps

Inlet: Split 100:1 (He); 250 °C; 3 mL/min (constant flow)

Column: HP-5MS – 30 m \times 320 μm \times 0.250 μm df

Oven: 180 °C isothermal

Detector: FID

³Chromatographic conditions for C14–C16

10 μL syringe

10 injections for each volume; injection volumes from 10 to 50%

2 sample washes; 6 sample pumps

3 solvent A and B washes post-injection

Inlet: Split 25:1 (He); 250 °C; 3.2 mL/min (constant flow)

Column: HP-5MS – 30 m \times 320 μm \times 0.500 μm df

Oven: 100 °C (1 min); 30 °C/min to 250 °C

Detector: FID

⁴Determined by residual analyte area measured in subsequent solvent blank (4 solvent A and 4 solvent B post-washes)

Sample Injection

The 7693A injector provides a wide range of injection capabilities to provide maximum flexibility:

Injection parameter control	Parameter range
Variable sampling depth	-2 to +30 mm above default
Pre- and post-injection syringe	0-15 rinses for each of solvent A and B rinsing
Sample prewashes	0-15 prewashes
Viscosity delay	0-7 seconds
Preinjection sample pumps	0-15 pumps
Minimum sample injection	10 nL (with 1 µL syringe)
Maximum sample injection	50 µL (with 100 µL syringe in standard tower) 250 µL (with 500 µL syringe and Enhanced Sample Handling Syringe Carriage)
Injection plunger speed	Fast/slow/variable
On-column injection mode	Automatic
Multiple injection mode	1-99 injections of specified volume
Injection delay time	0-1 minute (within multiple injection mode)
Preinjection dwell time	0-1 minute
Post-injection dwell time	0-1 minute
Solvent saver	Set at 10, 20, 30, 40, and 80% of syringe volume
Injection range	1 to 50% of syringe volume in increments of 1%
Syringe size	1, 2, 5, 10, 25, 50, and 100 µL maximum volume with standard syringe carriage 250 and 500 µL maximum volume with optional Enhanced Sample Handling Syringe Carriage

Sample Management

Vial Handling

- System supports neckless (shell) vials, standard 2 mL vials, and micro vial inserts
- 16 samples with injection tower and standalone turret
- 150 samples with injection tower and tray
- Sampler tray positioned away from GC to minimize exposure to heat
- Tray samples stored in 3 removable 5 x 10 racks
- Racks are compatible with multi-tip pipettes

Solvent

- 4 mL solvent vials
- 2 × 4 mL for injector tower with standalone turret (usable solvent capacity of 4 mL)
- 10 × 4 mL for injector tower with transfer turret (usable solvent capacity of 20 mL)

Syringe Support

- Up to 100 μ L with standard syringe carriage
- 250/500 μ L with optional Enhanced Sample Handling Syringe Carriage
- Supports compatible liquid and gastight syringes

Sample Sequencing

- Advanced sequencing with random access using Agilent software
- Simple sequencing using the 7890A/6890 Series GC keyboard
- Next sample overlap
- Capability to run priority samples

Heater/Chiller Module

- User installable
- Heats or cools all 150 vials in the tray (temperature range 5–60°C)
- Built-in sensor monitors average coolant temperature in plate
- Uses aluminum vial racks to hold samples
- Requires customer-supplied thermal bath recirculator

Heater/Mixer/Bar Code Reader

- Single vial heating prior to injection (temperature range 35–80°C)
- Single vial mixing prior to injection
- Heating time and mixing time are fully programmable
- Bidirectional mixing up to 4,000 RPM
- Entire module is integrated into 150-position sample tray

Method Programming

The 7693A system, equipped with two towers, a tray, a heater/mixer/bar code reader and Enhanced Sample Handling Syringe Carriage can perform liquid manipulation including:

- Solvent addition
- Standard addition
- Internal standard addition
- Dilution
- Derivatization
- Quenching

Physical Specifications Nominal Weights and Dimensions

Weight

7693A injector	3.9 kg
7693A tray without options or accessories	6.8 kg
7693A tray with heater/mixer/bar code reader	7.1 kg
7693A tray with heater/chiller	9.0 kg
7693A tray with heater/mixer/bar code reader and heater/chiller	9.3 kg
Controller box for 6890A	5 kg

Height

Above bench surface of top of 7693A injector as mounted on 7890A	94 cm
Above bench surface of bottom of 7693A tray as mounted on 7890A	43 cm
Above bench surface of top of 7693A tray as mounted on 7890A	73 cm
Of controller box for 6890A	11 cm

Width

Extension of 7693A tray past left side of 7890A	45 cm
Width of controller box for 6890A	25 cm

Depth

Of 7693A tray with/without options, front to back	42 cm
Extension of 7693A tray past front of 7890A	2 cm
Of 6890A controller	31 cm

Technical and Environmental

- Indoor use only in ordinary atmospheres
- Altitude up to 4 300 m
- Ambient operating temperature 15 to 35 °C
- Ambient operating humidity 5 to 95%
- Mains supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage
- Pollution degree 2. Installation Cat II
- 7693A, ALS Controller, is rated for mains connection to 100–120 VAC or 220–240 VAC, 50/60 Hz, 180 VA

Safety and Support

- Injector will not operate if not mounted on GC
 - Error indicators show the source operating failure
 - Flash memory allows product firmware enhancements to be uploaded via PC
 - Onsite repair is available for the 7693A injector and tray system
 - In the event of any instrument failures, Agilent's industry-leading *Express Exchange** service can minimize downtime by shipping replacement sampler modules within hours
 - Contact sales representative to verify compatibility with software
- * Not available in all countries

For More Information

For more information on our products and services visit our Web site at www.agilent.com/chem

www.agilent.com/chem

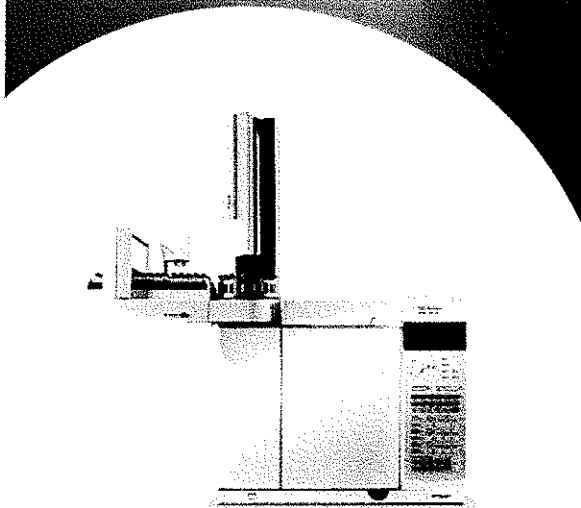
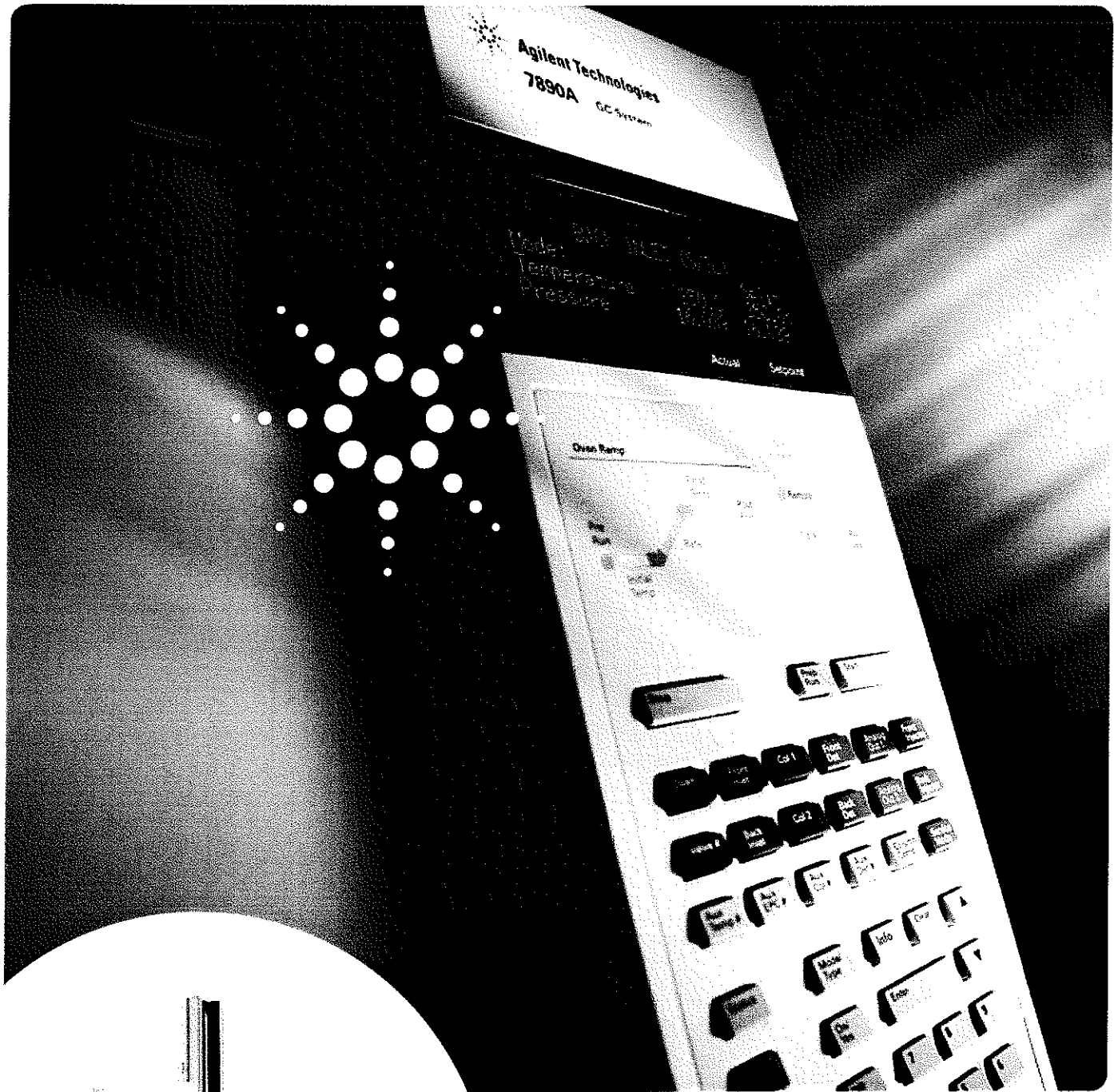
Agilent shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material

Information, descriptions, and specifications in this publication are subject to change without notice

© Agilent Technologies, Inc. 2009
Printed in the USA
February 6, 2009
5990-3526EN



