GC AND GC/MS

Your Essential Resource for Columns & Supplies

The Measure of Confidence

Agilent Technologies

GC AND GC/MS

Achieve excellent, reproducible performance for difficult samples

For over 40 years, Agilent has broken new ground with innovations in Gas Chromatography. And now, we continue our tradition of leadership by offering you the industry's broadest selection of GC and GC/MS columns and supplies. All are manufactured to Agilent's exact specifications to minimize downtime and ensure consistent, high-quality results.

Agilent Ultra Inert solutions

provide the flow path inertness vital to analytical success. Ultra Inert split and splitless liners are manufactured and tested to our highest level of scrutiny to ensure quality and consistency. Agilent J&W Ultra Inert GC columns are tested with the industry's most demanding test probe to reduce detection limits and produce more accurate data for difficult analytes. Agilent GC and GC/MS instruments bring together all elements for trace-level analysis, dramatically improving MS resolution, spectral integrity, and detection limits.

GC and GC/MS supplies

include premium non-stick septa, plasma coated to eliminate chemical bleed and contamination, so your GC system will maintain its integrity, stay cleaner, and require less maintenance. General-purpose septa are made from an enhanced injection-molded silicone to withstand over 200 automatic injections at 350 °C. Vespel/graphite ferrules are manufactured to the ideal hardness for GC/MS applications to prevent contamination caused by flaking.

Agilent J&W GC columns

deliver the best inertness for acids, bases, and mixed functional compounds, the lowest bleed levels, and the tightest column-to-column reproducibility. Mass Spec Grade GC columns (VF-ms, DB-ms and HP-ms) give you robust performance, low column bleed, and a wide range of selectivity. LTM column modules combine a fused silica capillary GC column with heating and temperature-sensing components for efficient column heating and cooling. What's more, integrated guard columns protect your analytical columns from non-volatile compounds in the sample matrix.

Table of Contents

PUT MORE THAN 40 YEARS OF RELENTLESS INNOVATION BEHIND YOUR EVERY RESULT

By continually raising the standards for technologies that support your routine analyses, Agilent's R&D efforts have led to breakthroughs such as:

- **New GC columns** that help you achieve higher levels of inertness and column-to-column reproducibility
- **LC column choices** that deliver the sensitivity and reliability you need for demanding applications
- **Cutting-edge sample preparation products** that promote reliable extraction and concentration
- **Fresh atomic and molecular spectroscopy ideas** for identifying and confirming targets and unknowns

Longtime Agilent customers have experienced our commitment firsthand. And now, we look forward to demonstrating how Agilent's approach to relentless innovation can work to your advantage, too.

CHEMICAL ANALYSIS SOLUTIONS

Food

From high-volume screening of vegetables for large numbers of pesticides to rapid identification of pathogens, Agilent understands the analytical needs of food producers, shippers, and regulators. When a new toxin appears, we deploy substantial resources to quickly help customers develop robust and reliable methods. Agilent's leading separations, mass spectrometry, and spectroscopy solutions are emerging as valuable food testing techniques.

Environmental

Agilent offers more than 40 years of environmental testing and regulatory expertise. We help government and private labs with the full range of assays, from routine testing of soils for heavy metals to detection of pharmaceuticals in groundwater, in concentrations down to parts per trillion.

Energy and Fuels

Agilent collaborates closely with process industry customers to offer analytical systems that meet their needs for separation, detection, throughput, and support. We'll even preconfigure custom or standard analyzers so they arrive at the lab ready-to-go. Agilent's expertise in both chemical analysis and life science is a powerful combination for researching and producing biofuels, including a wide range of analytical techniques for fatty acid methyl esters (FAMEs). Our newly-expanded portfolio also offers powerful tools for developing and producing photovoltaic films and solar panels.

Forensics

Because the careers of world class athletes and many other individuals hinge on drug testing, it's critical that those doing the testing have the highest level of confidence in the results. Forensics analysts worldwide have grown to depend on Agilent tools for accuracy, reliability, and speed in this high stakes, high-throughput field. Our best selling GC, GC/MS and popular LC and LC/MS are workhorses in forensics labs.

Traditional Lab Informatics

The ways labs generate and store data profoundly affect their efficiency. Agilent offers a rich, integrated suite of software products built on a set of customer-driven architectural values with the Agilent OpenLAB Laboratory Software Suite. OpenLAB delivers superior performance, open systems integration and investment protection. Our commitment is to deliver more value across each step in the life cycle of scientific data – from data collection and analysis to interpretation and management.

Materials Science

Agilent offers a newly expanded portfolio of instruments used for the research, manufacturing and testing of advanced materials, from precision optics to pulp, paper and polymers. Tools for chromatography, atomic absorption spectroscopy, molecular spectroscopy, X-ray crystallography, and nuclear magnetic resonance all support continuous progress in materials science.

LIFE SCIENCE SOLUTIONS

Biopharmaceutical

As "multi-omics" studies gain momentum in the search for new therapeutics, Agilent is uniquely positioned to provide the instruments, reagents, and powerful software needed for performing experiments in multiple disciplines and combining the massive amounts of data into biological insight.

Pharmaceutical

Drug manufacturing requires the accuracy, sensitivity and high throughput of other analytical applications, along with the demands of regulatory record-keeping and validation requirements. Agilent provides a potent combination of rugged, high-throughput tools and unmatched compliance services. Agilent now offers the market-leading family of dissolution apparatus and sampling systems that pair perfectly with our HPLC and UV systems.

Proteomics

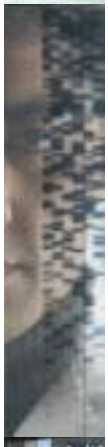
Research into how large sets of proteins affect the health of an organism requires special sets of analytical tools. Agilent has built a formidable arsenal of liquid chromatograph/mass spectrometers, bioinformatics systems, multiple affinity protein removal columns, and OFFGEL electrophoresis for protein identification and protein biomarker discovery. Accurate-Mass mass spectrometry and the microfluidic HPLC-Chip/MS are two Agilent innovations speeding the work of proteomics researchers around the globe.

Metabolomics

Collections of small molecules are increasingly being seen as rich sources of biomarkers, but studying metabolites presents many challenges. The need for speed, accuracy, and powerful interpretation capabilities in looking at chemical profile snapshots is underscored because molecules are constantly entering, leaving or changing within the metabolome. Agilent's GC, LC, NMR and MS portfolios, along with our excellent bioinformatics offerings, user-customizable METLIN metabolite database for LC/MS, and the industry's first commercial GC/MS retention time locked metabolite library align well with needs of metabolomics researchers.

Genomics

Agilent is a global leader in microarrays, scanners, and reagents used in a wide variety of genomic-based disease research experiments. Our SureSelect Target Enrichment System dominates the category, streamlining next generation sequencing studies worldwide. Agilent offers a wide range of catalog microarrays and a highly-developed capability to produce custom arrays featuring ink jet-based SurePrint fabrication and the eArray on-line design tool. All Agilent microarrays feature highly sensitive, selective 60-mer probes. With as many as eight arrays printed on a standard 1 x 3 in. slide, the cost per experiment becomes very affordable.



Life Science Informatics

Mirroring its extensive instrument portfolio, Agilent offers the industry's most extensive suite of bioinformatics software, helping users derive knowledge from complex genomic, proteomic, metabolomic and other biological data. This includes DNA Analytics for analyzing CGH, ChIP and methylation microarray data. The GeneSpring suite includes informatics software for microarray-based gene expression data, genotyping data, and GeneSpring MS, which are useful for analyzing mass spec data from proteomics and metabolomics experiments and comparing complex datasets to explore biological questions from multiple perspectives.

Lab Automation

To meet the skyrocketing demand for more throughput and automation, Agilent has substantially expanded its lab automation offerings. The Agilent line of liquid handlers and microplate processors are designed to streamline high-volume life science workflows. Agilent is also continually upgrading its advanced autosamplers for LC, GC, LC/MS and GC/MS, adding functionality and speed to reflect the performance of its advanced instruments.

Vacuum Technology

Agilent works with customers to solve vacuum challenges from experiments in high-energy physics to developing systems for producing flat panel displays. Agilent manufactures vacuum systems used in its own mass spectrometry instruments as well as those of other manufacturers. Agilent's vacuum technology has been proven by the most powerful physics experiment ever built, CERN's Large Hadron Collider machine, which was used in the discovery of the Higgs boson particle.

Get the Agilent Service Guarantee

Should your instrument require service while covered by an Agilent service agreement, we guarantee repair or we will replace your instrument for free.

No other company offers this level of commitment to keep your lab up and running at peak efficiency.

Laboratory decision makers and users ranked Agilent as their first choice for general laboratory compliance services.

Agilent Service and Support for Instrument Systems

Focus on what you do best

For over 40 years, Agilent has been building and maintaining the instruments you count on to stay competitive and successful. Trust us to protect your investment with a broad portfolio of services, backed by a global network of experienced service professionals dedicated to the productivity of your lab.

Agilent Advantage Service Plans

The best service available for your Agilent instruments

Agilent offers a flexible range of service plans so that you can choose the level of coverage that is best for your lab.

- **Agilent Advantage Gold** – Priority-one coverage for ultimate uptime and productivity
- **Agilent Advantage Silver** – Comprehensive coverage for dependable laboratory operations
- **Agilent Advantage Bronze** – Total repair coverage at a fixed annual price
- **Agilent Repair Service** – Basic coverage for reliable instrument repair

Agilent Advantage service plans include Agilent Remote Advisor for real-time remote monitoring and diagnostics. Through secure internet connections, you can interact with Agilent service professionals, receive detailed asset reports, and configure text or email alerts to notify you before problems occur – helping you to maximize instrument uptime and optimize laboratory workflows.

Agilent Compliance Services

Equipment qualification that meets the most stringent requirements

Enterprise Edition Compliance was developed to streamline compliance across your entire lab. Used globally in regulated labs, including standards organizations and regulatory agencies, Enterprise Edition enables you to:

- Improve qualification efficiency by automating protocols across platforms to ensure greater efficiency and minimize regulatory risk
- Standardize your entire compliance operation with robust test designs that work with all your instruments
- Add, remove or reconfigure tests based upon your unique user requirements
- Significantly reduce staff review time with consistently formatted, computer generated, tamper-proof reports

Agilent Education and Consulting Services

Our best minds, working for you

Make the most of your instrument with training and consulting from the same experts who designed the instruments, software and processes you use every day.

- Classroom and on-site training in instrument operation, troubleshooting and maintenance
- Customized consulting services to meet your lab's unique needs

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 the system toward an upgraded model. Not only does Agilent ensure a reliable purchase now, but we also ensure that your investment is just as valuable in the future.

For more detailed information,
please go to **www.agilent.com/chem/services**
or contact your local Agilent Services and Support representative.

Technical Support at work for you

Have a hardware, software, application, instrument repair or troubleshooting question? Agilent's technical experts are available to answer your questions. With years of laboratory experience, our technical support specialists can provide in-depth knowledge and experience.

For questions pertaining to supplies found in this catalog, contact your local Agilent office or Authorized Agilent Distributor or visit **www.agilent.com/chem/techsupport**

Need more information?

Visit **www.agilent.com/chem/contactus** to:

- Locate your nearest Agilent office or distributor for expert technical support.
- Get fast sales and product assistance by phone. Simply use the scroll-down menu to select your country.
- Receive email assistance using our convenient online forms.

Agilent GC and GC/MS Systems

Achieve the highest level of Productivity and Performance

The industry leader in Gas Chromatography

The Agilent 7890 GC

Gives you everything you need to take your lab to the next level of performance, including advanced separation capabilities and powerful productivity tools

The Agilent 7820A GC

An affordable, high-quality solution for small- to medium-sized labs that are require with routine analyses using standard GC methods

The Agilent 6850 Series II GC

An excellent choice for any laboratory where bench space, ease of use, and independent channel flexibility are important

The information you need, wherever you need it

The Agilent 490 Micro GC and 490-PRO

The right GC solution If you want the ability to measure anywhere, and get the results you need in seconds

The customer-proven worldwide bestseller, Agilent 5975 Series GC/MSD

5975C GC/MSD

Superior performance, reliability, and productivity with industry-leading 7890 GC

5975T LTM GC/MSD

Compact, transportable GC/MS with fast, lab-quality performance

5975E GC/MSD

Affordable GC/MSD with economical 7820GC

Flexible, sensitive, and affordable EI, CI, and MS/MS, Agilent 240/220 Ion Trap GC/MS

240 Ion Trap GC/MS

The most powerful EI, CI and MS/MS analysis with unmatched full scan sensitivity

220 Ion Trap GC/MS

Compact and budget-friendly design – No.1 Ion Trap system in universities worldwide

Our most powerful trace analysis system

Agilent 7000B Triple Quadrupole GC/MS

You can rely on Agilent's 7000B Triple Quadrupole GC/MS system for extraordinary sensitivity, selectivity, and day-after-day reliability with your most complex matrices

Your choice for exceptional qualitative analysis, Agilent 7200 Q-TOF GC/MS

The world's first Q-TOF GC/MS combines the proven separation power of Agilent's 7890A GC with the high detection selectivity and accurate mass information of a TOF analyzer

Agilent Analyzers and Application Kits

Bring a new Application online can stretch your lab to the limit. Agilent solves this problem with our GC, Micro GC, GC/MS and GC/MS/MS Analyzers, which are factory preconfigured and pre-tested to get you up and running in the shortest possible time.

Agilent Gas Clean Filters

The Agilent Gas Clean Filter System provides enhanced gas quality for maximum productivity. Clean gases reduce the risk of column damage, sensitivity loss, and instrument downtime. Oxygen, hydrocarbons and moisture can cause loss of sensitivity and accuracy of the GC, and damage your column and consumables. Inserting a Gas Clean Filter System in the gas line immediately before the instrument inlet greatly reduces the level of impurities and helps you detect any problems before they occur.

Turn to pages 132-133.

Ultra Inert GC Columns

The Agilent J&W Ultra Inert GC column family pushes industry standards for consistent column inertness and exceptionally low column bleed, resulting in lower detection limits and more accurate data for difficult analytes. And, each column is tested with the most demanding Ultra Inert test probe mixture in the industry, and an individual performance summary sheet is shipped with each column.

Turn to page 237.

Ultra Inert Liners

Agilent Ultra Inert Inlet liners provide a robust, reproducible and reliable inert flow path, even when containing wool. These liners are rigorously tested and certified to ensure exceptional batch-to-batch uniformity, low bleed and superior coverage, even with highly active compounds.

Turn to pages 22-29.

Bulk GC Supplies

Ideal for high-usage laboratories, Agilent bulk gas chromatography supplies provide the high quality and consistency of Agilent chromatography supplies in convenient and economical packaging.

Turn to page 14.

Agilent CrossLab

Agilent CrossLab Supplies

Agilent CrossLab offers a growing portfolio of GC supplies manufactured for seamless performance with a variety of non-Agilent analytical instruments in your lab. Look inside this catalog to find a wide range of products for your applications.

Agilent CrossLab is more than supplies:

- Over 40 years of chromatography expertise
- The right supplies for both routine and challenging applications
- Hassle-free operations and reproducible results
- High-quality products manufactured to Agilent standards
- Technical and application support
- Dependable worldwide availability and delivery
- Convenience of consolidating purchasing
- 90-day risk free money back guarantee

All with our risk-free, 90-day, money-back guarantee.

Agilent CrossLab GC supports instruments from PerkinElmer, Shimadzu, Dionex (now part of Thermo Scientific), CTC Analytics, and more. The comprehensive range includes premium non-stick inlet septa, Ultra Inert inlet liners, liner-O-rings, column ferrules and nuts, autosampler syringes, and vials and closures.

All Agilent CrossLab high quality supplies are backed by Agilent's worldwide technical support and dependable availability and delivery.

Turn to page 139.

Agilent Parts and Supplies

GC and GC/MS Maintenance Schedule

Item	Typical Schedule	Actions/Comments
Gas Management		
Gas purifiers (carrier gas and detector gas)	Every 6 to 12 months	Replacement schedule is based on capacity and grade of gas. In general, replace non-indicating traps every 6 to 12 months or when indicating traps start to change color. Replace indicating traps when indicating material is starting to change color.
Internal split vent trap	Every 6 months*	Replace to prevent material backing up into EPC control and to avoid costly repair.
External split vent trap	Every 6 months*	Replace to prevent sample analytes from escaping into the laboratory environment.
Flow meter calibration	Every 1 to 2 years	Re-calibrate electronic flow meters – follow recommended schedule for the unit (shown on the calibration certificate).
Sample Introduction and Inlets		
Syringes and/or syringe needles	Every 3 months*	Replace syringe if dirt is noticeable in the syringe, if it cannot be cleaned, if the plunger doesn't slide easily, or if clogged. Replace needle if septa wear is abnormal or the needle becomes clogged.
Inlet liner	Weekly*	Check often. Replace when dirt is visible in the liner or if chromatography is degraded.
Liner O-rings	Monthly*	Replace with every liner change.
Inlet septum	Daily*	Check often. Replace when signs of deterioration are visible (gaping holes, fragments in inlet liner, poor chromatography, low column pressure, etc.)
Inlet hardware	Every 6 months Every year	Check for leaks and clean. Check parts and replace when parts are worn, scratched, or broken.
Inlet gold or stainless steel seal	Monthly*	For highest level of reproducibility, change inlet seal with every liner change, but minimally replace monthly or when scratched, corroded, or if there is build-up of non-volatile sample components.

*Schedule is an approximation of average usage requirements. Frequency may vary widely based upon application and sample type.

(Continued)

GC and GC/MS Maintenance Schedule

Item	Typical Schedule	Actions/Comments
Columns		
Front-end maintenance	Weekly-monthly*	Remove 1/2 to 1 m from the front of the column when experiencing chromatographic problems (peak tailing, decreased sensitivity, retention time changes, etc.). Replace inlet liner and septum, and clean inlet as necessary. Guard column may be useful for increasing column lifetime.
Solvent rinse	As needed	Perform when chromatography degradation is due to column contamination. Only for bonded and cross-linked phases.
Replacement	As needed	Replace when trimming and/or solvent rinsing no longer restore chromatographic performance.
Ferrules	As needed	Replace when changing columns and inlet/detector parts.
Detectors		
FID/NPD jets and collector	As needed	Clean when deposits are present. Replace when they become scratched, bent, or damaged, or when having difficulty lighting FID or keeping flame lit.
NPD bead	As needed	Replace when signal drifts or there is a dramatic change in sensitivity.
FID	Every 6 months	Measure hydrogen, air, and makeup gas flows.
TCD	As needed	Thermally clean by "baking-out" when a wandering baseline, increased noise, or a change in response is present. Replace when thermal cleaning does not resolve the problem.
ECD	Every 6 months or as needed	Wipe test. Thermally clean by "baking-out" when baseline is noise, or the output value is abnormally high. Replace when thermal cleaning does not resolve the problem.
FPD	Every 6 months or as needed	Measure hydrogen, air, and makeup gas flows. Clean/replace FPD windows and seals when detector sensitivity is reduced.
NCD and SCD	Every 3 months*	Change pump oil, oil coalescing filter and chemical trap.
Mass Selective Detectors		
Tune MSD	As needed	Keep plenty of PFTBS (P/N 05971-60571) on hand.
Check the calibration vial	Every 6 months	Vial can be refilled without venting the system.
Replace the foreline pump oil	Every 6 months	Check the fluid weekly. Change when the fluid becomes discolored or every 6 months.
Replace the diffusion pump fluid	Every year or as needed	Check the fluid weekly. Too little fluid will cause the pump to run at a higher temperature, resulting in degradation and loss of high vacuum. Change when the fluid is discolored or contains particulates.
Clean the ion source	As needed	Clean when performance deteriorates to remove contamination and to restore the electrostatic properties of the ion lens system. Replace scratched parts to maintain optimal performance.

*Schedule is an approximation of average usage requirements. Frequency may vary widely based upon application and sample type.

Bulk GC Supplies

Single taper splitless liner, no wool, 5190-2270

Certified gold plated seal kit, 5190-2209

Liner O-rings, 5190-2269

Non-stick BTO septa, 5190-3157

Ideal for high usage laboratories, our bulk supplies provide the quality and consistency of Agilent chromatography supplies in convenient and economical packaging. We currently offer Agilent inlet liners, septa, gold inlet seals, and liner O-rings in bulk packaging.

- Economical and convenient packaging
- Overall cost of ownership reduced
- Same great quality Agilent products

Bulk GC Supplies

Description	Unit	Part No.
Ultra Inert Liners		
Ultra Inert Liner, low pressure drop, glass wool	100/pk	5190-3173
Ultra Inert Liner splitless liner, single taper, no wool	100/pk	5190-3170
Ultra Inert splitless liner, single taper, glass wool	100/pk	5190-3171
Ultra Inert split liner, straight, glass wool	100/pk	5190-3172
Liners		
Single taper split liner, low pressure drop	100/pk	5190-2275
Single taper splitless liner, no wool	100/pk	5190-2270
Single taper splitless liner, glass wool	100/pk	5190-2271
Double taper splitless liner, no wool	100/pk	5190-2272
Seals		
Certified gold plated seal kit, includes washer	10/pk	5190-2209
O-Rings		
Non-stick fluorocarbon O-ring for Flip Top	100/pk	5190-2268
Certified non-stick fluorocarbon O-ring	100/pk	5190-2269
Septa		
Non-stick BTO septa, 11 mm	400/pk	5190-3157
Non-stick Advanced Green septa, 11 mm	400/pk	5190-3158
Siltite Ferrule Bulk packs		
Ferrules, Siltite,0.1 to 0.25 mm column	100/pk	5190-4022
Ferrules, Siltite, 0.32 mm column	100/pk	5190-4023
Ferrules, Siltite, 0.53 mm column	100/pk	5190-4024

Inlet Septa

Septa are available for a variety of different applications and have different upper temperature limits. Lower temperature septa are usually softer, seal better, and can withstand more punctures (injections) than their high-temperature counterparts. If septa are used above their recommended temperatures, they can leak or decompose, causing sample loss, lower column flow, decreased column life and ghosting. To minimize problems:

- Use within the recommended temperature range
- Change regularly
- Install the retainer nut "finger-tight"
- Use septum purge when available
- Use autoinjectors
- Use sharp syringe needles

Premium Non-Stick Septa

Agilent premium non-stick inlet septa are designed and manufactured to provide a reliable non-contaminating seal. Our tri-fold blister pack ensures that each septum remains clean and ready to use.

- Proprietary plasma treatment prevents sticking and unnecessary inlet cleaning
- Innovative blister packaging keeps each septum clean and ready for use
- Center point guides the needle for easy penetration, less coring and longer life
- Precision molding assures accurate fit in the inlet
- Each batch is tested for bleed on Agilent 7890 GC-FID
- Premium formulations selected for sealing and chromatographic cleanliness
- No need to bake septa before using

Inlet Septa

Summary of Premium Inlet Septum Characteristics

Septum Type	Bleed	Lifetime	Temperature Limits
Non-Stick BTO (Bleed and Temperature Optimized)	✓✓✓	✓	to 400 °C injection port temp
Non-Stick Advanced Green	✓✓	✓✓	to 350 °C
Non-Stick Long-Life	✓	✓✓✓	to 350 °C

✓✓✓ = best ✓✓ = very good ✓ = good

TIPS & TOOLS

Need inlet septa for your non-Agilent instruments? Check the Agilent CrossLab septa starting on page 147

Inlet Septa

Non-Stick Bleed and Temperature Optimized (BTO) Septa

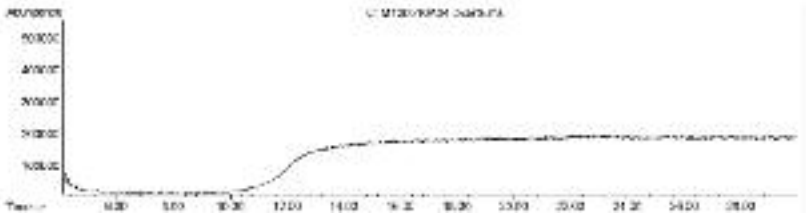
- Extended temperature range, lowest bleed
- Maximum injection port temperature 400 °C
- Plasma treatment eliminates sticking in the injection port
- Pre-conditioned; ready to use
- Blister packaging for cleanliness and convenience
- Ideal for use with low-bleed, "Mass Spec" capillary columns

BTO septa, 5183-4757

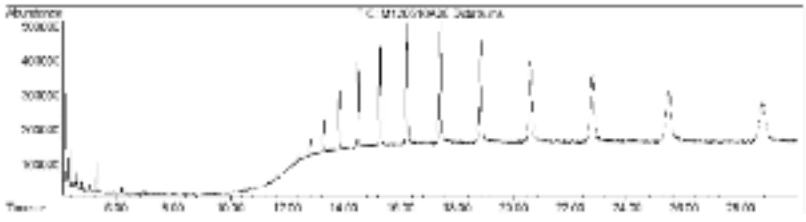
Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Unit	Part No.
11 mm septa	50/pk	5183-4757
11 mm septa	100/pk	5183-4757-100
11 mm septa	400/pk	5190-3157
5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4758

Comparison of septum purity: TIC profile of iso-octane extractions



Agilent BTO Septa with CenterGuide



Competitor's High-Temperature Septa without CenterGuide

Non-Stick Advanced Green Septa

- True long-life, high temperature green septa
- More injections per septum
- Plasma treatment eliminates sticking in the injection port
- Maximum injection port temperature 350 °C
- High-performance alternative to competitors' "green" septa
- Blister packaging for cleanliness and convenience

Advanced green septa, 5183-4759

Non-Stick Advanced Green Septa

Description	Unit	Part No.
11 mm septa	50/pk	5183-4759
11 mm septa	100/pk	5183-4759-100
11 mm septa	400/pk	5190-3158
5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4760

Non-Stick Long-Life Septa

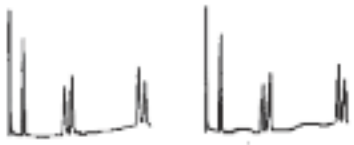
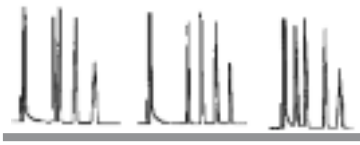
- The preferred septa for autosamplers
- Pre-pierced for extended life and reduced coring
- Ideal for overnight runs
- Up to 400 injections per septum
- Plasma treatment eliminates sticking
- Maximum injection port temperature 350 °C
- Soft, 45 durometer, easy on autosampler needles
- Blister packaging for cleanliness and convenience

Long-life septa, 5183-4761

Non-Stick Long-Life Septa

Description	Unit	Part No.
11 mm septa	50/pk	5183-4761
11 mm septa	100/pk	5183-4761-100
5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4762

Septa Troubleshooting

Symptom	Possible Causes	Remedy
Extra Peaks/Humps 	Septum bleed	Turn off injector heater. If extra peaks disappear, use septum specified for higher temperature or analyze at lower inlet temperature.
Baseline Change After Large Peak 	Large leak at septum during injection and for a short time thereafter (common with large diameter needles)	Replace septum and use smaller diameter needles.
Retention Times Prolonged 	Carrier gas leaks at septum or column connection	Check for leaks. Replace septum or tighten connections if necessary.

General Purpose Septa

Agilent's general purpose septa are made from an enhanced injection-molded silicone rubber. The septa material, gray in color, is specified to withstand over 200 automatic injections at an injection port temperature of 350 °C.

General purpose gray septa

General Purpose Septa

Description	Unit	Part No.
11 mm septa	50/pk	5080-8896-50
11 mm septa	100/pk	5080-8894-100
9.5 mm (3/8 in) septa*	50/pk	5080-8728-50
9.5 mm (3/8 in) septa*	100/pk	5080-8728-100
5 mm through hole septa for on-column inlets, automatic or manual injections**	25/pk	5181-1260
5 mm septa for high column backpressure, on-column inlets**	25/pk	5181-1261

*For 5700 series and 5830/40 GCs

**5 mm septa are packaged in glass jars

Merlin Microseal

- Low bleed, longer life alternative to standard septa for split/splitless injection and SPME
- Requires 23 gauge syringe needle
- Has a lifetime of more than 2000 injections, depending on samples and operating conditions
- Greatly reduced instrument downtime for septa changes and injection port liner changes due to septa particulates
- Two distinct sealing mechanisms: double O-ring type seal around the syringe needle and spring assisted duckbill to seal the injection port
- Temperature range 50-400 °C

Merlin Microseal

Description	Part No.
General Purpose Merlin Microseal (3-100 psi)	
General purpose Merlin Microseal starter kit Includes Microseal septum and nut	5182-3442
Merlin Microseal general purpose replacement septum 3 to 100 psi	5182-3444
Merlin Microseal high pressure nut	5182-3445
High sample volume septum kit Contains general purpose Merlin Microseal, six 23-gauge syringes, 500 vials and caps	5181-8839
Low Pressure Merlin Microseal (1-45 psi)	
Merlin Microseal kit, low pressure Includes nut and septum	5181-8816
Merlin Microseal kit, low pressure Includes nut and 2 septa	5181-8833
Merlin Microseal low pressure replacement septum	5181-8815
Microseal PTFE nut liners, 2/pk	5182-0853

(Continued)

Merlin Microseal

Description	Part No.
For Bruker/Varian GCs*	
Merlin microseal SPME kit, 1079 23 gauge, 1/p	392609901
Merlin Microseal adapter kit for 1177 inlets Contains adapter, nut and general purpose Merlin Microseal septum	392609903
Merlin microseal SPME replacement seal, 23GA, 1/pk	392609902
Syringes for Merlin Microseal	
Autosampler syringe Gold Standard, 5 µL, 23 gauge	9301-0892
Autosampler syringe, Gold Standard plunger, 10 µL, 23 gauge	9301-0713
Autosampler syringe, Blue Line, 5 µL, 23 gauge	G4513-80213
Autosampler syringe, Blue Line, 10 µL, 23 gauge	G4513-80209
Manual syringe, 5 µL, 23 gauge	5182-3438
Manual syringe, 10 µL, 23 gauge	5182-3439

*Varian GC systems are now Bruker products

TIPS & TOOLS

Agilent Blue Line autosampler syringes are specifically designed to support the higher productivity features of the 7693A ALS, while increasing plunger life and reducing costly downtime. Learn more at **www.agilent.com/chem/BlueLineSyringes**

Inlet Liners

Injection port liners have a variety of features to help vaporize the sample so that a true representation of the sample enters the column. Additionally, Agilent liners are individually packaged to maintain cleanliness until used. The part number and lot are silk screened on the liner for quality control and user convenience, and lot tracking is available for quality assurance.

Liner Dimensions Driven by Inlet Operation

Well-controlled glass dimensions promote better liner-to-liner consistency, ensuring GC system accuracy and reproducibility. That is why Agilent liners are made to the following precise tolerances:

Outer Diameter (OD)

- Larger od liners fit tightly to improve analyte recovery and limit sample migration onto the inlet's metal surface. Ideal for splitless injection.
- Smaller od liners are less resistant to carrier and split flow inside the inlet. Best for split injection.

Internal Diameter (ID)

- Ensures that the sample vapor is small enough to fit within the volume of the liner.
- Prevents backflash, sample loss into the septum purge, and split lines – all of which can lower reproducibility and sensitivity.

TIPS & TOOLS

Clearly Better Inertness

Confidently quantify active analytes with industry leading Ultra Inert GC solutions

- Agilent industry leading GC/MS instruments
- Ultra Inert columns
- Ultra Inert liners

To learn more and order your free poster, visit **www.agilent.com/chem/ultrainert**

Length

- Regulates internal volume and ensures proper sealing between the septum and the inlet seal.
- Precise glass bumps on the bottom of the liner allow you to repeatably position the liner relative to the inlet bottom. This is especially critical if you install liners by measuring the distance from the O-ring to the top of the liner.

Tapers

None	Bottom Tapers	Dual Tapers
• Straight tubes used in split injection with autosamplers	• Directs sample onto head of column and limits analyte exposure to bottom of inlet • Minimizes decomposition and discrimination	• Contain sample within glass liner limiting contact with metal inlet surface • Thought to limit loss through septum purge

Glass Wool

- Less molecular weight discrimination
- Provides additional surface area for sample vaporization, increasing reproducibility
- Serves as a trap for non-volatiles

For split liners, Agilent specifies the placement of glass wool in the liner so that the syringe penetrates the glass wool, wiping the syringe, to provide the most repeatable results with Agilent autosampler and split/splitless inlet design thermal profile.