Agilent Technologies



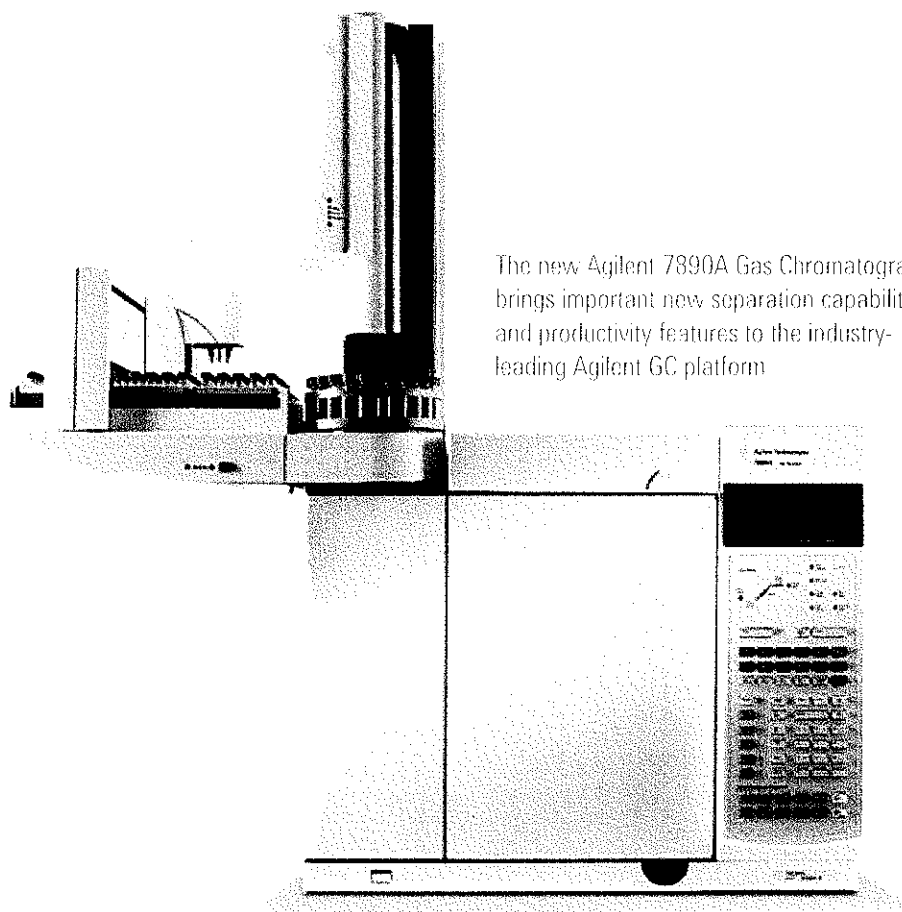
The Agilent 7890A Gas Chromatograph
All the elements for perfect chemistry.

Our measure is your success.

Introducing the Agilent 7890A Gas Chromatograph.

Step up to a higher level of GC reliability, productivity and confidence.

Adding an exciting new chapter to a 40-year history of GC leadership, Agilent's new 7890A flagship GC gives you everything you need to take your lab to the next level of GC and GC/MS performance, including advanced separation capabilities, powerful new productivity features and real-time self-monitoring instrument intelligence. Plus, of course, legendary Agilent reliability.



The new Agilent 7890A Gas Chromatograph brings important new separation capabilities and productivity features to the industry-leading Agilent GC platform.

Agilent Performance and Reliability

5th-generation electronic pneumatics control (EPC) and digital electronics set a new benchmark for retention time locking (RTL) precision and help make the 7890A Agilent's most dependable GC ever

Higher Productivity

Faster oven cool down, robust backflush capability, advanced automation features and faster GC/MS oven ramps let you get more done in less time—at the lowest possible cost per sample—all easily incorporated into your existing method.

Expanded Chromatographic Capabilities

Highly flexible EPC design enables even more sophisticated hydrocarbon analyses. An optional 3rd detector (TCD) can speed up complex gas analyses and allows more types of analyses to be run on a single GC.

Easier Operation

Powerful, chromatographer-friendly software simplifies method setup and system operation and minimizes training time. Practical, time-saving design features speed up and simplify routine maintenance.

Easy, direct method transfer from your 6890 GC

Because the Agilent 7890A system is built upon proven 6890 GC inlets, detectors and GC oven, you can transfer methods to the 7890A GC with complete confidence. We make it even easier with Agilent ChemStation software that can automate the process.



Breakthrough Capillary Flow Technology.

*Agilent's innovative Capillary Flow modules enable reliable, leak-free in-oven connections. Available in a number of useful configurations, they are versatile tools for analyzing complex matrices, as well as providing gains in productivity and data integrity. **Page 6***



Perform inlet maintenance in seconds!

Convenient new Turn-Top design is built into each split/splitless (SSL) inlet, allowing you to change liners more quickly and easily than ever before, without special tools or training.



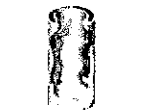
Customized control and data-handling software.

*Choose the software package that exactly meets your lab's needs—from single user/single instrument to multi-instrument/multi-vendor laboratories throughout the world. **Page 10***



Agilent LTM Technology accelerates analytical cycle times

*Agilent Low Thermal Mass (LTM) technology provides direct, rapid heating and cooling of capillary columns for extremely fast analytical cycle times and higher productivity. **Page 11***



New Multimode inlet serves as two inlets in one.

*Agilent's Multimode inlet (MMI) includes split/splitless, temperature ramping and large volume injection capabilities. **Page 12***



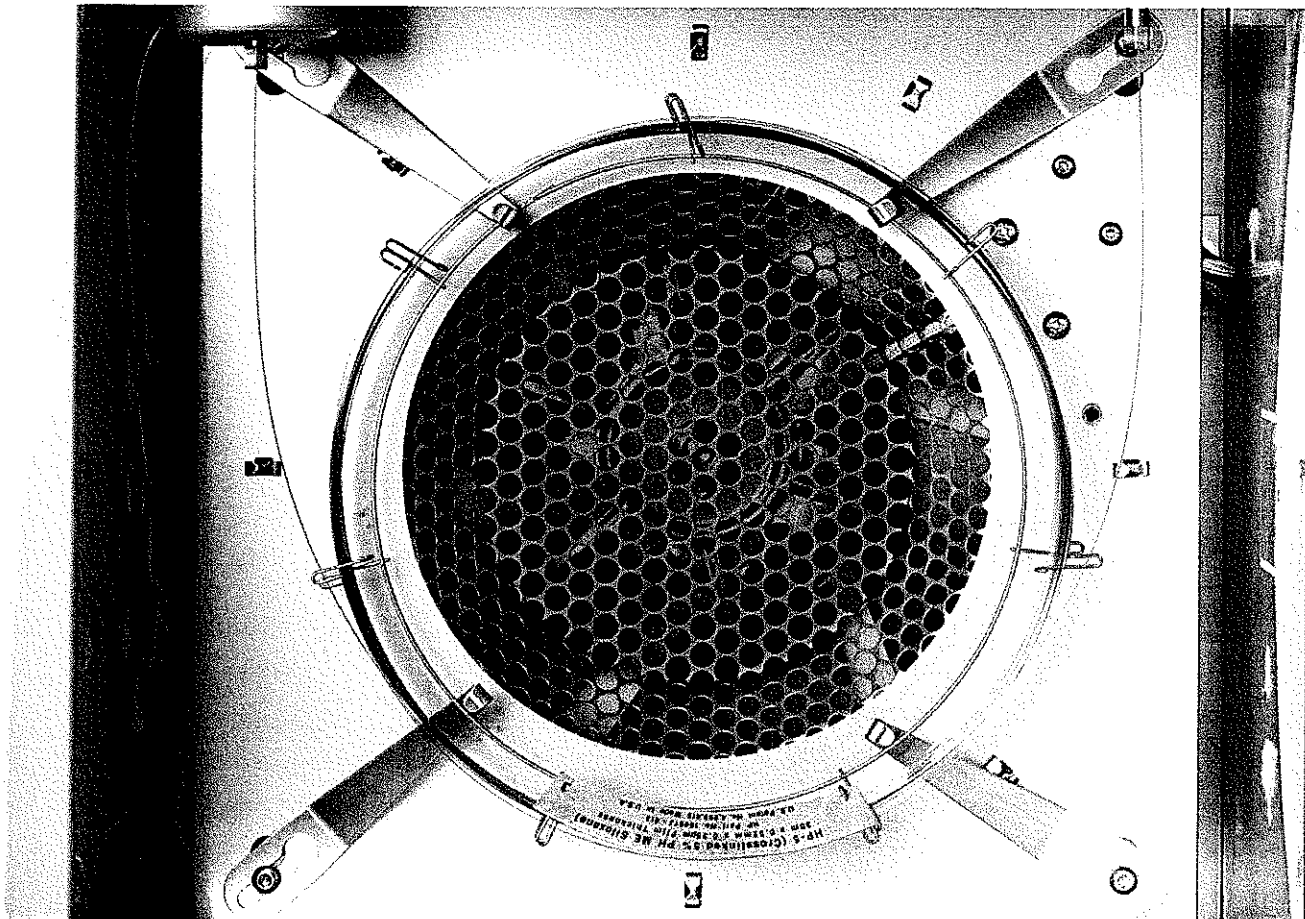
Complete selection of options and accessories.

*Configure the exact system to meet your lab's needs today and easily adapt to changing application and throughput requirements. **Page 12***



One-button access for service, maintenance and logs.

The Agilent 7890A GC's control panel—which will be instantly familiar to 6890 GC users—includes a new button that gives you instant access to routine maintenance information.

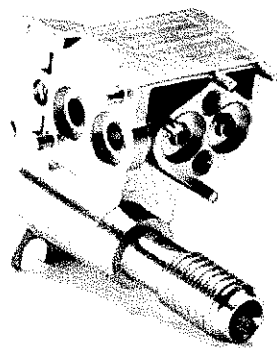


The heart of performance.

The combination of precise pneumatics, GC column oven temperature control, and Agilent J&W GC columns leads to outstanding retention time repeatability, the basis for all chromatographic measurement.

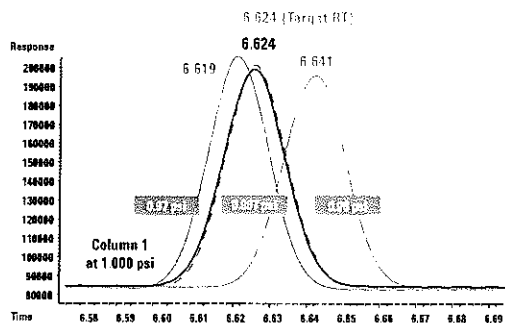
**At the end of the day,
it's about getting a job done.**

At Agilent building the world's most trusted GC solutions is an ongoing process of evolution. Each new generation of instruments offers improved performance, higher productivity, greater precision and new analytical capabilities. It's easy to get excited about technology and we do. But we never lose sight of the fact that no matter what the application, the bottom line is results: Getting better data with greater confidence and processing more samples in less time at the lowest possible cost.