Agilent Ultra Inert deactivated liners are recommended for samples with active analytes – such as phenols, amines, organic acids, pesticides and drugs of abuse – that could be irreversibly adsorbed on active surfaces in the inlet.

Deactivation

Developed for your high sensitivity analyses, Ultra Inert deactivation provides extreme surface inertness – even for liners containing glass wool. Agilent Original deactivation is recommended for your everyday analyses With use, even deactivated liners become active. Replace the liner regularly.

TIPS & TOOLS

Tight control of liner dimensions is critical to reproducibility of GC results.

Single taper, Ultra Inert Liner with glass wool, 5190-2293

Agilent Ultra Inert Liners

Agilent Ultra Inert Liners

Agilent Ultra Inert Liners are the perfect companion to Agilent J&W Ultra Inert GC columns. They provide reproducible inertness liner after liner, maintained through a sequence of samples, and for a range of analytes. Agilent's Ultra Inert Liners were developed – and are manufactured and certified – using a suite of tests specifically designed to ensure batch-to-batch uniformity.

- Exceptional batch-to-batch liner uniformity
- Low to no bleed or background contamination
- Superior coverage, allowing use of glass wool even with highly active compounds

Only Ultra Inert Liners are delivered in Agilent's exclusive touchless packaging with a pre-cleaned, conditioned and non-stick plasma treated O-ring pre-installed. Touchless packaging aids in removal of the old liner, and easy installation of the new, clean, preconditioned liner – without risk of contamination from touching.

Agilent Ultra Inert Liners

Description	Volume (µL)	ID (mm)	1/pk	5/pk	25/pk	100/pk*
Split Inlet Liners						
Low pressure drop, Ultra Inert Liner with glass wool	870	4	5190-2295	5190-3165	5190-3169	5190-3173
Straight, Ultra Inert Liner with glass wool	990	4	5190-2294	5190-3164	5190-3168	5190-3172
Splitless Inlet Liners						
Single taper, Ultra Inert Liner	900	4	5190-2292	5190-3162	5190-3166	5190-3170
Single taper, Ultra Inert Liner with glass wool	900	4	5190-2293	5190-3163	5190-3167	5190-3171
Splitless, double taper Ultra Inert Liner, no wool	800	4	5190-3983	5190-4007		
Dimpled, splitless, Ultra Inert Liner	200	2	5190-2297	5190-4006		
Straight, Ultra Inert Liner		1	5190-4047			
Straight Ultra Inert Liner for SPME		.75	5190-4048			

*The 100/pk is not in the Touchless packaging. O-rings must be purchased separately.

TIPS & TOOLS

Remove the risk of contamination with touchless packaging.

Ultra Inert Inlet Liners are delivered in exclusive Agilent touchless packaging with a pre-cleaned, conditioned, and non-stick plasma treated O-ring pre-installed. Now you can quickly and easily install the new, clean liner – without searching for the O-ring pack or risking contamination from touching.

View a demonstration of the touchless packaging at **www.agilent.com/chem/touchless**

Agilent Original Deactivation Split Liners

Agilent single taper split liners are made to strict dimension specifications for optimal inlet performance and feature the tightest tolerances for od, id, taper, and glass wool placement. For ease-of-use and reproducibility, some liners have a positioning bead, a restriction to secure the position of the glass wool, and a feature to consistently self-position to the recommended height. The liners also feature Agilent's Original proprietary deactivation.

TIPS & TOOLS

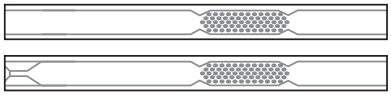
Agilent recommends part number 5190-2295 as the top split liner and for splitless injection UI part number 5190-2293

Agilent Original Deactivation Split Liners

Description	Volume (µL)	ID (mm)	1/pk	5/pk	25/pk	100/pk
Single Taper Split Liners						
Single taper, glass wool, deactivated, low pressure drop	870	4	5183-4647	5183-4701	5183-4702	5190-2275
Single taper, glass wool, deactivated	870	4	5183-4711	5183-4712	5183-4713	
Straight Split Liners						
Straight, glass wool, non-deactivated	990	4	19251-60540	5183-4691	5183-4692	
Focus Liners						
Deactivated with glass wool	935	4		210-4004-5		
Tapered, deactivated with glass wool	880	4		210-4022-5		

Single taper split liner, 5183-4647, 5183-4711

Straight split liner, 19251-60540



Focus liners, 210-4004-5, 210-4022-5

TIPS & TOOLS

To learn more about our comprehensive portfolio of Agilent CrossLab GC supplies – including our Agilent CrossLab original deactivation liners – go to **www.agilent.com/chem/CrossLab**

Agilent Original Deactivation Splitless Liners

Single taper splitless liner, 5181-3316, 5181-3316i

Single taper, glass wool splitless liner, 5062-3587

Double taper splitless liner, 5181-3315

Straight, non-deactivated, quartz splitless liner, 18740-80220, 5181-8818

Straight, non-deactivated splitless liner, 210-3003

Direct inject liner, 18740-80200

Agilent Splitless Liners

Description	Volume (µL)	ID (mm)	1/pk	5/pk	25/pk	100/pk
Single Taper Splitless Liners						
Single taper, deactivated	900	4	5181-3316	5183-4695	5183-4696	5190-2270
Single taper, inert	900	4	5181-3316i			
Single taper, glass wool, deactivated	900	4	5062-3587	5183-4693	5183-4694	5190-2271
Double Taper Splitless Liners						
Double taper, deactivated	800	4	5181-3315	5183-4705	5183-4706	5190-2272
Straight Splitless Liners						
Straight, deactivated, quartz	250	2	5181-8818	5183-4703	5183-4704	
Straight, non-deactivated, quartz	250	2	18740-80220	5183-4707	5183-4708	
Straight, non-deactivated	990	4	210-3003	210-3003-5		
Direct Inlet Liners						
Straight, non-deactivated (for gas samples, headspace, or purge & trap)	140	1.5	18740-80200	5183-4709	5183-4710	

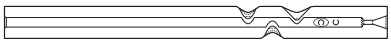
TIPS & TOOLS

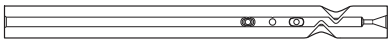
Need inlet liners and O-rings for your non-Agilent instruments? Check out the Agilent CrossLab inlet liners. See pages 140-141.

Agilent Specialty Injection Liners

MultiMode Inlet Heavy Matrix

Description	Volume (µL)	ID (mm)	1/pk	5/pk	25/pk
Dimpled					
Dimpled splitless single taper, deactivated	200	2	5190-2296		
Ultra Inert Deactivated Dimpled liners					
Dimpled, splitless, Ultra Inert Liner	200	2	5190-2297	5190-4006	
Manual Injection					
Straight, with cup (for manual injections)	800	4	18740-80190	5183-4699	5183-4700
Straight split liner with cup, glass wool, and packing, 18740-60840	800	4	18740-60840	5183-4697	5183-4698
	800	4			
	800	4			
Straight, with cup (for manual injections)	800	4			
SPME					
SPME, deactivated	70	0.75	5188-6471		
SPME, Ultra Inert deactivation	70	0.75	5190-4048		
Volatiles					
Volatiles Organic Analysis liner	1		5190-4047		





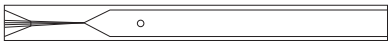
Single taper dimpled splitless liner, 5190-2296, 5190-2297

Straight split liner with cup, glass wool, and packing, 18740-60840

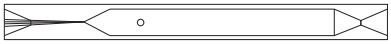
Programmed Temperature Vaporization (PTV) Liners

Description	Volume (µL)	ID (mm)	Part No.
PTV Liners			
PTV liner, single baffle, glass wool, deactivated	180	2	5183-2038
PTV liner, single baffle, deactivated	200	2	5183-2036
PTV liner, multi baffled, deactivated	150	1.8	5183-2037
PTV liner, sintered glass, deactivated	112	1.5	5190-1426
Liners for High Temperature PTV Inlet, G3506A			
PTV liner, high temperature, quartz	713	3.4	5188-5313
PTV liner, high temperature, borosilicate	668	3.4	5188-5356

Direct Connect



Single taper direct connect liner, G1544-80730



Dual taper direct connect liner, G1544-80700

Description	ID (mm)	Part No.
Direct Connect		
Direct column connect	4	G1544-80730
Dual taper direct connect liner, splitless, Agilent proprietary deactivation	4	G1544-80700
Single taper direct connect liner, splitless, deactivated, inert	4	G1544-80731

Liner O-Rings

Liner O-rings, 5190-2269

- Liners are sealed in the inlet with O-rings or graphite seals
- Graphite seals are used when inlet temperatures exceed 350 °C
- Fluorocarbon O-ring seals are easier to replace than graphite that deforms and flakes apart

Only Agilent Fluorocarbon Liner O-rings are:

- Pre-cleaned, then conditioned to eliminate out-gassing of contaminants, which is especially important for trace, ECD and MSD analyses
- Plasma treated for a non-stick, contaminant-free surface that won't stick to the inlet metal surface
- Packaged for convenience and cleanliness in a novel dial package that delivers 1 clean O-ring at a time

Liner O-Rings

Description	Unit	Part No.
Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
	100/pk	5190-2269
Graphite O-ring for splitless liner	10/pk	5180-4173
Graphite O-ring for split liner	10/pk	5180-4168
Non-stick fluorocarbon liner O-ring for Flip Top	10/pk	5188-5366
	100/pk	5190-2268
High temperature PTV inlet liner fluorocarbon O-ring	10/pk	5188-5311

TIPS & TOOLS

Agilent's Ultra Inert GC liners are delivered in Touchless packaging with a certified, non-stick O-ring pre-installed. See page 24.

Capillary Column Ferrules and Nuts

Using the wrong ferrule or a worn-out ferrule to seal your column connection can result in inconsistent and unreliable chromatography. An improper ferrule can cause leaks, which allow air and other contaminants to enter the instrument through the column seal, causing major interference with column and detector performance.

For optimum performance, ferrules should be replaced every time the column is replaced and when performing column maintenance.

To minimize problems, follow these general techniques for ferrule installation:

- Don't overtighten – finger tighten the column nut, then use wrench to tighten
- Maintain cleanliness
- Bake out ferrules prior to use (Vespel and Vespel/Graphite only)
- Avoid contamination, such as fingerprint oils
- Inspect used ferrules with magnifier for cracks, chips, or other damage before reusing them
- Change ferrules when new columns or injector/detector parts are installed

Vespel/Graphite ferrules, 5181-3323

Caution: Agilent capillary column ferrules are manufactured to tolerances specific for Agilent J&W HP and DB brand columns. Fused silica tubing used for Agilent J&W VF columns has slightly different tolerances for the outer diameter. Turn to pages 32-33.

Ferrule Selection Recommendations

Ferrule Type	Upper Temp. Limit	Usages	Advantages	Limitations
Graphite (100%)	450 °C	• General purpose for capillary columns • Suitable for FID and NPD • Recommended for high temperature and cool on-column applications	• Easy-to-use stable seal • Higher temperature limit • Can be removed easily	• Not for MS or oxygen-sensitive detectors • Soft, easily deformed or destroyed • Possible system contamination
Vespel/Graphite (85%/15%)	350 °C	• General purpose for capillary columns • Recommended for MS and oxygen-sensitive detectors • Most reliable leak-free connection	• Mechanically robust • Long lifetime	• Not reusable • Flows at elevated temperature • Must re-tighten frequently
Vespel (100%)	280 °C	• Isothermal operation • Can be reused or removed easily • Excellent sealing material when making metal or glass connections	• Mechanically robust • Long lifetime • Can be reused or removed easily	• Leaks after temperature cycle • Flows at elevated temperature • Must re-tighten frequently

TIPS & TOOLS

Look for the following signals that indicate ferrule damage:

- Background noise from oxygen diffusing into the system
- Column bleed catalyzed by oxygen
- Sample degradation
- Sample loss
- Increase in detector signal/noise
- Poor retention time reproducibility

Short and Long Ferrules

Short Ferrules (height 3 mm)

Vespel/Graphite ferrules, 5181-3323

Universal column nut, 5181-8830

Standard fitting for Agilent GC inlet and detectors (FID, NPD, ECD) column connections use short ferrules and the Universal nut

Long Ferrules (height 3.6 mm)

Pre-conditioned long ferrule for MSD connection, 5062-3508

MS interface column nut, 05988-20066

Pre-conditioned graphite/vespel ferrules are recommened with MSD Interface nut

Column nut for long or long two-hole ferrules, 05921-21170

Alternative nut for Agilent standard inlet or detector fittings used with long graphite/vespel ferrules

TIPS & TOOLS

100% Vespel ferrules should only be used for isothermal applications.

Capillary Column Ferrules – for use with the most brands of column, including DB and HP columns

Column ID (mm)	Ferrule Nom ID	Graphite Ferrule Short Part No.	Vespel Short Ferrule Part No.	85% Vespel/15% Graphite Short Ferrule Part No.	Pre-Conditioned Long Ferrule 85% Graphite/15% Vespel for MSD connection
0.1-0.25	0.4	500-2114	5181-3322	5181-3323	5062-3508
0.32	0.5	5080-8853	5062-3513	5062-3514	5062-3506
0.45	0.8	500-2118	5062-3511	5062-3512	5062-3538
0.53	0.8	500-2118	5062-3511	5062-3512	5062-3538
No hole				5190-4054	5181-3308

Capillary Column Ferrules – for use with CP, VF and Select columns

Column ID (mm)	Factor 4, Select and CP Column Brands	Ferrule Nom ID	Graphite Ferrule Short Part No.	Vespel Ferrule Short Part No.	85% Vespel/ 15% Graphite Short Ferrule	Pre-Conditioned Long Ferrule 85% Graphite/15% Vespel for MSD*
0.025-0.05	CP, VF, Select	0.4	500-2114	5062-3515	5062-3516	5062-3507
0.075	CP, VF, Select	0.4	500-2114	5062-3515	5062-3516	5062-3507
0.1-0.25	CP, VF, Select	0.5	5080-8853	5062-3513	5062-3514	5062-3508
0.32	CP, VF, Select	0.5	5080-8853	5062-3513	5062-3514	5062-3508
	CP-silica PLOT	0.8	500-2118	5062-3511	5062-3512	5062-3538
0.53	CP, VF, Select	0.8	500-2118	5062-3511	5062-3512	5062-3538
No hole					5190-4054	5181-3308

*These ferrules are recommended for GC/MS

For additional capillary column ferrule selection, please refer to our CrossLab portfolio.Turn to page 143.

Vespel ferrule, 5181-3322

Graphite ferrules, 5080-8853

Vespel/Graphite ferrule, 5062-3514

Universal column nut, 5181-8830

MS interface column nut, 05988-20066

Column Nuts

Description	Part No.
Short Nuts	
Universal column nut, 1/16 in hex, 2/pk	5181-8830
Finger tight column nut for 530 µm columns*	5020-8293
Finger tight column nut for 320 µm columns and smaller*	5020-8292
Blanking plug, finger tight style	5020-8294
6850 column nut, 2/pk	5183-4732
Extended column nut, VI inlet	G3504-20504
High Temperature SimDis PTV inlet, 4 mm hex	5188-5312
Long Nuts	
MS interface column nut, female	05988-20066
Column nut for long or long two-hole ferrules	05921-21170
Accessories	
Open end wrench, 1/4 and 5/16 in	8710-0510

*For use with graphite ferrules only

Specialty Ferrules, 85% Vespel/15% Graphite

Ferrule ID (mm)	Column ID (mm)	Unit	Part No.
Two Hole			
0.5	0.1	10/pk	5181-3388
0.5	0.10.20.25	10/pk	5062-3580
0.5	0.32	10/pk	5062-3581
No Hole			
Capillary column long ferrule		10/pk	5181-3308
Capillary column short ferrule		10/pk	5190-4054
High Temperature PTV Inlet SS/Graphite			
0.4	0.32	10/pk	5188-5315
0.4	0.53	10/pk	5188-5314

Straight Ferrules

Description	Unit	Part No.
1/4 in PTFE	10/pk	0100-1378
1/4 in Graphite	10/pk	0100-1324
1/8 in PTFE	10/pk	0100-1365
1/8 in Graphite	10/pk	0100-1325
1/8 in 85% Vespel/15% Graphite	10/pk	0100-1332
1/16 in PTFE	10/pk	0100-1375
1/16 in Graphite	10/pk	0100-1326
1/16 in VG-2 Vespel, 40% Graphite	10/pk	0100-1379
6.4 mm Vespel		0100-1104
1/4 in 85% Vespel/15% Graphite	10/pk	0100-1331

1/8 in 85% Vespel/15% Graphite, 0100-1332

Reducing Ferrules

Description	Unit	Part No.
1/8 to 1/16 in Vespel	10/pk	0100-1342
1/8 to 1/16 in VG-1 Vespel, 15% Graphite	10/pk	0100-1344
1/16 in to 0.4 mm VG-2 Vespel, 40% Graphite	10/pk	0100-1381

Ferrules for LTM Rapid Heating/Cooling System

Description	Original Design (5/pk)	2010+ Siltite/ Ultimate Union (10/pk)
For use with 0.25-0.4 mm id LTM columns	5190-1437	5188-5361
For use with 0.4-0.5 mm id LTM columns	5190-1438	5188-5362
For use with 0.5-0.8 mm id LTM columns	5190-1439	5188-5363

Ferrules and Nuts for NCD and SCD

Description	Part No.
Spare column nut and ferrule kit	G6600-80018

Capillary Flow Technology Supplies

Agilent offers a family of GC accessories based on our proprietary Capillary Flow Technology. These accessories increase system productivity and performance:

- Deans Switch device simplifies the analysis of complex samples
- Purged Effluent Splitter for inert, leak-free column effluent splitting

Ultimate Union

Ultimate Union

The Ultimate Union is part of Agilent's Capillary Flow Technology family, providing extremely low dead volume column connections. Like the QuickSwap, Deans Switch and Purged Effluent Splitter, the Ultimate Union uses special fittings and SilTite ferrules to create an inert, leak-free and robust seal that doesn't need re-tightening after temperature cycles.

Each Agilent Ultimate Union kit contains:

- 1 Union (your choice of deactivated or non-deactivated)
- 2 Internal nuts
- 1 Swaging nut
- 1 Oven wall clip

Ultimate Union Kits, Fittings and Ferrules

Description	Part No.
Ultimate union kit, deactivated	G3182-61580
Ultimate union kit, non-deactivated	G3182-61581

Fittings, Ferrules and Supplies

For leak-free, low dead volume and inert column connections with capillary flow accessories, such as the Deans Switch or QuickSwap MS Interface, use SilTite ferrules and specified nuts. For Capillary Flow devices, use deactivated fused silica tubing. Do not use tubing that has been coated with stationary phase.

Fittings, Ferrules and Supplies

Description	Unit	Part No.
Internal nut		G2855-20530
Swaging nut		G2855-20555
Tee, inert		G3184-60065
Column storage fitting		G2855-20590
SilTite metal ferrules, 0.10-0.25 mm id capillary columns	10/pk	5188-5361
SilTite metal ferrules, 0.32 mm id capillary columns	10/pk	5188-5362
SilTite metal ferrules, 0.53 mm id capillary columns	10/pk	5188-5363
Ferrule pre-swaging tool		G2855-60200

Internal nut, G2855-20530

Tee, inert, G3184-60065

Column/Retention Gap Installation Supplies

Description	Part No.
250 µm retention gap, one 5 m piece	160-2255-5
320 µm retention gap, one 5 m piece	160-2325-5
530 µm retention gap, 5 m length	160-2535-5
Fused silica, deactivated, 0.15 mm x 1 m	160-2625-1
Fused silica, deactivated, 0.15 mm x 5 m	160-2625-5
Fused silica, deactivated, 0.15 mm x 10 m	160-2625-10

Press-fit Capillary Column Connectors

Glass press-fit connections

In the past it was necessary to use press-fit connectors with specific dimensions to connect columns of those dimensions. Modern press-fit connectors are "laser-milled" to provide highly reproducible taper angles throughout the length of the press-fit, ensuring an excellent seal. Now the only choice you have to make is between a glass union for standard applications, and fused silica unions or deactivated quartz unions for applications demanding maximum inertness.

Glass and Fused Silica Press-fit Connectors

Description	Unit	Part No.
Glass union, universal, 2-way	25/pk	705-0825
Fused silica union, universal, 2-way	5/pk	705-0905
Fused silica union, universal, 2-way	25/pk	705-0925
Fused silica union, universal, 3-way		705-0903
Polymide sealing resin, 5 g		500-1200

Quartz splitter

Quartz Press-fit Connectors/Splitters

Description	Unit	Part No.
Quartz column connector, 0.1 to 0.53 mm	5/pk	5181-3395
Deactivated quartz column connector	5/pk	5181-3396
Quartz splitter		5181-3397
Quartz deactivated splitter		5181-3398

Graphpak Capillary Column Connectors (2.5 mm)*

Column ID (mm)	Connector ID (mm)	Part No.
Capillary Detector Port Connector		
0.32/0.25	0.4	5021-7166
0.53	0.7	5021-7164
Capillary Divider for Simultaneous Sampling		
0.32/0.25	0.53	5021-7148
0.53	0.7	5021-7146
Capillary Injection Port Connector		
0.2	0.3	5021-7169
0.32/0.25	0.4	5021-7170
0.53	0.7	5021-7168

*The 2.5 mm Graphpak is not compatible with the Graphpak 2M used for the PTV.

Graphpak connector for Agilent capillary detectors

Graphpak divider for simultaneous sampling

Note: Order ferrules in addition to the connector to fit your column. Ferrules must be ordered separately.

Ferrules for Connectors

Column ID (mm)	ID (mm)	Unit	Part No.
0.2	0.3	10/pk	5021-7136
0.32/0.25	0.4	10/pk	5021-7137
0.53	0.7	10/pk	5021-7134
Graphpak plug ferrule		10/pk	5021-7133
Replacement Graphpak column nut		5/pk	5062-3525

Capillary injection port connector, 5021-7170

Valves and Loops

General purpose gas sampling valves

Gas Sampling General Purpose Valves

Description	Part No.
6-port replacement valve WE series, 400 psi, 225 °C	5062-9508
6-port replacement valve WE series, Hastelloy C, 400 psi, 225 °C	5062-9509
10-port replacement valve WE series, 400 psi, 225 °C	5062-9510
10-port replacement valve WE series, Hastelloy C, 400 psi, 225 °C	5062-9511
6-port replacement valve WT series, 300 psi, 350 °C	0101-0584
10-port replacement valve WT series, 300 psi, 350 °C	0101-0585

General purpose liquid sampling valves

Liquid Sampling General Purpose Valves

Description	Part No.
0.2 µL replacement valve UWP series, 1,000 psi, 175 °C	0101-0636
0.5 µL replacement valve UWP series, 1,000 psi, 175 °C	0101-0637
1.0 µL replacement valve UWP series, 1,000 psi, 175 °C	0101-0638
0.5 µL replacement valve UWP series, 5,000 psi, 75 °C	0101-0639

Replacement Rotors for Gas Sampling Valves

Description	Part No.
6-port replacement rotor WE series, 400 psi, 225 °C	5181-7459
10-port replacement rotor WE series, 400 psi, 225 °C	5181-7460
6-port valve, replacement rotor, WT series, 300 psi, 350 °C	1535-4952
10-port replacement rotor WT series, 300 psi, 350 °C	1535-4954

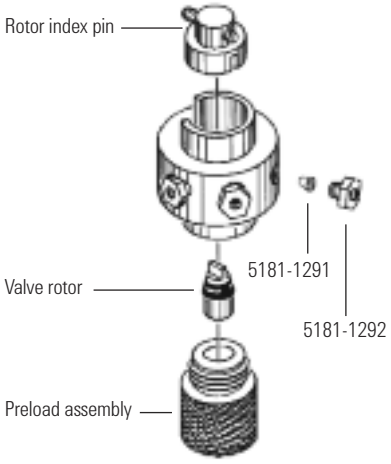
Valve Supplies

Description	Part No.
1/16 in stainless steel nut	5181-1291
1/16 in front ferrule, stainless steel	5181-1292
Straight metering valve, 1/16 in, stainless steel, for LSVs as a sample-out restrictor or as a flow-balancer for 10-100 mL/min	0101-0355
Micrometering valve, for flow balancing gas flows of 2-50 mL/min	0101-0633
Air actuator	19325-60660
Angle metering valve, 1/16 in, stainless steel	0101-0403
7 µm gas line filter	0101-0532

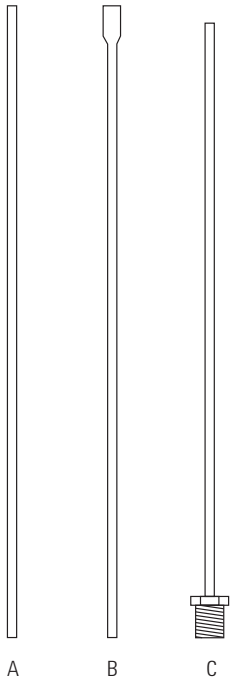
Front ferrules, stainless steel, 5181-1292

Valve Column Connections

Description	Part No.
1/16 in Tube Assembly, inert (50 cm, 0.010 in id)	G1580-60060
1/16 in Tube Assembly, non-inert (50 cm, 0.010 in id)	G1580-80060
1/16 in Tube Assembly, inert (50 cm, 0.020 in id)	G1580-60062
1/16 in Tube Assembly, non-inert (50 cm, 0.020 in id)	G1580-80062
Swaging nut	G2855-20555
Internal nut	G2855-20530
Hex nut, 5/16 in-20	2950-0232
Nut Plate Assembly	05890-80660
Ferrule pre-swaging tool	G2855-60200
SilTite metal ferrules, 0.10-0.25 mm id capillary columns	5188-5361
SilTite metal ferrules, 0.32 mm id capillary columns	5188-5362
SilTite metal ferrules, 0.53 mm id capillary columns	5188-5363



Valve body, disassembled



Valve Loops for GC
(Includes loop, nut and ferrule, 1/16 in)

Description	Part No.
Sample loop, 0.25 cc	0101-0303
Sample loop, 0.50 cc	0101-0282
Sample loop, 1.00 cc	0101-0299
Sample loop, 2.00 cc	0101-0300
Sample loop, 5.00 cc	0101-0301
Sample loop, 10.00 cc	0101-0302

Valve Supplies for GC

Description	Part No.
A. Tube, 1/16 in stainless steel, 280 mm long	18900-20250
Tube, 1/16 in stainless steel, 400 mm long	18900-20280
Tube, 1/16 in stainless steel, 375 mm long	18900-20281
Tube, 1/16 in stainless steel, 560 mm long	18900-20300
B. Tube, 1/16 in with 1/8 in flare, stainless steel, 360 mm long	1530-2163
Tube, 1/16 in with 1/8 in flare, stainless steel, 520 mm long	1530-2167
C. Tube, 1/16 in with 1/8 in bulkhead fitting, 520 mm long	07675-80050
Tube, 1/16 in with 1/8 in bulkhead fitting, nickel, 460 mm long	18900-80255

Sample Introduction Systems

7693A Automatic Liquid Sampler Replacement Parts and Supplies

To support the higher productivity, performance, and flexibility offered by the 7693A ALS, Agilent has expanded its supplies offering. Agilent Blue Line autosampler syringes are specifically designed to support the 7693A, while increasing plunger life and reducing costly downtime. For cost-conscious laboratories, economical shell vials and caps provide quality at an attractive price. Additional accessories, such as color-coded sample trays and vial caps, add to system ease-of-use.

7693A Automatic Liquid Sampler

7693A Replacement Parts and Supplies

Description	Unit	Part No.
Gripper finger caps	16/pk	G4514-60710
Injector mounting post		G4513-20561
Dual parking post for autosampler		05890-61525
Needle support insert, standard		G4513-40525
Needle support insert, on-column		G4513-40529
Vial rack, set of 3, Includes 3 white label tags		G4514-67505
Vial rack label kit		G4525-60701
Vial rack label kit, red	3/pk	G4525-60702
Vial rack label kit, yellow	3/pk	G4525-60703
Vial rack label kit, green	3/pk	G4525-60704

Wash Vials (also for standards, diluents)

Description	Unit	Part No.
4 mL wash vials with fill markings and caps	25/pk	5182-0551
Diffusion caps for 4 mL vials	12/pk	07673-40180
Septa for 4 mL vials*	144/pk	9301-1031
4 mL wash vial with screw caps	144/pk	9301-0723

*Septa for 4 mL vials should only be used for sample storage

Automatic Liquid Sampler Supplies

Automatic Liquid Sampler Supplies

Description	Part No.
Screw for mounting syringe	07673-20570
Quadrant tray (4 tray sections)	18596-40015
7673 Basic Supply Kit Contains 10 µL syringes (6/ea), 23/26 gauge needles, 4 mL vials with diffusion caps (144/pk), 2 mL automatic sampler vials with screw caps (1,000/pk), GC septa (25/pk), vial racks (5/pk)	07673-60840

Bar Code Reader Labels

Description	Part No.
Labels numbered (1,000/roll)	
1 to 1,000	5958-9450
1,001 to 2,000	5958-9441
2,001 to 3,000	5958-9442
3,001 to 4,000	5958-9443
4,001 to 5,000	5958-9444
5,001 to 6,000	5958-9445

7697A Headspace Sampler Supplies

The new 7697A Headspace Sampler from Agilent utilizes advanced designs based on our industry-leading gas chromatography architecture. The headspace sampling technique allows introduction of volatile compounds to the GC or GC/MS from virtually any sample matrix, while leaving unwanted components in a disposable sample vial. With up to 111 sample vial positions and removable vial racks, the 7697A supports nearly continuous operation to satisfy even the busiest laboratory.

- Built-in legendary Agilent pneumatics for superior control and easier setup
- Proven valve and loop sampling technology
- Fully-automatic sample vial leak checking and available bar code reader help ensure greater confidence in results method compatibility
- Instrument control software that is fully integrated in Agilent data systems
- Resource conserving programmable instrument scheduler

7697A Headspace Sampler

7697A Headspace Replacement Parts and Supplies

Description	Part No.
Tray vial racks	G4556-60019
Vial rack label	G4556-90500
Universal/external split vent trap with 3 cartridges, 1/8 in Swagelok fitting	RDT-1020
Leak test kit Includes instruction sheet, no-hole ferrule, 1/8 in nylon tube fitting plug, headspace leak test vial, 1/16 in stainless steel ZDV plug, 11 mm low bleed septa (5/pk)	G4556-67010
Sample probe, deactivated SN 1030	G4556-60690
Sample probe, deactivated SN 2000	G4556-60125
6-port valve, replacement rotor, WT series, 300 psi, 350 °C	1535-4952

TIPS & TOOLS

The transfer line heater assembly is 1 m in length and accommodates the following tubing types:

- Fused silica capillary of 0.25 mm, 0.32 mm, and 0.53 mm id with maximum od of 0.67 mm
- Metal capillary of 0.53 mm id, such as Agilent UltiMetal or ProSteel, with maximum od of 0.67 mm

For one transfer line, a piece of fused silica or ProSteel approximately 1 m in length is required in addition to one ferrule and one nut and reducing union. Order a ProSteel sleeve to protect the transfer line when operating above 200 °C. ProSteel operated above 200 °C in the transfer line without the sleeve can permanently bind to the heated conduit tube.