The heart of reliability.

Integrated electronics and advanced mechanical design provide for superior reliability. The pneumatics manifold of the 7890A has been re-engineered for even greater reliability.



5th-generation EPC and advanced digital electronics set a new benchmark in pressure setpoint precision (to 0.001 psi)—improving RTL precision for very-low-pressure applications

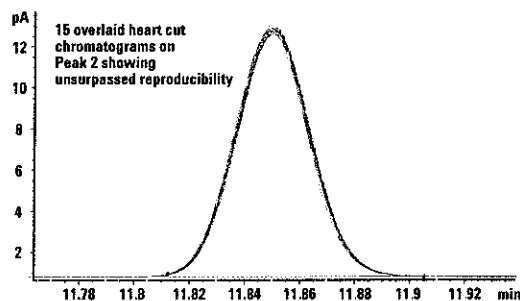
Retention Time Locking—now even more precise
Agilent's unique retention time locking (RTL) software enables you to reproduce retention times with extreme precision from one Agilent GC system to another—regardless of inlet detector, operator or location. This powerful software capability allows you to identify peaks more easily and accurately and increase sample throughput, as well as reducing the risk of noncompliance.

Unsurpassed Retention Time Reproducibility

Run	Peak 1*	Peak 2*
1	9.0839 min	11.8492 min
2	9.0835	11.8492
3	9.0841	11.8494
4	9.0846	11.8496
5	9.0851	11.8507
6	9.0849	11.8502
7	9.0845	11.8504
8	9.0849	11.8500
9	9.0847	11.8504
10	9.0853	11.8502
11	9.0852	11.8502
12	9.0851	11.8508
13	9.0847	11.8503
14	9.0848	11.8507
15	9.0853	11.8506
Average	9.0847 min	11.8501 min
Standard Deviation	0.000527	0.000535

*Heart-cut from column 1

Full electronic pneumatics control makes it fast and easy to set all pressures and flows. Our 5th-generation EPC and digital electronics keep these setpoints constant from run to run, providing superior retention time repeatability.

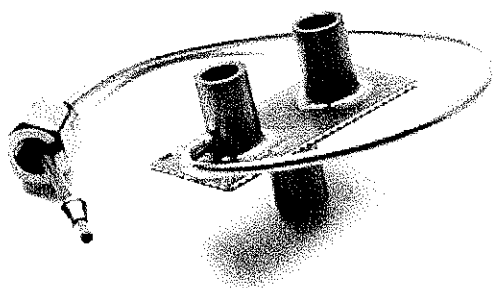


Not only is one ensured unsurpassed retention time reproducibility in standard applications but also in multi-dimensional applications such as the heart-cutting example shown here.

Add extra dimensions to your chromatography with Agilent Capillary Flow Technology.

Agilent's proprietary Capillary Flow Technology solves a problem chromatographers have been wrestling with for decades: How to make reliable, leak-free capillary connections that can stand up to the temperature extremes of a modern GC oven

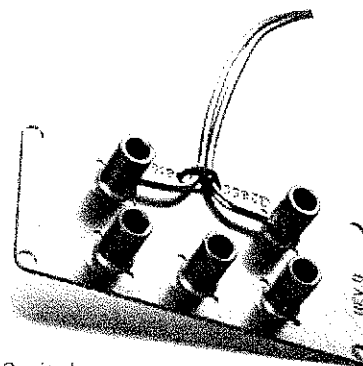
These inert, low-mass, low-dead volume devices not only make it easy to make secure connections, they give you the ability to precisely divert your gas flow pneumatically where and when you want. This opens the door to highly useful techniques that can improve your analytical results, as well as saving time and resources. For example:



QuickSwap

Here's an elegant answer to a common GC/MS problem: Waiting around for a mass spectrometer to vent before you can change out a column or perform routine inlet maintenance

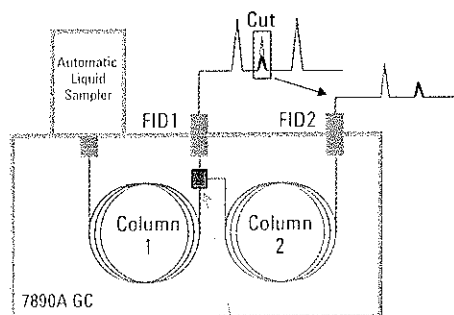
Using a simple, inexpensive QuickSwap device you can safely disconnect the column without venting and without losing vacuum—in about 30 seconds! (1)



Deans Switch

The idea of fluidic switching between two columns, or redirecting effluent, has been around almost since the beginning of GC. But before Capillary Flow Technology, the implementation hasn't been reliable enough for routine use in a GC oven.

Deans switching enables two-dimensional GC ("heart-cutting") for analysis of trace compounds in complex samples. Flow redirection can also reduce maintenance costs by protecting detectors or columns. (2)

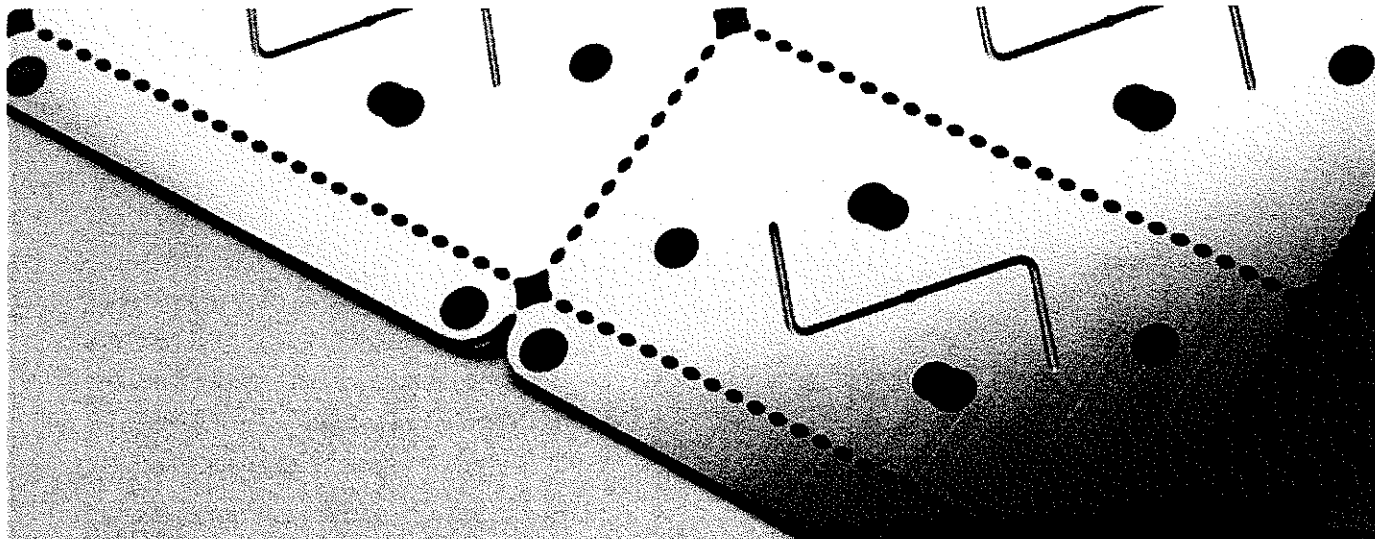


Deans Switch

In this example, the Capillary Flow Deans Switch provides additional selectivity that enables the analysis of unresolved trace components by heart-cutting onto another column having a different stationary phase.

(1) 5989-9803EN. Cut Maintenance Time from Hours to Minutes—Capillary Flow Technology QuickSwap

(2) 5989-9384EN. Increase the Resolving Power of Your GC—Capillary Flow Technology Deans Switch



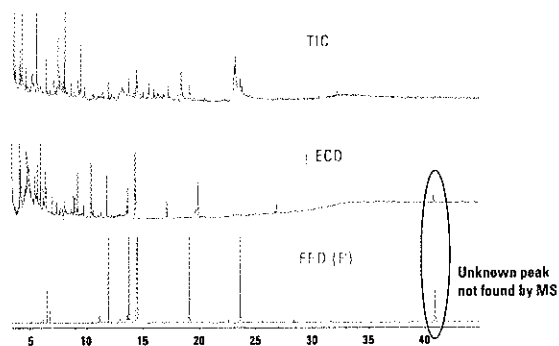
The heart of Capillary Flow Technology.

*Photolithographic chemical milling of diffusion-bonded plates provides flow channels with low dead volumes
Low thermal mass ensures reliable tracking of GC oven temperatures.*

Flow Splitting

Flow splitting—sending the sample to multiple detectors—can provide the most information from a sample in a single run and is especially valuable for analyzing compounds in complex matrices. This technique can help you locate peaks of interest faster, get better integration of target peaks and have higher overall confidence in identifying unknowns. (3)

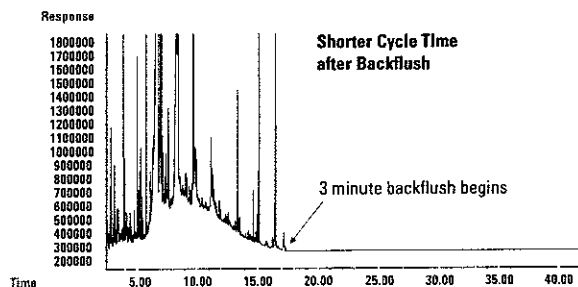
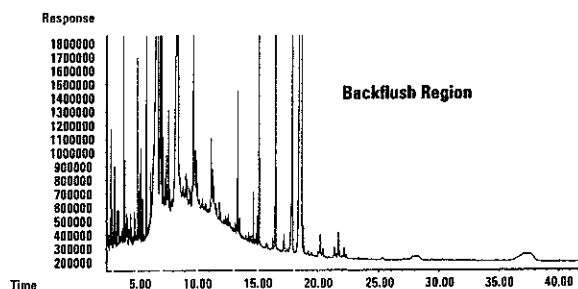
Strawberry Extract Highlighting Unknowns



Backflushing

Backflushing is an extremely valuable technique that can be implemented with any purged Agilent Capillary Flow device. It can improve the quality of your analysis and save you time and money on every run—and as backflush occurs post-run you don't have to change method conditions for the time during the chromatographic run.