7697A Headspace Sampler

7697A Headspace Replacement Parts and Supplies

Description	Part No.
Tray vial racks	G4556-60019
Vial rack label	G4556-90500
Universal/external split vent trap with 3 cartridges, 1/8 in Swagelok fitting	RDT-1020
Leak test kit Includes instruction sheet, no-hole ferrule, 1/8 in nylon tube fitting plug, headspace leak test vial, 1/16 in stainless steel ZDV plug, 11 mm low bleed septa (5/pk)	G4556-67010
Sample probe, deactivated SN 1030	G4556-60690
Sample probe, deactivated SN 2000	G4556-60125
6-port valve, replacement rotor, WT series, 300 psi, 350 °C	1535-4952
Transfer Line Components	
Deactivated fused silica, 5 m length	
0.25 mm	160-2255-5
0.32 mm	160-2325-5
0.45 mm	160-2455-5
0.53 mm	160-2535-5
ProSteel deactivated stainless steel, 5 m length	
0.53 mm	160-4535-5
Polyimide sleeve for ProSteel	4177-0607
Polyimide, Valcon ferrule, 5/pk	
Ferrule, low thermal mass, column id 320 µm, 0.5 mm id, 5/pk	5190-1438
Ferrule, low thermal mass, column id up to 250 µm, 0.4 mm id, 5/pk	5190-1437
Nut and reducing union for 6 port valve and transfer line connection	0100-2594
Septum nut, transfer line, split/splitless and multimode inlets	G3452-60835

G3520A XLSI Accessory Supplies

Description	Part No.
G3520A XLSI Accessory kit	G3520-67001
Ceramic wafer column cutter	5181-8836
Transfer line nut fitting	G3520-20210
Column storage fitting	G2855-20590
Magnifier, 3x, 6x, paddle, plastic	G2855-40001
Plug for microfluidic manifold or unions	G2855-60570
Ferrule pre-swaging tool	G2855-60200

Sampling Loops

Description	Part No.
Sampling Loops, SN 2000	
Sample loop, 0.025 mL	G4556-80101
Sample loop, 0.05 mL	G4556-80102
Sample loop, 0.10 mL	G4556-80103
Sample loop, 0.50 mL	G4556-80105
Sample loop, 1.00 mL	G4556-80106
Sample loop, 5.00 mL	G4556-80109
Sample loop, 3.00 mL	G4556-80108
Certified Sample Loops*	
Certified sample loop, 1.00 mL	G4556-80126
Certified sample loop, 3.00 mL	G4556-80128
Sampling Loops, SN 1030	
Sample loop, 0.025 mL	G4556-80111
Sample loop, 0.05 mL	G4556-80112
Sample loop, 0.10 mL	G4556-80113
Sample loop, 0.50 mL	G4556-80115
Sample loop, 1.00 mL	G4556-80116
Sample loop, 3.00 mL	G4556-80118
Sample loop, 5.00 mL	G4556-80119

*Certified sample loops are validated by Micro Precision Calibration, Inc and come with a calibration certificate. Loops can be recertified yearly by contacting Micro Precision directly at +1 (530) 268 1860.

Vials and Caps for 7697A

Description	Unit	Part No.
Vial kit 20 mL Headspace crimp top, flat bottom vials, silver aluminum one-piece crimp caps with safety feature, PTFE/white silicone septa	100/pk	5182-0840
Headspace crimp top, flat bottom vials, 10 mL	100/pk	5182-0838
Headspace crimp top, flat bottom vials, 20 mL	100/pk	5182-0837
Silver aluminum crimp caps with 20 mm, PTFE/silicone septa	100/pk	5183-4477
20 mm electronic crimper		5062-0208
Ergonomic manual crimper for 20 mm caps		5040-4669

Certified headspace crimp top vials, 5182-0837

Aluminum crimp caps, 5183-4477

Manual crimper and decapper, 5040-4669

G1888A Network Headspace Sampler Supplies

Description	Part No.
Stainless Steel Sample Loops	
Certified sample loop, 1 mL, deactivated	5190-2265
Certified sample loop, 3 mL, deactivated	5190-2266
Sample loop, 1 mL, deactivated	2321700003
Sample loop, 3 mL, deactivated	2321700004
Probes and Unions	
Sample probe, deactivated	2322700011
M6 union, brass	2302533140
Union, zero dead volume, deactivated	2307230001
Union	2307232901
Transfer Line Needles and Unions	
Needle only, headspace transfer line, deactivated 0.5 mm od	2322590004
Needle only, headspace transfer line, deactivated 0.7 mm od	2322590005
Strain relief septum nut	6410090050
Tubing	
Tubing, solenoids to 6-port valve, deactivated	0410105017
Tubing, probe to 6-port valve, deactivated	1300502506
Standards	
OQ/PV Headspace Sample Contains 0.2-0.3% t-butyl disulfide, 1,2-dichlorobenzene, and nitrobenzene in ethanol	5182-9733
PM Kits	
G1888A PM kit with 1 mL loop	G1888-60702
G1888A PM kit with 3 mL loop	G1888-60703
G1888A enhanced PM kit	G1888-60704

G1888A Headspace unit

G1883A Network Headspace Supplies

Description	Part No.
Needles	
Needle only, headspace transfer line, deactivated 0.5 mm od	2322590004
Needle for transfer line, 0.25 mm id, 0.5 mm od, nickel	301-016-HSP
Needle only, headspace transfer line, deactivated 0.7 mm od	2322590005
Needle for transfer line, 0.4 mm id, 0.8 mm od, nickel	301-015-HSP
Needle assembly vial probe, deactivated	232-2790012-EHS
Needle assembly vial probe, nickel	232-2790010-EHS
Fittings	
Union elbow M5	998-0000053-EHS
Transfer line nut	19258-20830
Transfer line ferrule	19258-20870
Union FF 6MB, 5-piece set	325-062-HSP
Union T6 MB, 5-piece set, brass	325-132-HSP
Union T5 MA	325-185-HSP
Valves	
Restrictor, stainless steel	321-002-HSP
Valve, solenoid vent Kalrez	3600500001
Valve, solenoid vial pressurization	3600500002
Tubing and Transfer Lines	
Sample loop, 1 mL, deactivated	2321700003
Sample loop, 1 mL, nickel	321-055-HSP
Sample loop, 3 mL, deactivated	2321700004
Sample loop, 3 mL, nickel	321-056-HSP
Oven adaptor for 10 mL vials	301-017-HSP
Tube, needle, 6-port valve, deactivated	301-212-HSP
Tube, needle, 6-port valve, nickel	301-169-HSP
Tube, vent-valve stainless steel	301-170-HSP
Sensor tube, 125 mm PTFE	321-057-HSP
Transfer line, deactivated, 1 m	301-211-HSP
Transfer line, 1 m, nickel	301-152-HSP
Transfer line, 80 cm, nickel	301-011-HSP
Repair, Leak Test, and OQ/PV Supplies	
Strain relief septum nut	301-205-HSP
Headspace leak test kit	G1888-60701
OQ/PV Headspace Sample	5182-9733

Teledyne Tekmar Purge and Trap Supplies

Stratum PTC Sample Concentrator

Glassware for Teledyne Tekmar Purge and Trap Concentrators, 1/2 in Mount

Description	Part No.
5 mL frit sparger (glassware only)	5182-0852
5 mL frit sparger kit with fittings	5182-0846
25 mL frit sparger (glassware only)	5182-0851
25 mL frit sparger kit with fittings	5182-0845
5 mL fritless sparger (glassware only)	5182-0850
5 mL fritless sparger kit with fittings	5182-0844
25 mL fritless sparger (glassware only)	5182-0849
25 mL fritless sparger kit with fittings	5182-0796
5 mL needle sparger (glassware only)	5182-0848
5 mL needle sparger kit	5182-0795
25 mL needle sparger (glassware only)	5182-0847
25 mL needle sparger kit	5182-0794

Traps for Teledyne Tekmar Stratum and Atomx Purge and Trap Concentrator

Description	Part No.
Trap, BTEX + MTBE	5188-8813
Trap #5, OV-1/Tenax/Silica Gel/Charcoal	5188-8814
Trap #8, Carbopak B/Carbosieve S-III	5188-8815
Trap #9, Proprietary	5188-8816
Trap, Tenax/Silica Gel/Carbosieve S-III	5188-8817
Strat-Trap, Tenax/Silica Gel, #2	5188-8818
Strat-Trap, Tenax/Silica Gel/Charcoal, #3	5188-8819
Strat-Trap, OV-1/Tenax, #7	5190-1445
Strat-Trap, Tenax, #1	5190-1446
Trap, VOCARB 3000	5188-8820
Trap, VOCARB 4000	5188-8821
Trap, BTEX	5188-8822
Trap, Tenax	5188-1447
Trap, VPH	5188-1448

Stratum and Atomx traps are U-shaped

Trap, BTEX + MTBE, 5188-8813

Atomx VOC Autosampler Supplies

Description	Part No.
Antifoam agent, Antifoam 1520, 10 mL	5190-2235
Syringe with side port, 27 mL	5190-2234
Vessel, amber IS, 15 mL	5190-2233
Frit sparge glassware kit, 25 mL	5190-2232
Fritless sparge glassware kit, 25 mL	5190-2231

Atomx Purge and Trap Concentrator

Traps for Teledyne Tekmar Velocity Purge and Trap Concentrator

Description	Part No.
Trap, Vocarb 3000 (K Trap)	5182-0775
Trap, Vocarb 4000 (I Trap)	5182-0774
Trap, Tenax (A Trap)	5182-0783
Trap, Tenax/Silica Gel/Charcoal (C Trap)	5182-0781
Trap, BTEX	5182-0773
DryFlow moisture trap	14-8911-003

Velocity traps are straight

TIPS & TOOLS

Compared to a frit sparger, the fritless sparger may be the better choice when a water sample has a tendency to foam. This sparger is not appropriate for soil samples, which tend to clog the capillary tube.

Agilent ARCHON Purge and Trap Autosampler

Agilent ARCHON Purge and Trap Autosampler with removable tray

ARCHON removable 51 position sample tray

Archon Purge and Trap Supplies

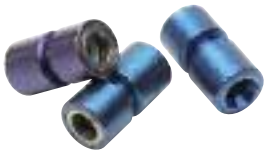
Description	Part No.
Vial kit, 40 mL, precleaned vials, caps, and septa, 72/pk	5183-4741
Bottle without cap, 80 oz.	DY50390600
22 mm septa, PTFE/silicone, 72/pk	5190-3978
22 mm septa, EPA lowbleed, 60/pk	5190-3976
Syringe mount O-ring	DY50549500
Water probe replacement kit, for S/N above 995	DY50573990
Sparge probe replacement kit, for S/N above 13160	DY70007791
Sparge probe replacement kit, for S/N 995-13160	DY50574190
Sparge probe replacement kit, for S/N below 995	DY50549290
Standard reservoir	DY50548400
Water transfer line	DY50551400
I.S. pickup/waste lines	DY70001990
Soil transfer line	DY50574500
75-micron screen for water probe	DY50559800
Water probe, cleaned, for S/N 695-995	DY50549100
Sparge probe cleaned, for S/N above 13160	DY70007701
10-micron soil probe frit	DY50559900
Valco rotor loop, 1 µL	DY50572600
Flangeless nuts and ferrules, 8/pk	DY70008101
PTFE stir bar for 40 mL vials	DY50295500
Spin bar for soil vial	DY50402400
Stir magnet	DY50546100
Valco valve and actuator	DY50540700
Glass barrel with decal, 26 mL	DY50296800
Kit, chiller option, field	DY70008590

Markes Thermal Desorption

Agilent now offers a comprehensive line of supplies for Markes Thermal Desorption (TD) instrumentation. Thermal desorption allows the introduction of volatile and semivolatile compounds from a wide range of sample matrices, directly into a GC or GC/MS.

Markes Thermal Desorption system

Sampling tube, MKI-UTD-5105



Silcosteel Difflok cap, MKI-MTD-1204

Markes Thermal Desorption Supplies

Description	Unit	Part No.
O-rings, Markes 7 mm cold trap seals	10/pk	MKI-U-COV07
O-rings, Markes 6 mm cold trap seals	10/pk	MKI-U-COV06
PTFE filter disks, 5.1 mm Markes TD	10/pk	MKI-U-DISK1
PTFE filter disks, 6.3 mm Markes TD	10/pk	MKI-U-DISK3
Spare general purpose carbon cold trap		MKI-U-T11GPC
Sampling tube, Tenax TA, Markes Unity		MKI-UTD-5105
Quick fit connectors, Markes Unity	10/pk	MKI-C-QSC10
Stainless steel Difflok cap, Markes Unity	10/pk	MKI-MTD-1169
Silcosteel Difflok cap, Markes Unity	10/pk	MKI-MTD-1204
O-ring insertion tool, Markes Unity TDI		MKI-Z-0285
O-ring extraction tool, Markes Unity TDI		MKI-Z-0351
Cold trap alignment tool, Markes Unity		MKI-UTD-5064
Cold trap, air toxics, C_2-C_{14}, Unity 2		MKI-U-T3ATX-2S
Cold trap, air toxics, C_2-C_{14}, Unity		MKI-U-T3ATX
Cold trap, materials emissions, Unity		MKI-U-T12ME
Cold trap, GP Carbon, $C_{4/5}$-$C_{30/32}$, Unity 2		MKI-U-T11GPC-2S
O-rings, 010 Markes Unity	10/pk	MKI-U-COV10
Cold trap, materials emissions, Unity 2		MKI-U-T12ME-2S
Empty stainless steel TD tubes	10/pk	C-TBE10
Tenax stainless steel tubes, preconditioned/capped	10/pk	C-TBP1TC
Empty glass TD tubes	10/pk	C-GT010
PTFE inserts	10/pk	C-PL010
Long term TD tube storage caps	10/pk	C-CF020
Cap-LOK Tool for long term storage caps		C-CPLOK
Diffusive sampling caps	10/pk	C-DF010
Bio-VOC breath samplers	10/pk	C-BIO10
Disposable card mouth piece for Bio-VOC	10/pk	C-B010M
Tenax TA 34-60 Mesh, 10 g		C-TNXTA

(Continued)

Markes Thermal Desorption system

Markes Thermal Desorption Supplies

Description	Unit	Part No.
General purpose hydrophobic tubes, stainless steel Preconditioned and capped with 1/4 in brass storage caps. For pumped sampling n-C_5 to n-C_{20}.	10/pk	C-HY010C
Tenax/S'carb 'Sulphur' tubes Preconditioned and capped with 1/4 in brass storage caps. For odor and landfill gas analysis.	10/pk	C-102SSC
Carbograph 1 stainless steel tubes Preconditioned and capped with 1/4 in brass storage caps. For pumped sampling C_5 to C_{14}, plus diffusion of BTX.	10/pk	C-TBP1C1C
Carb X stainless steel tubes Preconditioned and capped with 1/4 in brass storage caps. For pumped/diffusion of 1.3-butadiene & benzene.	10/pk	C-TBP1CXC
Air toxics (TO-17) stainless steel tubes Preconditioned and capped with 1/4 in brass storage caps. For pumped sampling VOCs n-C_3 to n-C_{12}.	10/pk	C-AT010C
Universal stainless steel tubes Preconditioned and capped with 1/4 in brass storage caps	10/pk	C-UN010C
Glass tubes with 1 cm Tenax For direct liquid injection	10/pk	C-G1CM10
Glass air toxics (TO-17) tubes Pre-packed with 2 carbon-based sorbents; preconditioned and capped with 1/4 in brass storage caps	10/pk	C-GAT010C
CRS BTX Standards, 1 µg	10/pk	C-BTX1UG

Inlet Systems

Agilent Inlet Convenience Kits

Convenience kits are an easy way to get all the supplies you need using one part number. Agilent's new preventative maintenance kits include septa, liners, O-rings, gold seals and traps.

QuickPick Splitless PM Kit, 5188-6497

QuickPick Purged Packed PM Kit, 5188-6498

Split Vent Trap PM Kit, 5188-6495

Agilent Inlet Convenience Kits

Description	Part No.
QuickPick Split Inlet PM Kit Includes 5 non-stick BTO septa, 1 split liner, 1 non-stick liner O-ring, and inlet gold seal kit	5188-6493
QuickPick Split Vent and Inlet PM Kit Includes 5 non-stick BTO septa, 1 split liner, 1 non-stick liner O-ring, inlet gold seal kit, and split vent trap with 2 O-rings	5188-6496
QuickPick Splitless Inlet PM Kit Includes 5 non-stick BTO septa, 1 splitless liner, 1 non-stick liner O-ring, and inlet gold seal kit	5188-6494
QuickPick Splitless Vent and Inlet PM Kit Includes 5 non-stick BTO septa, 1 splitless liner, 1 non-stick liner O-ring, inlet gold seal kit, and split vent trap with 2 O-rings	5188-6497
QuickPick Purged Packed Inlet PM Kit Includes 5 non-stick BTO septa, 1 O-ring, 1 ferrule, and 1 disposable glass liner	5188-6498
Internal split vent trap PM kit for split/splitless, volatiles, and PTV septumless inlet split vent line Includes 1 cartridge and 2 O-rings	5188-6495

Split/Splitless Inlet Seals

To ensure that you have a consistent and inert surface to properly seal the inlet and prevent sample degradation, Agilent has revolutionized production of the gold inlet seal. Unlike traditional machined seals, the new format Agilent Gold Inlet Seal has a very reproducible smooth surface, eliminating traces of machining grooves that can be the source of minute leaks. With Agilent's proprietary metal injection molding (MIM) manufacturing process, every gold inlet seal provides a high quality, leak-free seal so critical for reproducible results.

Our new package keeps the gold seal clean and scratch-free. For your added convenience, an inlet washer is provided with each inlet seal.

Gold plated seal kit, 5188-5367

Certified gold plated seal kit, 5190-2209

Split/Splitless Inlet Seals

Description	Unit	Part No.
Certified gold plated seal kit, includes washer		5188-5367
	10/pk	5190-2209
Gold plated seal with cross*		5182-9652
Stainless steel seal		18740-20880

*Use with total flow rates above 200 mL/min

Flip Top Inlet Sealing System

Agilent's Flip Top Inlet Sealing System is the faster, smarter way to change inlet liners on Agilent 6890, 6850 and 5890 GC systems.

- Cuts liner replacement time to as little as 30 seconds
- Eliminates frustrating searches for special wrenches or tools
- Improves inlet ergonomics – no more handling of heated parts, no more burns or scrapes
- Decreases downtime and increases productivity
- Minimizes exposure to ambient air, extending column life
- Easily installed by user in 15 minutes

Available exclusively from Agilent, the Flip Top has a levered arm that attaches to any 6890/6850/5890 insert weldment and locks to the injection port using an adapter ring screwed onto the inlet. Once installed, simply lift the arm of the Flip Top which releases the insert weldment from the injection port, and allows instant access to the liner. The process is simply reversed to reseal the weldment to the port.

Flip Top Inlet Sealing System

Description	Unit	Part No.
Flip Top Inlet Sealing System For 6890, 6850, 5890 only; not compatible with 7890		5188-2717
Non-stick fluorocarbon liner O-ring for Flip Top	10/pk	5188-5366
	100/pk	5190-2268

Flip Top Inlet Sealing System installation kit, 5188-2717

Split/Splitless Inlets

The combined split/splitless inlet is the most popular inlet for capillary column gas chromatography. Because it can be used in either split or splitless mode, it provides a very effective combination that can cover most analysis requirements.

Split Inlet Troubleshooting

Split inlets are spared from most band-broadening phenomena, since the splitting process generates narrow peaks. Peak broadening or tailing is usually due to:

- Improper column installation
- Low inlet temperature
- Low split flow (<20 mL/min on 6890)
- Inlet and needle discrimination and decomposition

If your results are inaccurate or inconsistent:

- Check the column and reinstall if necessary
- Increase inlet temperature by 50 °C and compare results
- Check inlets and needles for wear and replace as necessary

Splitless Inlet Troubleshooting

Most problems encountered with a splitless injection are related to:

- Incorrect purge time
- Degradation
- Improper focusing
- Inappropriate column temperature
- Backflash

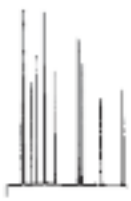
You can also improve the reproducibility and linearity of peak areas and avoid backflash by matching:

- Inlet temperature
- Liner volume
- Injection volume

Decomposition

Loss of peak area or generation of new peaks can sometimes be dramatically reduced by changing liner type or by deactivating the liner and inlet with silanizing reagents. Removing or reducing the amount of liner packing can also decrease inlet activity.

Column Troubleshooting

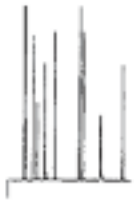


Normal Peaks

Correct column positioning in both injection port and FID

Tailing Solvent Peaks

Column positioned incorrectly in the injection port or possible ferrule particle in the carrier gas flow path



Wrong Peak Ratios

Column positioned in the inlet (either too far or not far enough; verify 4-6 mm installation distance)

For the most reproducible split injection results, try Agilent's low pressure drop split liner (part number 5183-4647), with built in positioning bead, tight dimension tolerances, glass wool placement, and proprietary deactivation.

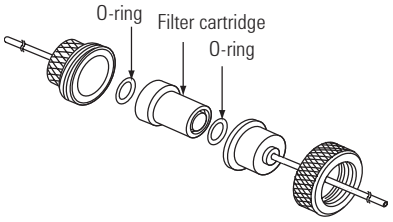
Split Mode Variables, Practices and Rationales

Parameter	Selection/Setting	Rationale
Inlet temperature	Try 250 °C or BP of last eluting compound	Ensures flash vaporization Minimizes inlet discrimination
Inlet liner	Large volume, deactivated	Minimizes backflash Minimizes degradation
Inlet packing	Silanized glass wool	Retains non-volatiles Minimizes inlet discrimination
	Glass beads or frit None	Less active than wool Least active
Injection volume	0.5-3 µL liquid 0.10-10 mL gas	Split easily adjusted Split adjusted accordingly
Injection technique	Fast autoinjection Hot-needle fast manual injection	Less needle discrimination Reproducible discrimination
Split ratio	50:1 to 500:1	Depends on sample and injection volume, and column id
Initial column temperatures	Not critical	Narrow initial peaks
Septum purge	2-3 mL/min	Minimizes ghosting

Splitless Mode Variables, Practices and Rationales

Parameter	Selection/Setting	Rationale
Inlet temperature	Just above highest boiling point of solutes (+20 °C)	Ensures flash vaporization Reduce if degradation occurs Use higher for dirty samples and higher-boiling solutes
Inlet liner	Large volume > 0.8 mL Small volume < 0.2 mL	Use with autoinjector Use only for slow manual injections and gas injections
Inlet packing	None	Use only with slow injection Decreases degradation
	Silanized glass wool	Use for fast autoinjection and dirty samples
Injection volume	0.5-2 µL liquid	Depends on solvent, liner and conditions
Injection technique	Fast autoinjection Hot-needle slow manual Hot-needle fast manual	Most reproducible Less needle discrimination Inject 1-2 µL/sec if narrow liner is used and > 1 µL injection Use for < 1 µL injections
Purge flow	20-50 mL/min	Higher if using constant flow
Purge delay time	20-80 sec	Adjust according to column flow rate/liner type and sample conditions
Oven temperature	10-25 °C below solvent BP	Necessary for solvent focusing
Column flow	> 2 mL/min when possible	Clears inlet fast Reduces backflash and decomposition
Septum purge	2-3 mL/min	Reduces ghosting
Quantification	Internal standard External standard addition	Maximizes reproducibility Use only with constant injection volume
Retention gap	1-3 m, deactivated (1-2 m per µL injected)	Reduces peak distortion Promotes solvent and stationary phase focusing

Split/Splitless Inlet Maintenance



Split vent trap, 5188-6495

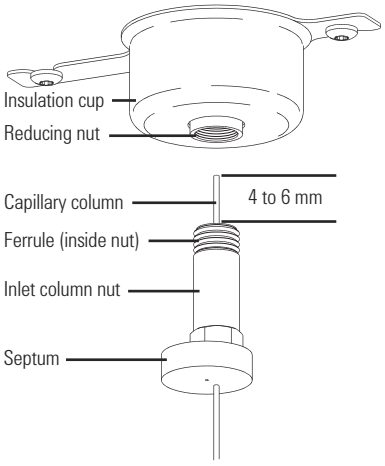
Changing the Split Vent Trap*

1. Remove the retaining clip.
2. Remove the old filter cartridge and two O-rings.
3. Verify the new O-rings are seated properly on the new filter cartridge.
4. Install the new filter cartridge then reassemble the trap. Do not fully tighten yet.
5. Place the filter trap assembly in the mounting bracket and install the retaining clip.
6. Fully tighten the split vent front weldment onto the trap.
7. Check for leaks.

*Change every 6 months

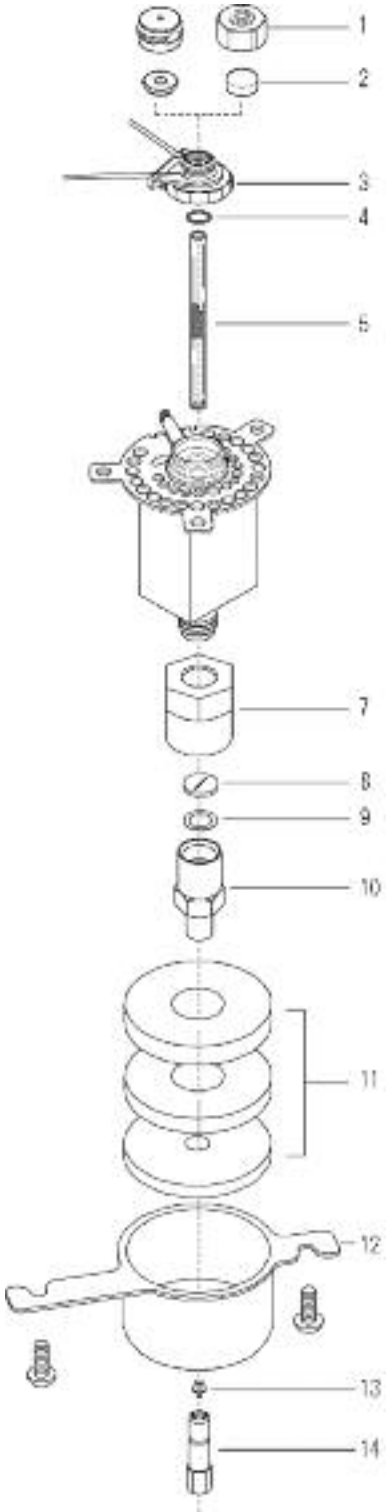
Installing a Capillary Column in a Split/Splitless Inlet

1. Prepare the column for installation.
2. Position the column so it extends 4 to 6 mm past the end of the ferrule.
3. Slide the septum to place the nut and ferrule in the correct position.
4. Insert the column in the inlet.
5. Slide the nut up the column to the inlet base and finger tighten the nut.
6. Adjust the column position so the septum is even with the bottom of the column nut.
7. Tighten the column nut an additional 1/4 to 1/2 turn. The column should not slide with a gentle tug.
8. Start carrier gas flow.
9. Verify flow by submerging the free end of the column in isopropanol. Look for bubbles.



WARNINGS & CAUTION

The split vent trap may contain residual amounts of any samples or other chemicals you have injected into the GC. Follow your company's safety procedures for handling these types of substances while replacing the trap filter cartridge.



Split/Splitless Inlet assembly

7890/6890/6850 Split/Splitless Inlet Supplies

Item	Description	Unit	Part No.
	Low pressure drop, Ultra Inert Liner with glass wool		5190-2295
	Universal, low pressure drop, Ultra Inert Liner with glass wool		5190-3169
	Single taper, Ultra Inert Liner		5190-3166
	QuickPick Split Inlet PM Kit		5188-6493
	QuickPick Split Vent and Inlet PM Kit		5188-6496
	QuickPick Splitless Inlet PM Kit		5188-6494
	QuickPick Splitless Vent and Inlet PM Kit		5188-6497
1	Headspace septum retainer nut		18740-60830
	Septum retainer nut		18740-60835
	Strain relief septum nut		301-205-HSP
2	11 mm Certified BTO septa	50/pk	5183-4757
	For complete offering of premium septa, see page 15		
3	7890 Insert Weldment		
	Top insert weldment assembly, standard		G3452-60730
	Turn top		G3430-40035
	Split ring		0510-1306
	Top insert weldment assembly, headspace		G3452-60100
	Top insert, AC gang fitting weldment		G3430-60011
	Top insert assembly, valve		G3480-67585
	6890 Insert Weldment		
	S/SL insert weldment Used with large charcoal canister type filter, for 6890/6850		G1544-60585
	S/SL insert assembly for G1540A with valved system option This insert assembly uses the large charcoal canister split vent filter, for 6890/6850		G1580-60585
	Similar to G1544-60575 except carrier lines separated for interface to valved systems of a G1540A instrument		G1580-60575
	Original standard EPC using 1/4 in split vent filter		G1544-60575
	Similar to G1544-60575 except allows insertion of 1/4 in chemical filters to clean carrier gas for ECD operation		G1544-80580
	Insert Weldment Standard manual pneumatics		19251-60575
4	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
	Graphite O-ring for split liner	10/pk	5180-4168
	Graphite O-ring for splitless liner	10/pk	5180-4173
	Non-stick fluorocarbon liner O-ring for Flip Top	10/pk	5188-5366
5	Split liner, single taper, low pressure drop, glass wool	1/pk 25/pk	5183-4647 5183-4702
	Splitless liner, single taper, without glass wool	1/pk 25/pk	5181-3316 5183-4696
	For complete offering of liners, see pages 25		

(Continued)

7890/6890/6850 Split/Splitless Inlet Supplies

Item	Description	Unit	Part No.
6	Split vent trap kit		G1544-60610
	Replacement cartridge Includes 2 cartridges and 4 O-rings		G1544-80530
	Split vent trap PM kit Includes 1 cartridge and 2 O-rings		5188-6495
7	Retaining nut		G1544-20590
8	Stainless steel seal		18740-20880
	Certified gold plated seal kit, includes washer		5188-5367
	Gold plated seal with cross		5182-9652
9	Washers, 0.375 od	12/pk	5061-5869
10	Reducing nut		18740-20800
11	Insulation kit, 3 pieces		5188-5241
12	Lower insulation cover		19243-00070
13	Ferrules		
	For complete offering of ferrules, see pages 33-34		
14	Universal column nut	2/pk	5181-8830
	6850 column nut	2/pk	5183-4732
	Split/splitless septum nut angled wrench		19251-00100
	Flip Top Inlet Sealing System For 6890, 6850, 5890 only; not compatible with 7890		5188-2717
	Capillary Inlet Evaluation Sample (Split Mode)		8500-4789
	Capillary Inlet Supplies Kit, Includes:		5181-8838
	Certified gold plated seal kit, includes washer		5188-5367
	Liner, split, straight, glass wool, non-deactivated	4 each	19251-60540
	Liner, splitless, single-taper, glass wool, deactivated	2 each	5062-3587
	Certified non-stick fluorocarbon O-ring	10/pk*	5188-5365
	Liner, direct, 2 mm id, deactivated		5181-8818
	11 mm Certified BTO septa	50/pk*	5183-4757
	Capillary inlet cleaning wires	5/pk*	5180-4153

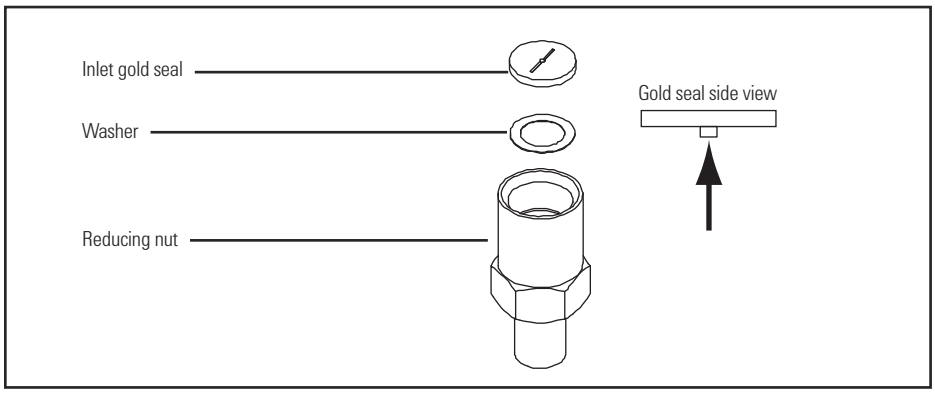
*Quantity when part ordered individually

Item 6, split vent trap, G1544-60610

Reducing nut, 18740-20800

Gold plated seal kit, 5188-5367

Gold seal on the split/splitless inlet



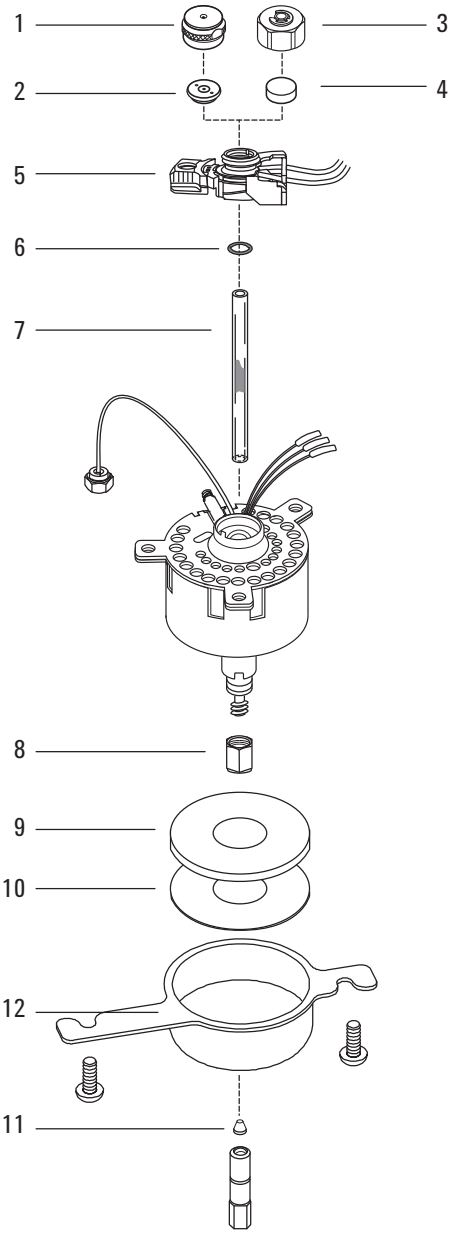
Multimode Inlet

Agilent's premium inlet – two inlets in one for maximum performance and flexibility for the 7890A

Whether you need to increase your system sensitivity with large volume injection capabilities, analyze thermally labile compounds or inject dirty samples, the Multimode Inlet delivers the performance and flexibility you need.