By reversing column flow immediately after the last compound of interest has eluted, you can eliminate long bake-out times for highly retained sample components. Instead, these materials are swept backwards through the column and out the split vent, preventing carryover, contamination, retention time shifts, and MSD source contamination. (4)



(3) 5989-9667EN: Get More Information in Less Time—Capillary Flow Technology Splitters

(4) 5989-9804EN: Reduce Run Time and Increase Productivity—Capillary Flow Technology Backflush

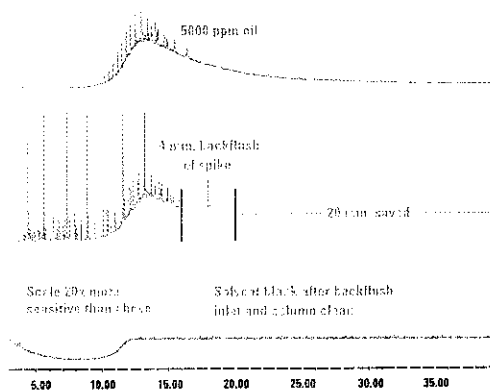
Advanced separation capabilities save time and enhance results.

EPA 8270

5 ppm EPA 8270 standard run spiked into 5000 ppm of a heavy oil to simulate interference from a hazardous waste.

Peaks of interest elute by 16 minutes but a 24-minute bake-out at 320°C is required to elute heavy components. Using the 7890A system's backflush capability the sample was rerun with a 4-minute backflush—saving 20 minutes per run (50% total cycle time savings)

ALS Overlap and faster cool down save an additional 4 minutes per cycle

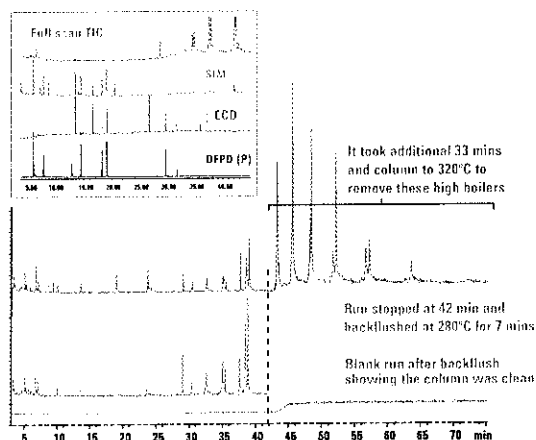


Pesticides in Milk Extract

Flow splitting enables multiple detectors and increased productivity.

The splitter device proportionally splits column effluent to multiple detectors: MSD, DFPD and μ ECD. Full-scan TIC from the MSD provides quantitation and confirmation; element-specific GC signals are useful for highlighting trace-level compounds to be identified by MSD.

The splitter also provides backflush capability to shorten cycle time and increase column life. Backflushing ensures that excess column bleed and heavy residues are not introduced into the MSD, reducing ion source contamination. It also eliminates carryover from sample accumulated at the head of the column providing a significant improvement in data integrity.

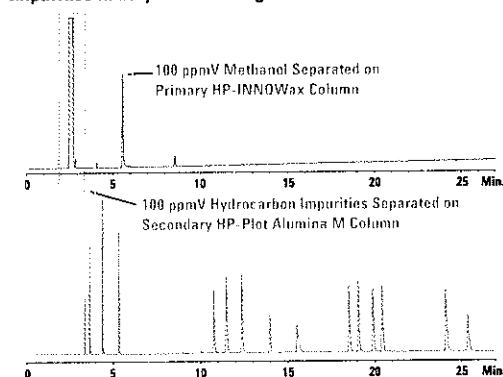


Impurities in Hydrocarbons

Ethylene analysis uses 2D GC to combine measurement by ASTM D6159 with a trace analysis of methanol.

This application takes advantage of Agilent's Capillary Flow Deans Switch device and the new Back Pressure Regulation (BPR) mode of the 7890A GC's Pneumatic Control Module to improve sensitivity and resolution. Dynamic blending systems make multi-level calibrations of gas samples easy and routine.

2-GC Separation of Oxygenates and Hydrocarbon Impurities in Ethylene in a Single Run

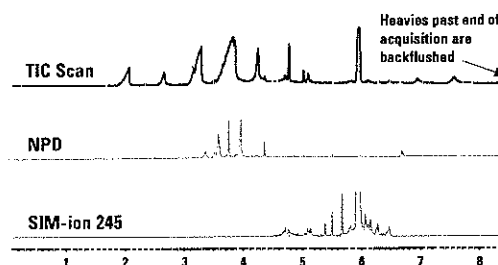


Rapid Drug Screening

Obtaining 3x the information in half the time or less, using GC/NPD/MSD with simultaneous SIM/Scan.

An Agilent Capillary Flow device is used to acquire NPD and MSD data simultaneously. This eliminates the need for a separate NPD screening run on a different GC; backflushing further reduces cycle time. Simultaneous SIM/Scan is used to screen for select low-level drugs, eliminating the need for a separate SIM run.

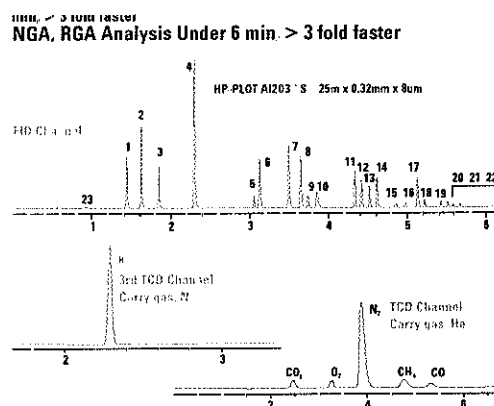
Overall cycle time is reduced by more than 55%. An existing 6890 GC/MSD method is made twice as fast using a 240V oven. Similar results were also achieved using a 120V oven with the new option for the 7890A high-speed GC/MSD oven. Deconvolution Reporting Software (DRS) further enhances throughput by reducing data interpretation time.



Analysis of Refinery Gases

Faster, high-resolution analysis of complex refinery gas samples using 3 channels of simultaneous detection.

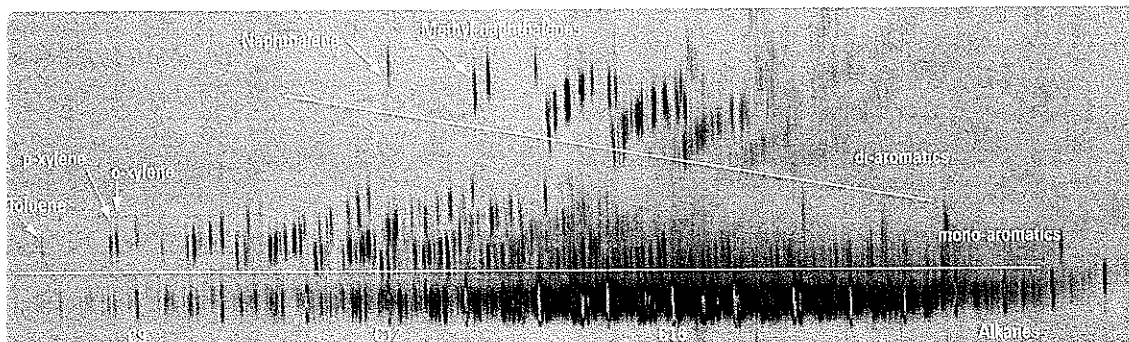
The Agilent 7890A GC now supports an optional 3rd detector (TCD). In this analysis, the GC is configured to run three parallel channels; all three detectors collect data at the same time. Complete analysis time of inert gases and hydrocarbons to n-C6 can be achieved in 6 minutes. (5)



Comprehensive GC Flow Modulation

Capillary Flow Technology enables GC x GC analysis of extremely complex samples—without the need for cryogen.

To date, available GC x GC systems require complicated and costly cryo-focusing techniques. The Agilent 7890A GC uses Capillary Flow Technology to enable flow modulation without the need for cryogen. This analysis of diesel fuel shows the normal boiling point distribution in the first dimension and functional group clusters in the 2nd dimension. (6)



(5) 5989-6103EN: Parallel GC for Complete RGA Analysis

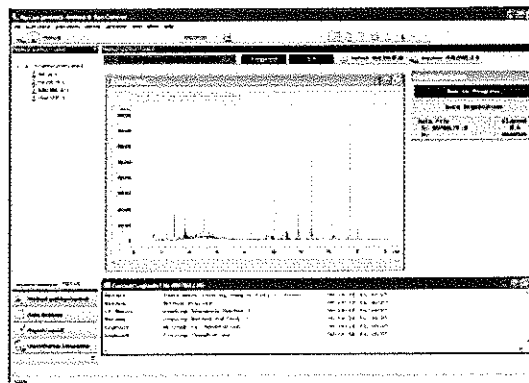
(6) 5989-9889EN: Get a Second Dimension of Information on Complex Samples—Capillary Flow Technology GC x GC Flow Modulator

To learn more about the Agilent 7890A GC, visit www.agilent.com/chem/7890A

GC software that fits your workflow and your applications—perfectly.

Agilent GC software makes it easy even for non-expert operators to take advantage of all the advanced capabilities of the new Agilent 7890A system. From the friendly, familiar GC and GC/MSD ChemStation and EZChrom Elite chromatography data systems to our groundbreaking new Lab Advisor Software for real time monitoring of Agilent GC and LC systems in your lab, you'll find everything designed to help you make the most of every run and every workday.

If your 7890A GC will be used in a regulated environment, Agilent software can help there, too, with comprehensive features to address the strict regulatory, certification and quality control requirements of your industry.

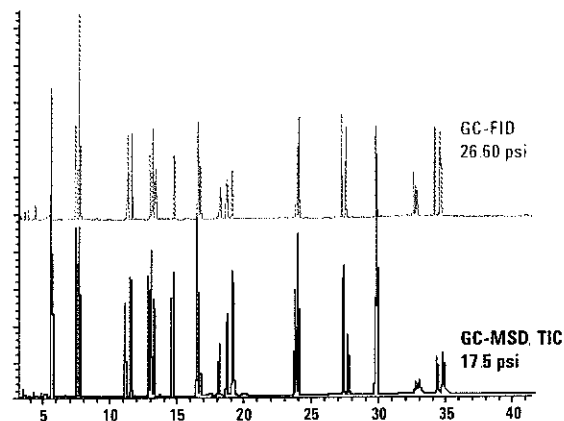


Agilent's industry-leading ChemStation chromatography data system lets you display, calibrate and report data from up to four signals—without having to synchronize separate runs and merge results. This is especially efficient when you need to set up and report complex analyses.

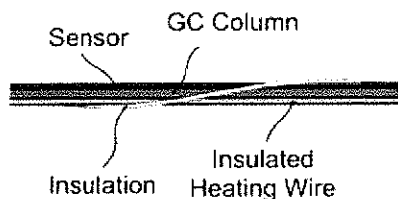
MSD Method Locked to FID Method (Mixture of 25 Pesticides)

Different Detector, Different Location, Different Operator—Same Results.

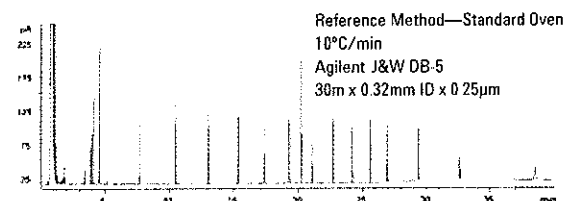
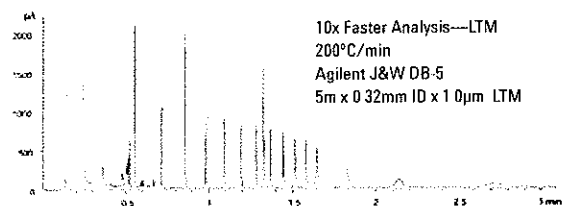
Retention Time Locking (RTL) software is a powerful productivity tool that lets you reproduce exactly the same results on multiple Agilent GC or GC/MSD systems—configuration to configuration, location to location, operator to operator. This revolutionary Agilent technology allows retention times to be reproduced within hundredths and even thousandths of a minute. RTL enables you to more easily and accurately identify peaks, increase sample throughput, reduce the risk of noncompliance, enhance confidence in analytical results—as well as lower your operating costs.



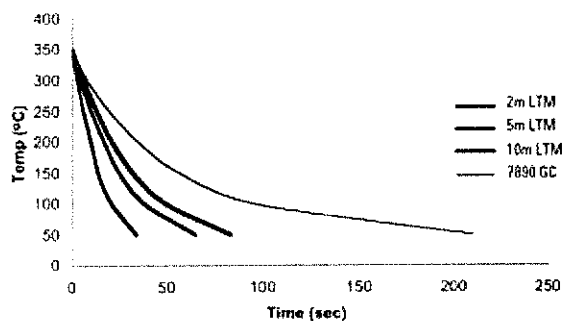
Low Thermal Mass (LTM) technology provides faster analytical cycle times, higher productivity. Agilent's LTM system for GC and GC/MS provides direct, rapid heating and cooling for faster GC analyses and higher sample throughput. By providing independent temperature control of up to four column modules, the technology opens the door to new capabilities in multi-dimensional GC, and integration with Agilent Capillary Flow Technology can greatly reduce column maintenance. As an added benefit, the LTM system consumes far less power than a conventional GC platform. (7) (8) Our industry-leading Agilent J&W column phases are available as LTM column modules including Wall Coated Open Tubular (WCOT) and Porous Layer Open Tubular (PLOT) columns.



The key to LTM technology: weaving direct heating and temperature sensing components around standard fused-silica capillary column (up to 30 meters) for rapid heating and cooling.



LTM vs conventional GC—Traditional run time for typical alkane standard of 40 minutes is reduced to less than 3 minutes utilizing the LTM system's accelerated ramp rates (200°C/min) and a shorter column. (9)



Typical cooling times for standard (5-inch) LTM column modules of typical lengths are significantly faster than a conventional GC oven.

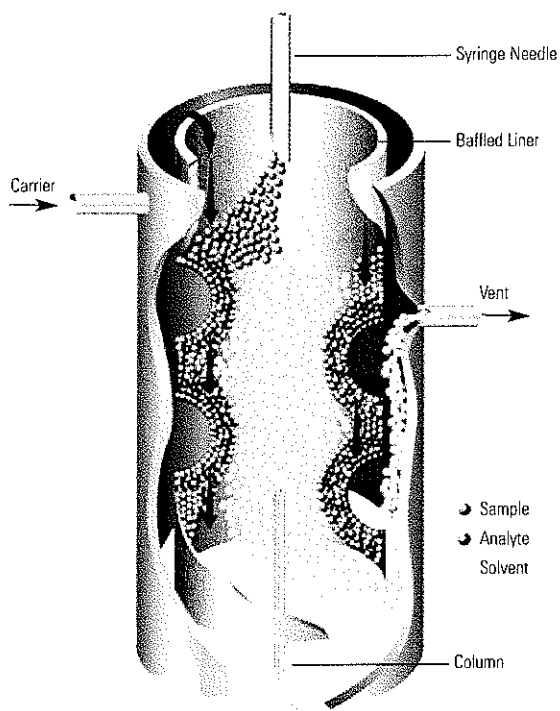
(7) 5990-3325EN. Agilent LTM System for GC and GC/MS. Faster analytical cycle times, higher productivity.

(8) 5990-3451EN. Fast Analysis of Polynuclear Aromatic Hydrocarbons Using Agilent Low Thermal Mass (LTM) GC/MS and Capillary Flow Technology QuickSwap for Backflush.

(9) 5990-3201EN. Ultra-Fast Total Petroleum Hydrocarbons (TPH) Analysis with Agilent Low Thermal Mass (LTM) GC and Simultaneous Dual-Tower Injection.

Ready for anything your lab can throw at it, including the future.

The modular, fully automated Agilent 7890A GC system includes the industry's widest selection of inlets, detectors, columns, consumables and sample introduction choices—in fact, everything you need to keep your lab up and running at peak productivity.



Agilent's highly versatile Multimode inlet (MMI) combines the capabilities of spit/splitless operation (cold, hot and pulsed), temperature programming and large volume injection with a solvent vent mode. Benefits include higher system sensitivity, ability to analyze thermally labile compounds and more robust handling of dirty samples. (10)

(10) 5990-3954EN, Agilent Multimode Inlet for Gas Chromatography

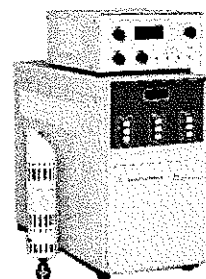
(11) 5990-3336EN, Agilent 7693A Series Automatic Liquid Sampler—Inject new performance into your gas chromatography

Full dynamic range FID

State-of-the-art digital electrometer enables a linear dynamic range of 10^7 seamlessly integrated into a single run.

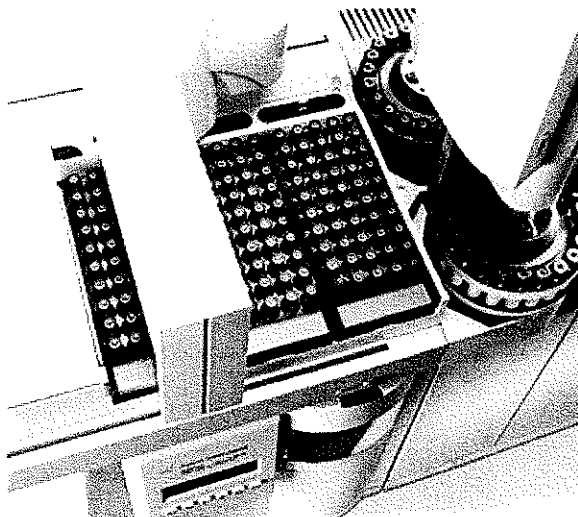
Sensitive and selective element detection

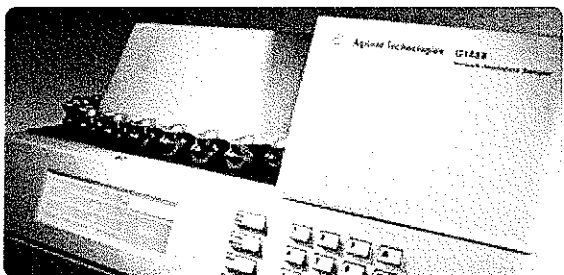
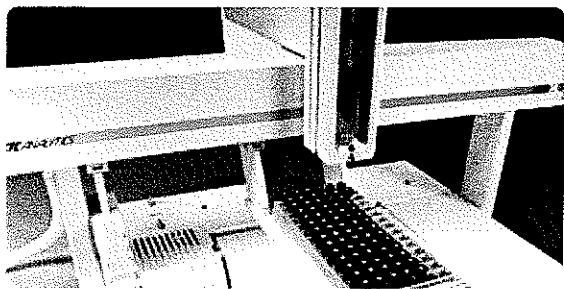
Agilent offers a wide variety of element-sensitive detectors, including a Flame Photometric Detector (FPD) that has been recently improved and is 5x more sensitive for sulfur and 10-15x more sensitive for phosphorous. Sulfur Chemiluminescence Detectors (SCD) provide the highest sensitivity and selectivity for demanding applications.



The perfect productivity partner for your Agilent 7890A GC

Add an Agilent 7693 Series Automatic Liquid Sampler for the fastest injection times of any GC autosampler, plus dual simultaneous injection and 150-vial capacity. Enhanced sample preparation capabilities help to eliminate variability and rework and include automated dilution, internal standard addition, heating, mixing and solvent addition. (11)





High performance Agilent J&W GC columns and supplies to meet every analytical need.

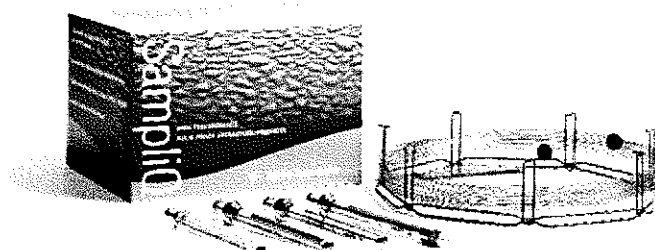
Agilent GC consumables including our Agilent J&W High Efficiency columns, are designed, manufactured and packaged to deliver maximum productivity from your Agilent GC and GC/MSD systems. We strive to provide you with the cleanest, most inert flow path. From our proprietary deactivated inlet liners to our injection-molded inlet gold seal through the Agilent J&W Ultra Inert GC columns for increased sensitivity, your samples are protected from exposure to active sites or outgassed contaminants that can alter your results.