Multimode Inlet Body

Item	Description	Part No.
1	Merlin cap	5182-3445
2	Merlin Microseal	5182-3444
3	Septum retainer nut	18740-60835
4	11 mm Certified BTO septa 50/pk For complete offering of premium septa, turn to page 15.	5183-4757
5	Top insert assembly, standard	G3452-60730
6	Certified non-stick fluorocarbon O-ring	5188-5365
7	Dimpled splitless single taper, deactivated	5190-2296
8	Column nut adapter	G3510-20018
9	Foil (LN_2 only)	
10	Multimode Inlet insulation	19243-000681
11	Ferrule	For complete offering of ferrules, turn to pages 33-34.
12	MMI Metal Insulation Cup	G3431-00005



Exploded Parts View of the Multimode Inlet

TIPS & TOOLS

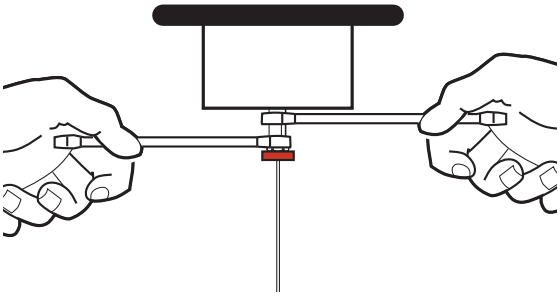
Because of the temperature programmability, graphite is preferred ferrule for the MMI. However, Graphite/Vespel ferrules can be used if they are temperature cycled and retightened. After the initial shrinkage, they do not show a detrimental leak for air.

Turn to pages 62-63.

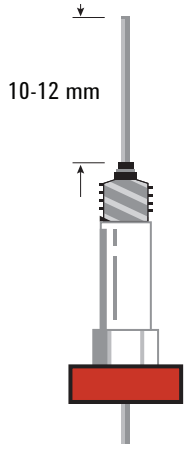
Installing a Capillary Column in a Multimode Inlet

1. Prepare the column for installation.
2. Thread the column adapter nut onto the base of the inlet and make sure it can spin freely.
3. Place a septum, capillary nut, and graphite ferrule on the column.
4. Score and snap off the end of the column.
5. Position the column so it extends 10 to 12 mm past the end of the ferrule.
6. Slide the septum to place the nut and ferrule in the correct position.
7. Insert the column in the inlet.
8. While holding the adapter with a wrench thread the column nut into the inlet (but do not tighten).
9. Adjust the column position so that the septum contacts the bottom of the column nut. Finger-tighten the column nut until it begins to grip the column.
10. While holding the inlet base with one wrench, use the second wrench to tighten the column nut an additional 1/4 to 1/2 turn so that the column cannot be pulled from the fitting with gentle pressure.

Step 2



Step 5



Cleaning the Multimode Inlet

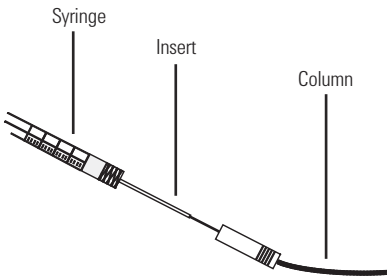
Agilent recommends using the G3510-60820 Multimode Cleaning Kit, which ships with detailed cleaning instructions.

Depending on the inlet mode used, the liner installed, and the cleanliness of the sample, the frequency of cleaning may range from weekly to monthly. When establishing your cleaning frequency, start with a visual inspection of the inlet bottom whenever a liner is changed. A small ring of material will collect at the bottom of the inlet when dirty samples such as food extracts or solid waste extracts are injected. An initial cleaning schedule of every two weeks for dirty samples and every two months for clean samples is appropriate and can be adjusted subsequently.

WARNINGS & CAUTION

The inside of the wall of the inlet is only 0.005 in thick and can be damaged with hard scrubbing.

Cool On-Column Inlets



Cool On-Column Inlet Maintenance

Installing a Capillary Column into a Cool On-Column Inlet

1. Gently insert the column into the inlet until it bottoms.
2. Insert the column nut into the inlet fitting and finger tighten.
3. Tighten the column nut an additional 1/4 turn with a wrench or until the column does not move. Use two wrenches to support inlet (5/16 in and 1/4 in).
4. If using an automatic injection system with a 0.25 mm or 0.32 mm column, verify that the column installation by manually pushing the syringe into the inlet.

Checking the Needle-to-Column Size on the Cool On-Column Inlet

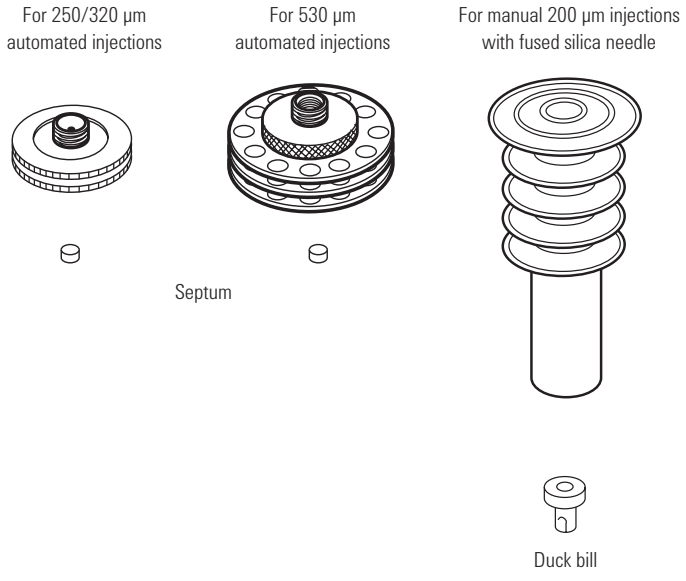
1. Check the needle-to-column size to make certain that the needle fits in the column.
2. Identify the correct insert for the column size. Use the insert that is the same size as the syringe needle to verify that the column you plan to use is the correct size.
3. Insert the column into one end of the insert.
4. Insert the syringe needle through the other end of the insert and into the column. If the needle cannot pass easily into the column, reverse the insert to try the needle and column in the other end.

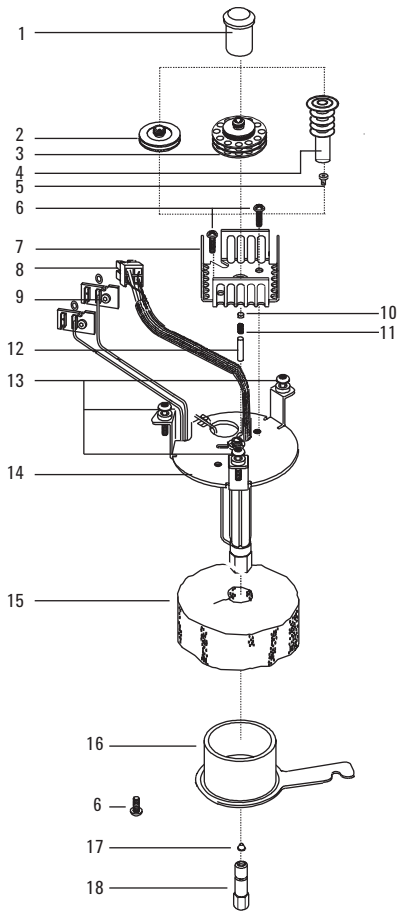
Changing the Septum on the Cool On-Column Inlet

1. Replace the septum.

   If you are using a septum nut, grasp the knurling and unscrew. Remove the old septum with tweezers. Use tweezers to install a new septum. Push the septum into the septum nut until properly seated. Firmly tighten the nut.

   If you are using a cooling tower, grasp the three rings and unscrew. The spring and duck bill septum may pop out of the inlet when you remove the cooling tower. Be careful not to lose them. If they do not pop out, use a thin wire to remove them from the inlet. Insert the replacement duck bill septum into the spring and place in the inlet. Reattach the cooling tower assembly, then finger tighten.
2. Before making an injection, check the alignment of the entire assembly using the proper size syringe.
3. Restore the analytical method.
4. Reset the septum counter.





Cool On-Column Inlet assembly

7890/6890 Cool On-Column Inlet Supplies

Item	Description	Part No.	Quantity
1	Needle guide top (optional)	19245-20670	
2	Septum nut base assembly, for 0.250/0.320-mm columns	19245-80521	1
3	Septum nut base, for 0.530 mm columns	G1545-80520	1
4	Manual cooling tower assembly (optional), for 0.200 mm columns	19320-80625	1
5	Duckbill for use with cooling tower, 10/pk	19245-40050	
6	Screw, M4 x 8, Torx T-20 chromeplate	0515-2711	3
7	Heatsink fin	G1545-00010	1
8	Heater/Sensor assembly	G1545-60520	1
9	Screw, M3 x 16 mm	1390-1022	1
10	Septa	Turn to page 15.	
11	Insert spring	19245-60760	1
12	Inserts (identify by number of rings on insert)		
13	Screw, M4 x 12 mm, T-20	0515-2496	3
14	Inlet weldment	G3454-80500	1
15	Inlet weldment insulation	G1545-20630	1
16	Cavity sleeve	19245-00060	1
17	Ferrules (identify by internal diameter)	Turn to pages 30-31.	
18	Column nut	Turn to pages 33-34.	

7673/7683 On-Column Autosampler Syringes

Volume (µL)	Description	Unit	Part No.
5	Removable needle, syringe only*		5182-0836
	Stainless steel needle for 0.53 mm column	3/pk	5182-0832
	Stainless steel needle for 0.32 mm column	3/pk	5182-0831
	Stainless steel needle for 0.25 mm column	3/pk	5182-0833
	Plunger button	10/pk	5181-8866

*Order appropriate needle

Programmable Temperature Vaporizer (PTV) Inlets

PTV inlets combine the benefits of split, splitless and on-column inlets. The sample is usually injected into a cool liner, so syringe needle discrimination does not occur. Then the inlet temperature is increased to vaporize the sample. The user programs vent times and temperature to achieve the equivalent of split or splitless transfer of sample vapors to the column. PTV injection is considered the most universal sample introduction system because of its flexibility.

Advantages

- No syringe-needle discrimination
- Minimal inlet discrimination
- Use of large injection volumes
- Removal of solvent and low boiling components
- Trapping of nonvolatile components in liner
- Split or splitless operation
- Retention time and area reproducibility approaching cool on-column injection

PTV inlets are actively cooled before and during injection by Peltier devices or by forced gases (air, liquid N_2, or liquid CO_2). Cryogenic cooling of the inlet can reduce inlet temperature enough to thermally focus gas injections from other sampling devices in the liner. This is a distinct advantage of using PTV inlets in comparison to conventional inlets for coupling auxiliary sampling devices to capillary columns.

Post-injection, PTV inlets are heated using electrical heaters or preheated compressed air. Depending on design, inlet temperature ramps are either ballistic (i.e., ramped to the maximum temperature at an uncontrolled maximum rate) or programmable.

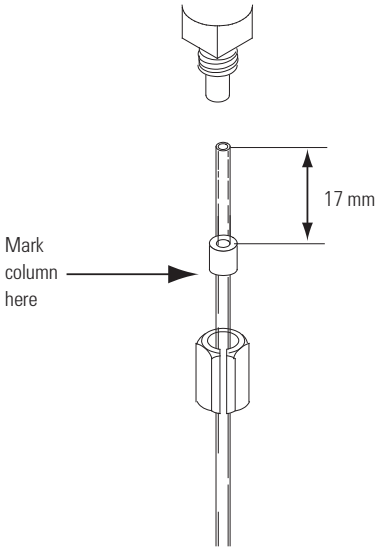
PTV Inlet Practices and Rationales (Cold Split/Splitless Modes)

Parameter	Selection/Setting	Rationale
Injection mode	Cold split	For general use and sample screening
	Cold splitless	For trace analysis
	Cold solvent vent	LVI
Inlet temperature ramp rate	Adjustable (i.e., 2 °C/sec to 720 °C/sec max)	Use slower ramp rates for labile, complex, or large volume samples Use faster ramp rates for most samples Use faster ramp rates to shorten splitless purge delay time
	Ballistic	Simpler, less expensive instrumentation
Inlet liner	Straight with silanized wool	For general use
	Baffled	For labile samples
	Packed with an adsorbent	For focusing gaseous injections from auxiliary sampling devices
Injection volume	0.1-1.5 µL 5-50 µL for LVI	Use lower volumes for volatile solvents and fast ramp rates Use volumes larger than 1.5 µL only in solvent-elimination mode
Sample Injection technique	Autosampler or manual, fast or slow	Not critical for cold split and splitless modes
Oven temperature	10-25 °C below solvent BP	For proper solvent effect in splitless mode
	Sample dependent	For split mode
Column flow	30-50 cm/sec	Clears inlet faster Less backflash
Septum purge	1-5 mL/min	Minimizes ghosting
Quantification	Any method	Inherently reproducible Low discrimination in cold injection modes
Retention gap	1-3 m, deactivated	Compensates for extended flooded zone and solvent-column incompatibility

PTV Inlet Maintenance

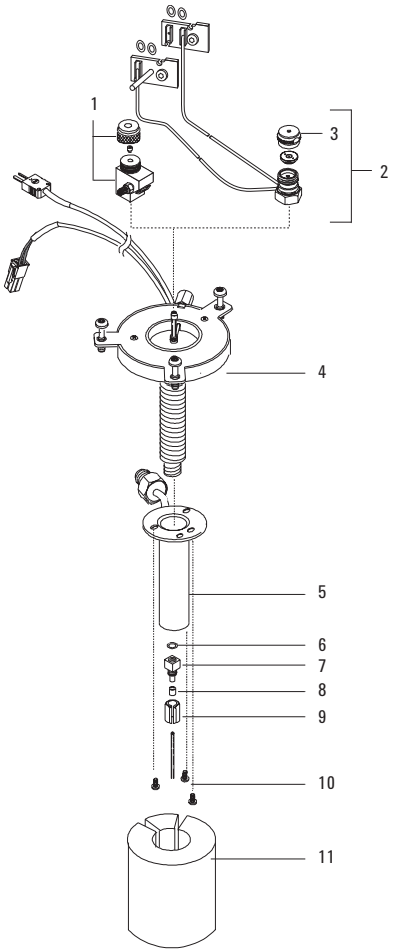
Installing a Capillary Column into the PTV Inlet

1. Position the column so it extends 17 mm above the end of the ferrule. Mark the column behind the ferrule with correction fluid or a marker. Slide the nut over the column.
2. Insert the column into the adapter and finger tighten the column nut. Looking through the slot in the nut, adjust the column until the mark is correctly positioned below the Graphpak 2M ferrule.
3. Tighten the column nut an additional 1/8 to 1/4 turn with a wrench. Do not overtighten.