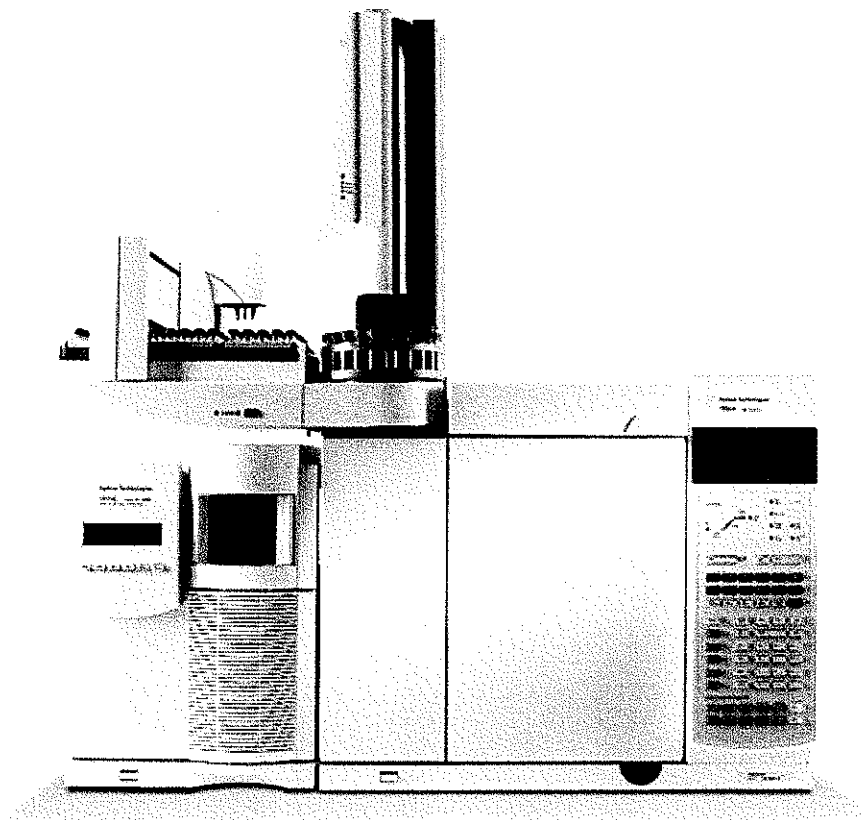
Boost your lab's output with additional sample preparation capabilities

Choose the versatile CombiPAL sample injector for liquid injection, headspace and solid-phase microextraction (SPME). The economical GC PAL platform can be configured for liquid injection only, but offers many of the other capabilities of the CombiPAL, including large volume injection (LVI), multiple vial sizes and extended sample vial capacity.

Agilent G1888 Headspace Sampler adds to your analysis capabilities

Automatically introduce volatile compounds from virtually any sample matrix directly into a GC or GC/MS. An inert sample pathway provides superior chemical performance without analyte degradation or loss. Agilent also offers other sample introduction devices for thermal desorption and purge and trap.





Widest selection of inlets
to optimize your separations

- Split/splitless (SSL) capillary
- Packed purged injection port (PPIP)
- Cool on-column (COC)
- Cool on-column with solvent vapor exit (COC-SVE)
- Programmable temperature vaporizing (PTV)
- Volatiles interface (VI)
- Multimode inlet (MMI)
- High temperature PTV
- High pressure gas sample injection
- Gas Sampling Valve (GSV)
- Liquid Sampling Valve (LSV)

High-sensitivity detectors
for every sample type

- 5975 series mass selective detector (MSD)
- 7000A Triple Quadrupole MS
- Flame ionization (FID)
- Thermal conductivity (TCD)
- Micro-electron capture (micro-ECD)
- Flame photometric, single- or dual-wavelength (FPD)
- Nitrogen-phosphorus (NPD)
- Sulfur chemiluminescence (SCD)
- Nitrogen chemiluminescence (NCD)
- Atomic emission (AED)*
- Pulsed flame photometric (PFPD)*
- Photoionization (PID)*
- Electrolytic conductivity (ELCD)*
- Halogen Specific Detector (XSD)*
- Oxygenate Flame Ionization Detector (O-FID)*
- Pulsed Discharge Helium Ionization Detector (PDHID)*

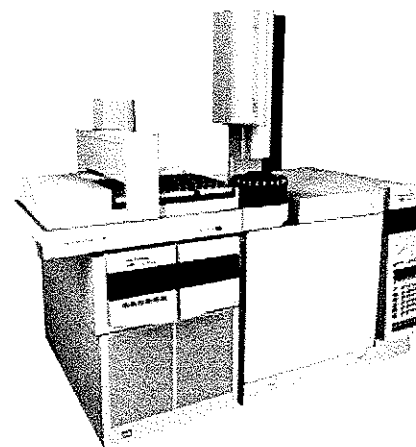
*Available through Agilent Channel Partners
Contact Agilent for other custom configurations. A wide variety of
additional solutions are available via Agilent's channel partners

Agilent Services keep your lab running at peak productivity.

With a 98% customer satisfaction rating, Agilent's service engineers are the most respected—and best-trained—in the industry. Whether you need support for a single instrument or a multi-lab, multi-vendor operation, we can help you solve problems quickly, increase your uptime and optimize your lab's resources. We offer:

- Expert installation, familiarization and advanced training to get you up and running as quickly as possible
- Comprehensive Agilent Advantage Service plan options for cost-effective maintenance, repair and compliance support
- On-site preventive maintenance that ensures dependable system operation and minimizes unplanned downtime
- Remote monitoring and diagnostics capabilities that help you to maximize instrument uptime and utilization in your lab
- Compliance and functional verification services to support your quality, regulatory or accreditation initiatives
- Cooperative Support Service plans to provide advanced tools and support for your in-house metrology team

Learn more about Agilent's top-ranked service and support at www.agilent.com/chem/services



7000A Triple Quadrupole MS

Reliable target compound analysis at the lowest limits of detection

The 7000A Triple Quadrupole MS helps you confidently detect and quantify trace-level target analytes in the most complex matrices. Engineered from the ground up for maximum productivity and robust high performance operation, this breakthrough system delivers:

- Routine femtogram-level sensitivity
- Outstanding data acquisition speed
- Superior selectivity of MS/MS
- Ultra-low noise delivered by helium-quench gas technology

Agilent's proven acquisition and control interface, along with powerful MassHunter data analysis and reporting software, make it easy even for non-expert operators to get expert results every time.

For more information

Learn more:

www.agilent.com/chem/7890A

Buy online:

www.agilent.com/chem/store

Find an Agilent customer center in your country:

www.agilent.com/chem/contactus

U.S. and Canada

1-800-227-9770

agilent_inquiries@agilent.com

Europe

info_agilent@agilent.com

Asia Pacific

adinquiry_aplsc@agilent.com

Research use only. Information, descriptions and specifications in this publication are subject to change without notice. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

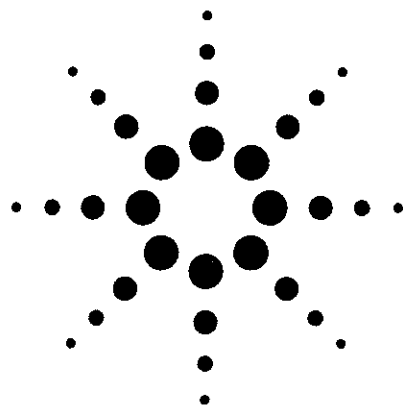
© Agilent Technologies, Inc. 2009

Printed in USA May 15 2009

5990-4114EN

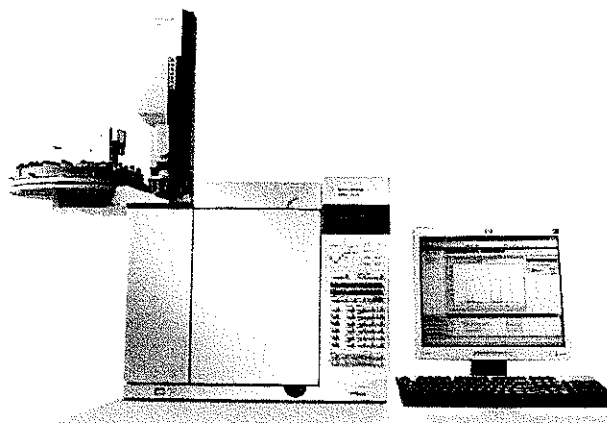


Agilent Technologies



Agilent 7890A Network Gas Chromatograph

Data Sheet



Chromatographic Performance

- Retention time repeatability < 0.008% or < 0.0008 min
- Area repeatability < 1%RSD

The Agilent 7890A is a state-of-the-art gas chromatograph that provides superior performance for all applications. Key to its performance is the use of advanced electronic pneumatic control (EPC) modules and high performance GC oven temperature control. Each EPC unit is optimized for its intended use with a specific inlet and detector option

GC oven temperature control of the 7890A oven allows for fast and precise temperature ramping. Overall thermal performance provides optimal chromatography including peak symmetry, retention time repeatability, and retention index accuracy.

The combination of precise pneumatic and temperature control leads to

extremely precise retention time reproducibility, which is the basis for all chromatographic measurement.

Agilent's proprietary Capillary Flow Technology provides a new dimension in chromatography with reliable, leak-free, in-oven capillary connections that stand up to repeated GC oven cycling over time. The 7890A GC has enhanced firmware to extend Capillary Flow capabilities and enhanced datasystem software to simplify set-up and operation of backflush. These new tools make it easier to analyze complex matrices and unknowns, and provide gains in productivity and data integrity for routine analyses via 2-dimensional heart cutting, detector splitting, and column backflushing

The 7890A GC has advanced built-in capabilities to monitor system resources (counters, electronic logs and diagnostics) Agilent GC systems are known for their reliability, ruggedness, and long life. The Agilent 10-year use

guarantee provides greater assurance for a low-cost of ownership throughout the GC's life.

System Capabilities

- Supports simultaneously:
 - Two inlets
 - Three detectors (third detector as TCD)
 - Four detector signals
- State-of-the-art detector electronics and the full-range digital data path enable peaks to be quantified over the entire concentration range of the detector (10^7 for the FID) in a single run
- Full EPC is available for all inlets and detectors. Control range and resolution are optimized for the specific inlet or detector module.
- Up to six EPC modules can be installed, providing control of up to 16 channels of EPC

*Using 7890A with EPC (splitless), ALS and Agilent Data System for analysis of tetradecane (2 ng to the column). Results may vary with other samples and conditions.



Agilent Technologies

- Pressure setpoint and control precision to 0.001 psi provides more retention time locking precision for low-pressure applications.
- EPC with capillary columns provides four column flow control modes: constant pressure, ramped pressure (3 ramps), constant flow, or ramped flow (3 ramps). Column average linear velocity is calculated
- Atmospheric pressure and temperature compensation is standard, so results do not change, even when the laboratory environment does
- Low Thermal Mass (LTM) system can be added to achieve fastest cycle times via rapid LTM capillary column module heating and cooling
- The LAN interface allows real-time monitoring of the GC when it is connected with Lab Monitor & Diagnostic Software, even when also connected to a data system.
- One-button access to maintenance and service modes from the keyboard
- Preprogrammed leak tests
- Automatic Liquid Sampling is fully integrated into mainframe control
- Setpoint and automation control can be done from the local keyboard or via a networked data system. Clock-time programming can be initiated from the front panel to initiate events (on/off, method start, etc.) at a future date and time
- A run time deviation log is created for each analysis to ensure that all method parameters were achieved and maintained.
- A full array of traditional gas sampling and column switching valves are available
- 550 timed events
- Display of all GC and ALS setpoints at the GC or data system.
- Context-sensitive online help

Column Oven

- Dimensions: 28 × 31 × 16 cm
Accommodates up to two 105 m × 0.530 mm id capillary columns or two 10-ft glass packed columns (9 in coil diameter, 1/4 in od), or two 20-ft stainless steel packed columns (1/8 in od).
- Operating temperature range suitable for all columns and chromatographic separations. Ambient temperature +4 °C to 450 °C.
 - With LN₂ cryogenic cooling: -80 to 450 °C.
 - With CO₂ cryogenic cooling: -40 to 450 °C.
- Temperature setpoint resolution: 1 °C.
- Supports 20 oven ramps with 21 plateaus. Negative ramps are allowed.
- Maximum achievable temperature ramp rate: 120 °C/min (120 V units are limited to 75 °C/min, see Table 1).

- Maximum run time: 999.99 min (16.7 h).
- Oven cool down (22 °C ambient) 450 to 50 °C in 4.0 min (3.5 min with oven insert accessory)
- Ambient rejection: < 0.01 °C per 1 °C.

Electronic Pneumatics Control (EPC)

- Compensation for barometric pressure and ambient temperature changes is standard.
- Pressure setpoints may be adjusted by increments of 0.001 psi, with typical control ± 0.001 for the range 0.000 to 99.999 psi; 0.01 psi for the range 100.00 psi to 150.00 psi
- User may select pressure units as psi, kPa, or bar.
- Pressure/flow ramps: Three maximum.
- Carrier and makeup gas settings selectable for He, H₂, N₂, and argon/methane.
- Flow or pressure setpoints for each inlet or detector parameter with both Agilent 7890A and Agilent ChemStations
- Constant flow mode is available when capillary column dimensions are entered into the 7890A
- Split/splitless, Multimode, and PTV inlets have flow sensors for the control of split ratio.
- Inlet modules
Pressure sensors: Accuracy: < ± 2% full scale, Repeatability: < ± 0.05 psi, Temperature coefficient: < ± 0.01 psi/°C, Drift: < ± 0.1 psi/6 months.
- Flow sensors: Accuracy: < ± 5% depending on carrier gas, Repeatability: < ± 0.35% of setpoint,

Table 1. Typical 7890A GC Oven Ramp Rates

Temperature range (°C)	120 V Oven rates (°C/min)	Fast ramp rates* (°C/min)	
		Dual-Channel	Single-Channel**
50 to 70	75	120	120
70 to 115	45	95	120
115 to 175	40	65	110
175 to 300	30	45	80
300 to 450	20	35	65

* Fast ramp rates require power > 200 volts at > 15 Amps.

** Requires G2646-60500 oven insert accessory.

normalized temperature and pressure $\pm 0.20 \text{ mL/min (NTP)* per }^\circ\text{C}$ for He or H₂; $\pm 0.05 \text{ mL/min NTP per }^\circ\text{C}$ for N₂ or Ar/CH₄.

- Detector modules:
Accuracy: $\pm 3 \text{ mL/min NTP}$ or 7% of setpoint, Repeatability: $\pm 0.35\%$ of setpoint

NTP = 25 °C and 1 atmosphere

Inlets

- Maximum of two inlets installed
- EPC compensated for atmospheric pressure and temperature variation
- Inlets available:
 - Packed purged injection port (PPIP)
 - Split/splitless capillary inlet (S/SL)
 - Multimode inlet
 - Temperature-programmable cool on-column (PCOC)
 - Programmable temperature vaporizer (PTV)
 - Volatiles inlet (VI)

S/SL

- Suitable for all capillary columns (50 μm to 530 μm id)
- Split ratios up to 7,500:1 to avoid column overload. Setting split ratios (particularly low split ratios) is limited by column parameters and control of system flows (particularly low system flows)
- Splitless mode for trace analysis. Pressure-pulsed splitless is easily accessible for best performance
- Maximum temperature: 400 °C
- EPC available in two pressure ranges: 0 to 100 psig (0 to 680 kPa) for best control for columns $\geq 0.200 \text{ mm diameter}$; 0 to 150 psig for columns <math>< 0.200 \text{ mm diameter}</math>.

- Gas saver mode to reduce gas consumption without compromising performance.
- Electronic septum purge flow control to eliminate "ghost" peaks.
- Total flow setting range:
0 to 200 mL/min N₂
0 to 1,250 mL/min H₂ or He
- Turn top inlet sealing system is built in standard with each 7890A S/SL inlet for quick, easy, injector liner changes

Multimode Inlet

- Provides the flexibility of a standard Agilent split/splitless inlet, combined with temperature programmable capabilities which allow for large volume injection. Also supports cool injections for improved signal response
- Temperature control: LN₂ (to -160 °C), LCO₂ (to -70 °C), air cooling (to ambient +10 °C with oven temperature <math>< 50 \text{ }^\circ\text{C}</math>) or Chilled Liquid Cooling (to 0 °C with water/alcohol coolant and using customer-supplied heating exchanger). Temperature programming of up to 10 ramps at up to 900 °C/min. Maximum temperature: 450 °C
- Injection modes:
 - Hot or cold split/splitless
 - Pulsed split/splitless
 - Solvent vent
 - Direct
- Suitable for all capillary columns (50 μm to 530 μm)
- EPC pressure range (psig): 0 to 100 psig
- Split ratio: up to 7500 to 1 to avoid column overload. Setting split ratios (particularly low split ratios) is limited by column parameters and control of system flows (particularly low system flows).

- Splitless mode for trace analysis. Pressure pulsed splitless is easily accessible for improved performance
- Electronic septum purge flow control
- Compatible with Merlin Microseal septum
- Setup of parameters facilitated with Agilent Solvent Elimination Calculator
- Total flow setting range:
 - 0 to 200 mL / min N₂
 - 0 to 1,250 ml/min H₂ or He
- Turn-top inlet sealing system is built in standard with each 7890A Multimode inlet for quick, easy injector liner changes

PCOC

- Direct injection onto cool capillary column ensures quantitative sample transfer with no thermal degradation.
- Automatic liquid injection supported directly onto columns $\geq 0.250 \text{ mm id}$.
- Maximum temperature: 450 °C
Temperature programming in 3 ramps or tracking oven. Subambient control to -40 °C is optional.
- Electronic pressure control range: 0 to 100 psig.
- Electronic septum purge flow control
- Optional solvent vapor exit for large-volume injections
 - Electronically controlled, inert, three-way valve allows solvent venting.
 - Includes software for method optimization.
 - Preassembled retention gaps/vent line/analytical column for easy installation.

PPIP

- Direct injection onto packed and wide-bore capillary columns.
- Electronic flow/pressure control: 0 to 100 psig pressure range, 0.0 to 200.0 mL/min flow range. Ranges are chosen to provide optimum performance over normal packed column setpoint ranges
- Electronic septum purge flow control.
- 400 °C maximum operating temperature
- Adapters included for 1/4-in. and 1/8-in. packed columns, and 0.530-mm capillary columns.

PTV

- Supports hot/cold split and splitless modes as well as large volume injections
- Temperature control: either LN₂ (to -160 °C) or LCO₂ (to -65 °C) cooling. Temperature programming of up to 3 ramps at up to 720 °C/min. Maximum temperature: 450 °C.
- EPC pressure range 0 to 100 psig
- Split ratio up to 7,500:1. Setting split ratios (particularly low split ratios) is limited by column parameters and control of system flows (particularly low system flows)
- Electronic septum purge flow control
- Choice of Gerstel septumless head or Merlin Microseal[®] septum head
- 450 °C maximum operating temperature.
- Total flow setting range:
 - 0 to 200 mL/min N₂
 - 0 to 1,250 mL/min H₂ or He

VI

- Very low volume (32 µL) interface suitable for gas or prevaporized samples. Recommended for use with

headspace, purge and trap, or thermal desorption samplers.

- Three modes for optimized sample introduction: split (up to 100:1 split ratio), splitless, and direct.
- Optimized EPC (H₂ or He carrier, 0.00 to 100 psig pressure control, 0.0 to 100 mL/min flow control).
- Electronic septum purge flow control.
- Silcosteel[®] treated flow path provides inert surface for minimum component adsorption.
- Maximum temperature: 400 °C.

Detectors

- Electronic pneumatics control and electronic on/off for all detector gases
- EPC compensated for atmospheric pressure and temperature variation

Detectors available:

FID

- Flame ionization detector (FID) that responds to most organic compounds.
- Minimum detectable level (for tridecane): < 1.8 pg C/s
- Linear dynamic range: >10⁷ (± 10%). Full-range digital data path enables peaks to be quantified over the entire 10⁷ concentration range in a single run.
- Data rates up to 500 Hz accommodate peaks as narrow as 10 msec at half height.
- Standard electronic pneumatic control for three gases:
 - Air: 0 to 800 mL/min
 - H₂: 0 to 100 mL/min
 - Makeup gas (N₂ or He): 0 to 100 mL/min
- Available in two versions: capillary column optimized or adaptable for either packed or capillary columns

- Flameout detection and automatic reignition
- 450 °C maximum operating temperature

TCD

- Thermal conductivity detector (TCD), a universal detector that responds to all compounds, excluding the carrier gas.
- Minimum detectable level: 400 pg tridecane/mL with He carrier. (This value may be affected by laboratory environment).
- Linear dynamic range: > 10⁵ ± 5%
- Unique fluidic switching design provides rapid stabilization from turn-on, low-drift performance.
- Signal polarity can be run-programmed for components having higher thermal conductivity than the carrier gas
- Maximum temperature: 400 °C
- Standard EPC for 2 gases (He, H₂, or N₂ matched to carrier gas type)
- Make-up gas: 0 to 12 mL/min
- Reference gas: 0 to 100 mL/min
- The 7890A GC can accommodate a third detector as TCD located on the left-hand side of the GC.

Micro-ECD

- Micro-electron capture detector (micro-ECD), a very sensitive detector for electrophilic compounds such as halogenated organic compounds
- Minimum detectable level: < 6 fg/mL lindane
- Proprietary signal linearization. Linear dynamic range: > 5 × 10⁴ with lindane
- Data acquisition rate: up to 50 Hz
- Uses β emission of < 15 mCi ⁶³Ni as the electron source.
- Unique micro-cell design minimizes contamination and optimizes sensitivity.

- 400 °C maximum operating temperature
- Standard EPC makeup gas types: argon/5% methane or nitrogen; 0 to 150 mL/min

NPD

- Nitrogen-phosphorus detector (NPD), a detector specific to nitrogen or phosphorus-containing compounds
- NPD available with one of two beads, Bloss (glass) bead or white ceramic bead (legacy offering)
Compared to the legacy white ceramic bead, the Bloss bead offers:
 - Longer lifetime
 - More stable operation during the bead's lifetime
- MDL: < 0.4 pg N/s, < 0.06 pg P/s with azobenzene/malathion/octadecane mixture with Bloss bead
- MDL: < 0.4 pg N/s, < 0.2 pg P/s with azobenzene/malathion/octadecane mixture with white ceramic bead
- Dynamic range: > 10⁵ N, > 10⁵ P with azobenzene/malathion mixture with Bloss or white ceramic bead
- Selectivity: 25,000 to 1 g N/g C, 200,000 to 1 g P/g C with azobenzene/malathion/octadecane mixture with Bloss bead
- Selectivity: 25,000 to 1 g N/g C, 75,000 to 1 g P/g C with azobenzene/malathion/octadecane mixture with white ceramic bead
- Data acquisition rate: up to 200 Hz
- Standard EPC for three gases:
 - Air: 0 to 200 mL/min
 - H₂: 0 to 30 mL/min
 - Makeup gas: 0 to 100 mL/min

- Available for packed/capillary columns or optimized for capillary columns
- 400 °C maximum operating temperature

FPD

- Single-wavelength flame photometric detector (FPD), or dual-wavelength flame photometric detector (DFPD) – a sensitive, specific detector to sulfur- or phosphorus-containing compounds
- MDL: < 60 fg P/s, < 3.6 pg S/s with methylparathion
- Dynamic range: > 10³ S, 10⁴ P with methylparathion
- Selectivity: 10⁶ g S/g C, 10⁶ g P/g C
- Data acquisition rate: up to 200 Hz
- Standard EPC for three gases:
 - Air: 0 to 200 mL/min
 - H₂: 0 to 250 mL/min
 - Makeup gas: 0 to 130 mL/min
- Available in single- or dual-wavelength versions
- 250 °C maximum operating temperature
- Agilent 7890A GC's ability to handle 4 signals allows simultaneous use of DFPD, top-mounted GC detector, and TCD.

SCD (Model 355)

- Highest sensitivity and selectivity for sulfur-containing compounds
- MDL: Typical < 0.5 pg/s, dimethyl sulfide in toluene
- Linear dynamic range: > 10⁴
- Selectivity: > 2 x 10⁷ g S/g C

NCD (Model 255)

- High selectivity for nitrogen-containing compounds

- MDL: < 3 pg N/s, in both N and nitrosamine modes, 25 ppm N as nitrobenzene in toluene
- Linear dynamic range: > 10⁴
- Selectivity: > 2 x 10⁷ g N/g C (selectivity in nitrosamine mode is matrix dependent)

See Agilent Sulfur Chemiluminescence Detector and Nitrogen Chemiluminescence Detector Specification Guide for additional information regarding performance and physical and environmental specifications.

MSD

See 5975 Series MSD specifications. See 7000A Triple Quadrupole GC/MS specifications.

Specialized detectors are available through Agilent Channel Partners including: atomic emission, helium ionization, and pulsed discharge ionization

Auxiliary EPC Devices

The 7890A GC has two positions for auxiliary EPC devices located on the back of the GC. Each position can be any combination of auxiliary EPC or pneumatics control module.

Note: The communication for a third detector as TCD EPC module (located on the left side of the GC) interfaces via one of these auxiliary EPC module positions. If a third detector (TCD) is installed, one of these auxiliary positions is thus taken.

Auxiliary EPC Module

- Three channels of pressure control
- EPC compensated for atmospheric pressure and temperature variation when connected to a user-defined capillary column
- Psig (gauge) and psia (absolute) pressure control

- Forward pressure regulated
- Maximum of 2 auxiliary EPC modules per GC

Pneumatics Control Module (PCM)

- 2 channels for operation
- EPC compensated for atmospheric pressure and temperature variation when connected to a user-defined capillary column
- First channel:
 - Pressure or flow control
 - Psig (gauge) and psia (absolute) pressure control
 - Forward pressure regulated
- Second channel:
 - Pressure control
 - Psig (gauge) and psia (absolute) pressure control
 - Forward pressure or back pressure regulated
- PCM can be located in either/both inlet EPC positions, and in either/both auxiliary positions on the back of the 7890A GC
- Maximum of 3 PCMs per GC

Capillary Flow Technology

Agilent's proprietary Capillary Flow Technology provides devices with reliable, leak-free, in-oven capillary connections to help analyze complex samples and provide gains in productivity. Devices feature:

- Photolithographic chemical milling for low dead volume flow pathways
- Diffusion bonding to form a single flow plate
- "Credit card" profile for fast thermal response
- Projection welded connections for leak-tight fittings

- Deactivation of all internal surfaces in the sample path for inertness

All of the following purged Capillary Flow devices require one channel from an auxiliary EPC or PCM module

Purged capillary flow devices, such as the Deans switch, purged effluent splitters, and QuickSwap, introduce an additional flow in the sample stream. For detectors that operate at low flow rates, like the MSD and TCD, some decrease in sensitivity will occur.

Deans Switch

Deans switching provides additional selectivity using 2-dimensional GC analysis. Peaks of interest that may be coeluting on one column are diverted to a separate column of different stationary phase. This technique can also reduce maintenance costs by having troublesome solvents or other components bypass detectors or columns

- Dimensions: 65 mm x 31 mm x 1 mm (65 mm x 31 mm x 11 mm, including weldment connectors with tubing to reach through top of oven)
- Weight: 30 grams, not including connector tubing.

Purged Effluent Splitters

A 3-way purged effluent splitter sends column effluent to three detectors, even an MSD. More information can be obtained in a single run to help locate target peaks in unknowns. A 2-way purged effluent splitter version is also available.

- Dimensions: 65 mm x 31 mm x 1 mm (65 mm x 31 mm x 11 mm, including weldment connectors with tubing to reach through top of oven)
- Weight: 26 grams, not including connector tubing.

QuickSwap

The QuickSwap device, for GC/MS, allows you to change a column or perform inlet maintenance without venting the MSD, saving a considerable amount of downtime

- Dimensions: 31 mm x 16 mm x 1 mm (31 mm x 16 mm x 22 mm, including weldment connectors)
- Weight: 10 grams, not including connector tubing.

Backflush

Each of the above purged Capillary Flow devices *also* provides the ability to backflush. By reversing column flow immediately after the last compound of interest has eluted, you can eliminate long bake-out times for highly retained (or high-boiling) contaminants, thereby shortening cycle times and protecting the column and detector. As backflush occurs after peaks of interest have eluted, the chromatographic method for peaks of interest does not need to change. Backflush is available when the column is attached to a split/splitless, volatiles interface, Multimode, or PTV inlet.

The 7890A GC firmware has been optimized for backflush operation:

- Displays positive and negative flows
- Inlet/outlet pressures settable to the limits of the controlling EPC devices
- EPC can be introduced at any column or restrictor connection
- Capillary Flow configuration of up to six columns/restrictors

Agilent GC Multitechnique ChemStation, EZChrom Elite data system, and GC/MSD ChemStation now include user-interface screens to simplify backflush set-up and operation with the 7890A GC

ALS Interface Module

- 7693A ALS Interface standard. Provides power and communications for up to two 7693A automatic injectors, one automatic sampler tray, and one heater/mixer/bar code reader.
- 7683 ALS Interface standard. Provides power and communications for up to two 7683 automatic injectors, one automatic sampler tray, and one bar code reader.
- Injector and tray install easily without the need for alignment.

Data Communications

- LAN
- Two analog output channels (1-mV, 1-V, and 10-V output available) as standard
- Remote start/stop
- Keyboard control of the Agilent Automatic Liquid Sampler (ALS)
- Storage of 10 methods
- Storage of five ALS sequences
- Binary-coded decimal input for a stream selection valve

Maintenance and Support Services

- Remote diagnostics
- Performance verification services

Environmental Conditions/Safety and Regulatory Certifications

The instrument is designed and manufactured under a quality system registered to ISO 9001. The instrument complies with international regulatory, safety, and electromagnetic compatibility requirements. The specifications are more conservative than actual test conditions. In addition, further testing was done under Agilent standards to ensure

operation after delivery and long-term usage. See <http://www.chem.agilent.com/cag/aboutapg/aboutQuality.html> for further information and typical product testing.

- Ambient operating temperature: 15 °C to 35 °C
- Ambient operating humidity: 5% to 95%
- Storage extremes: -40 °C to 70 °C
- Line voltage requirements: ± 10% of nominal
- Conforms to the following safety standards:
 - Canadian Standards Association (CSA): C22 2 No. 1010
 - CSA/Nationally Recognized Test Laboratory (NRTL): UL 3101
 - International Electrotechnical Commission (IEC): 61010-1
 - EuroNorm (EN): 61010-1
- Conforms to the following regulations on Electromagnetic Compatibility (EMC) and Radio Frequency Interference (RFI):
 - CISPR 11/EN 55011: Group 1 Class A
 - IEC/EN 61326
- Designed and manufactured under a quality system registered to ISO 9001, Declaration of Conformity available.

Other Specifications

- Height: 49 cm (19.2 in.)
- Width: 58 cm (22.9 in.) with EPC inlet and detectors; 68 cm (26.8 in.) with third detector as TCD or with certain valving options mounted on left-hand side of GC
- Depth: 51 cm (20.2 in.)
Typical weight: 49 kg (108 lb)
- Four internal 24-volt connections (up to 150 mA)

- Two external 24-volt connections (up to 150 mA)
- Two on/off contact closures (48 V, 250 mA max)
- 550 timed events via data system
50 timed events via GC keyboard.
- Support for up to 8 valves
 - Valves 1 to 4, 12V DC 13 watt in a heated valve box
 - Valves 5 to 6, 24 V DC 100 mA unheated, for low power valve applications
 - Valves 7 to 8, externally powered as a remote event from separate contact closure
- Independent heated zones, not including oven: six (two inlets, two detectors, and two auxiliary). Third detector as TCD can utilize any available zone from inlet or auxiliary zones.
- Maximum operating temperatures for auxiliary zones: 400 °C

References

1. A Guide to Interpreting Detector Specifications for Gas Chromatography. Agilent Technologies, publication 5989-3423EN
2. The Importance of Area and Retention Time Precision in Gas Chromatography. Agilent Technologies, publication 5989-3425EN

For More Information

For more information on our products and services, visit our Web site at www.agilent.com/chem.

www.agilent.com/chem

Silcosteel® is a registered trademark of the Restek Corporation

Merlin Microseal® is a registered trademark of Gerstel GmbH & Co. KG

Agilent shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Information, descriptions, and specifications in this publication are subject to change without notice

© Agilent Technologies, Inc., 2009
Printed in the USA
February 26, 2009
5989-6317EN



Agilent Technologies