7890/6890 Septumless PTV Inlet Supplies

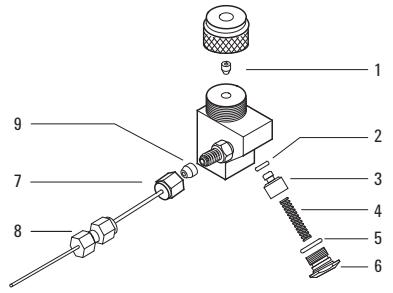
Description	Column ID (mm)	Unit	Part No.
Microseal high pressure nut			5182-3445
Merlin Microseal			5182-3444
Septumless head			G2617-60507
Septum head			G2618-80500
Septum retainer nut			18740-60835
PTV inlet assembly			G2617-60506
PTV LCO_2 cooling jacket			G2617-60508
PTV LN_2 cooling jacket			G2619-60501
Silver seal		5/pk	5182-9763
Graphpak 2M inlet adapter	0.20		5182-9754
	0.25-0.33		5182-9761
	0.53		5182-9762
Ferrules for Graphpak 2M inlet	0.20		5182-9756
	0.25		5182-9768
	0.32		5182-9769
	0.53		5182-9770
Replacement Graphpak column nut			5062-3525
PTV insulation block			G2617-20510
PTV Cryo insulator			G2617-60510
PTFE ferrule (needle seal)		10/pk	5182-9748
Kalrez seal			5182-9759
Valve body			5182-9757
Pressure spring			5182-9758
Viton seal		5/pk	5182-9775
Sealing element			5182-9760
CO_2 Cryo inline filter			3150-0602
Service kit for septumless head Contains Kalrez seal, valve body, and pressure spring			5182-9747
Graphpak 3D ferrules		5/pk	5182-9749
Assembly tool for Graphpak 3D ferrules			G2617-80540



PTV Inlet Body

Item	Description	Part No.
NS	Septumless head weldment	G3500-80000
1	Septumless head	G2617-60507
2	Septum head	G3500-80001
3	Septum nut	18740-60835
4	PTV inlet assembly	G2617-60506
5	Cooling jacket	
	PTV LCO_2 cooling jacket	G2617-60508
	PTV LN_2 cooling jacket	G2619-60501
NS	PTV inlet assembly with cooling jacket	
	PTV inlet with CO2 cooling jacket	G2617-60518
	PTV inlet with LN2 cooling jacket	G2617-60517
6	Silver seal	5182-9763
7	Graphpak inlet adapter	
8	Ferrules for Graphpak inlet	Turn to pages 30-31.
9	Replacement Graphpak column nut	5062-3525
10	Screw, M3 x 3 mm	
11	PTV insulation block	G2617-20510
NS	PTV Cryo insulator	G2617-60510

NS = not shown



PTV Septumless Head

Item	Description	Part No.
	Septumless head	G2617-60507
1	PTFE ferrule (needle seal)	5182-9748
2	Kalrez seal	5182-9759
3	Valve body	5182-9757
4	Pressure spring	5182-9758
5	Viton seal	5182-9775
6	Sealing element	5182-9760
7	PTV column adapter tube (includes 1/6-inch nut and ferrule)	G2617-80550
8	Septumless head weldment	G3500-80000
9	Straight ferrule, 1/16 in, 10/pk	0100-1375

Programmable Temperature Vaporizing (PTV) Liners

Description	ID (mm)	Volume (µL)	Part No.
Liners for Septumless PTV Inlet, G3501A, G3502A, G3503A			
PTV liner, single baffle, glass wool, deactivated	2	180	5183-2038
PTV liner, single baffle, deactivated	2	200	5183-2036
PTV liner, multi baffled, deactivated	1.8	150	5183-2037
PTV liner, sintered glass, deactivated	1.5	112	5190-1426
Liners for High Temperature PTV Inlet, G3506A			
PTV liner, high temperature, quartz	3.4	713	5188-5313
PTV liner, high temperature, borosilicate	3.4	668	5188-5356

Syringes for Septumless and High Temperature PTV Inlets

Volume (µL)	Description	Needle	Part No.
0.5	Removable	23/70/HP	5182-9651
5	Straight, fixed	23/42/HP	9301-0892
10	Straight, fixed	23/42/HP	9301-0713
50	Straight, fixed, for large volume injections	23/42/HP	5183-0318
100	Straight, fixed, for large volume injections	23/42/HP	5183-2058

Purged Packed Inlets

Packed column analysis is frequently done when high efficiency separations are not needed or when gases are analyzed by gas-solid chromatography. Purged packed inlets are simple in both design and use. Few parameters need to be set, and all carrier gas flow flushes through the inlet into the column in the standard configuration.

Purged Packed Inlet Practices and Rationales

Parameter	Selection/Setting	Rationale
Inlet temperature	BP of solvent +50 °C BP of major solute(s)	Ensures flash vaporization Use for neat samples
Insert type	1/8 in stainless steel 1/4 in stainless steel 530 µm	Use for stainless steel column only Inserts permit connection of columns up to 1/4 in od
Liner	Glass	Use to lower activity (replaceable)
Initial column temperature	Temperature programming	Sharpens peaks and reduces run time
Column type	1/8 in packed stainless 1/4 in packed glass 530 µm	Will not break Better for polar or labile compounds
Carrier gas flow	10-40 mL/min 10-60 mL/min	Use with N_2 carrier gas Use with He or H_2 carrier gas

For more information on our new expanded and refreshed Agilent packed column portfolio see pages 400-409

Purged Packed Inlet Troubleshooting

Purged packed inlets are active, have low volume and are generally flow controlled. This means that most packed column inlet problems involve sample decomposition, flashback, or leaks.

Decomposition

Diagnose inlet sample decomposition by comparing retention times for decomposition products to their standard retention times. Then try these options to improve results:

- Intracolumn direct injection
- Deactivated glass liners
- Lower inlet temperatures
- Remove column packing in the inlet zone
- Increase flow rates

Backflash

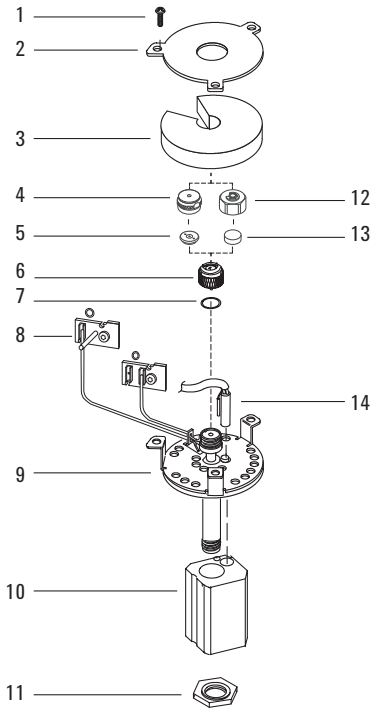
Large sample injections can exceed liner capacity and backflash into the gas supply lines and onto the septum. This can cause:

- Ghost peaks
- Sample losses
- Irreproducible peak areas
- Decomposition

Leaks

Septum and column leaks can cause column degradation and stationary phase decompositions on flow-controlled column inlets.

- Change the septum on a regular basis and check column connections to help eliminate leak holes.
- Keep the oven and inlet at room temperature when not in use or while changing the septum.

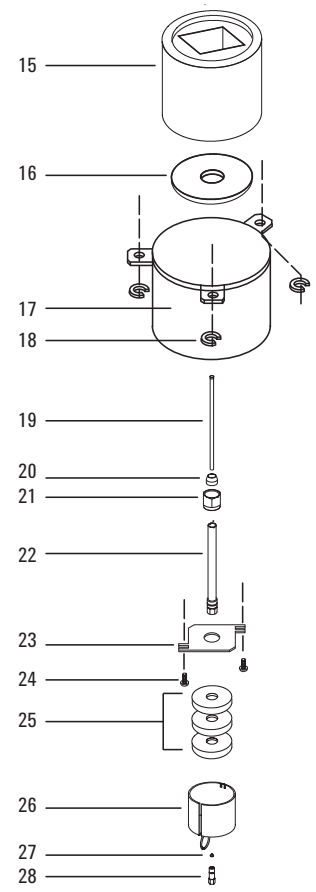


Purged Packed Inlet Upper Body

Purged Packed Inlet Upper Body

Item	Description	Part No.
1	Screw, Torx T-20, M4 x 12 mm	1390-1023
2	Top cover plate	G1543-00085
3	Top insulation	G1543-00100
4	Merlin cap	5182-3445
5	Septum, Merlin Microseal	5182-8815
6	Top insert weldment	19243-80570
7	O-ring, fluorocarbon	5080-8898
8	Screw, Torx T-10, M3 x 16 mm	G1946-20168
9	Inlet weldment	G3451-80501
10	Thermal block	G1543-20765
11	Bottom nut	G1543-20580
12	Septum retainer nut	18740-60835
13	11 mm septa	5183-4757
14	Heater/Sensor assembly	G1543-61540
NS	PTV Cryo insulator	G1543-00155

NS = not shown



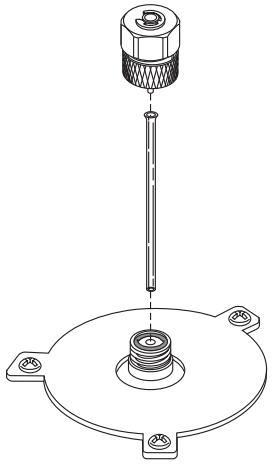
Purged Packed Inlet assembly

Purged Packed Inlet

Item	Description	Part No.
15	PP insulation	G3432-00004
16	PP bottom insulation	G3432-00003
17	PP insulation cup	G3431-00005
18	C-clip	0515-1799
19	Disposable glass liner, 170 µL internal volume	5080-8732
20	Vespel ferrule, 1/4 in	5080-8774
21	1/4 in nut, brass	5180-4105
22	530 µm column adapter for use with glass liners	19244-80540
23	Bottom plate for oven	G1543-00060
24	Screw, T-20, M4 x 12 mm	0515-2711
25	Adapter insulation	19234-60715
26	Insulating cup	19234-60700
27	Ferrules	Turn to pages 30-31.
28	Column nut (capillary, universal, 2/pk)	5180-8830

7890/6890/6850 Purged Packed Inlet Supplies

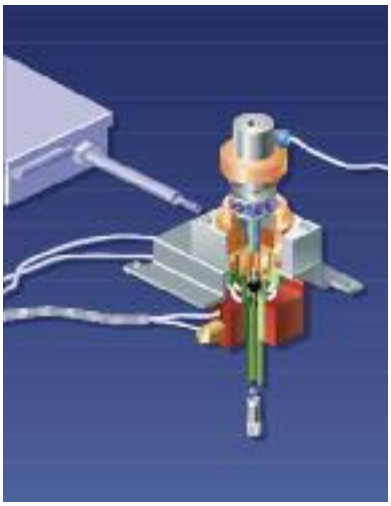
Description	Unit	Part No.
QuickPick Purged Packed Inlet PM Kit Includes 5 non-stick BTO septa, 1 O-ring, 1 ferrule, and 1 disposable glass liner		5188-6498
Merlin Microseal		5182-3444
Microseal high pressure nut		5182-3445
Septum retainer nut		18740-60835
11 mm Certified BTO septa	50/pk	5183-4757
Top insert weldment		19243-80570
O-ring, Fluorocarbon	12/pk	5080-8898
Disposable glass liner, 170 µL internal volume	25/pk	5080-8732
Disposable glass insert, deactivated, 170 µL internal volume	5/pk	5181-3382
Vespel ferrule, 1/4 in	10/pk	5080-8774
1/4 in nut, brass	10/pk	5180-4105
530 µm column adapter for use with glass liners		19244-80540
1/8 in column adapter for use with glass liners		19243-80530
1/4 in column adapter for use with glass liners		19243-80540
Insulating cup		19234-60720
Universal column nut	2/pk	5181-8830



How to install glass liner on Purged Packed Inlet

Nuts and Ferrules for 1/8 in Packed Columns

Description	Unit	Part No.
1/8 in stainless steel nut and ferrule set	20/pk	5080-8751
1/8 in brass nut and ferrule set	20/pk	5080-8750
Vespel/graphite ferrule, 1/8 in	10/pk	0100-1332



Detector Systems

Flame Ionization Detector (FID)

The FID requires routine maintenance to ensure optimum performance. Maintenance requirements are application dependent, but Agilent recommends periodically cleaning or replacing the following items:

FID Routine Maintenance

Item	Comments
FID Jet	A plugged jet results in longer retention times as the column exit/detector pressure increases. Once the jet becomes completely plugged, it is difficult to light or sustain a flame.
Ignitor Glow-Plug	Replace if corroded or burned out.
FID Collector/Insulators	Contamination can contribute to detector noise or loss of sensitivity.
Column Adapter/Seals For Adaptable FID only	Leaks at column fittings can result in difficulty lighting the FID or sustaining a flame after injection.

Typical FID Problems

Condensation

Since the FID combustion process results in water formation, the detector temperature must be kept above 300 °C to prevent condensation. At detector block temperatures below 300 °C, the castle assembly drops below 100 °C, resulting in condensation and possible rusting. Such condensation, especially when combined with chlorinated or fluorinated solvents or samples, causes corrosion, with resulting increase in detector noise and loss of sensitivity.

Flame Ignition

If the flame goes out or will not light:

- Measure the hydrogen/air and makeup flow rates – Low H_2 or makeup flows indicate a plugged jet, or a leak at the column fitting. Measure each gas flow independently.
- Confirm that the ignitor is glowing during the FID ignition sequence.
- Check for partially or completely plugged jet – Formation of silica or carbon deposits at the tip of the jet can cause plugging. Incorrect capillary column installation can also cause plugging.

It is best to replace a plugged jet, rather than try to clean it.

- Check that the capillary column is not installed all the way to the jet tip (withdraw 1-2 mm).
- Check that the correct type of jet is installed for the column you are using.
- Check for leaking column or adapter fitting at the base of the FID.
- Check the lit offset value to make sure it is not too low or too high. Adjust the value (normally set to 2.0 pA).

Injecting large volumes of aromatic solvent or water can cause the flame to go out. Switch to a non-aromatic solvent or reduce injection volume.

FID collector assembly

Increased FID Noise or Loss in Sensitivity

FID noise is affected by:

- The cleanliness of the GC gases and gas delivery system – Ensure that the carrier/H_2 and air purity is ≥ 99.9995%. Check traps and filters in the gas supply lines. The FID background signal should be ≤ 20 pA when the flame is lit and stablized.
- Dirty collector/PTFE insulators – Clean or replace.
- Dirty jet – An incorrect flame pattern can increase noise or affect sensitivity.

TIPS & TOOLS

For optimal sensitivity, use Agilent gas purifiers to ensure cleanliness of your GC gases, see pages 12-13

Installing a Capillary Column in the FID

WHAT YOU NEED:

- Column
- Ferrule(s)
- Column nut
- Column cutter
- 1/4 in open end wrench
- Septum
- Isopropanol
- Lab tissue
- Lint-free gloves
- Column ferrule installation tool (P/N 19251-80680)

WARNINGS & CAUTION

- The oven and/or inlet may be hot enough to cause burns. If either is hot, wear heat-resistant gloves to protect your hands.
- Wear safety glasses to protect your eyes from flying particles while handling, cutting or installing glass or fused silica capillary columns. Use care in handling these columns to prevent puncture wounds.
- Wear clean, lint-free gloves to prevent contamination of parts with dirt and skin oils.

1. Gather the required supplies and tools.
2. Load the GC maintenance method and wait for the GC to become ready.
3. If using the adaptable detector, verify that the adapter is installed.
4. Place a septum, capillary column nut, and ferrule on the column.
5. Score the column using a glass scribing tool. The score must be square to ensure a clean break.
6. Break off the column end by supporting it against the column cutter opposite the scribe. Inspect the end with a magnifying loupe to make certain there are no burrs or jagged edges.
7. Wipe the column walls with a tissue dampened with isopropanol to remove fingerprints and dust.
8. Install the capillary column.

   If the column id is greater than 0.1 mm:

   a. Gently insert the column into the detector until it bottoms; do not attempt to force it further.

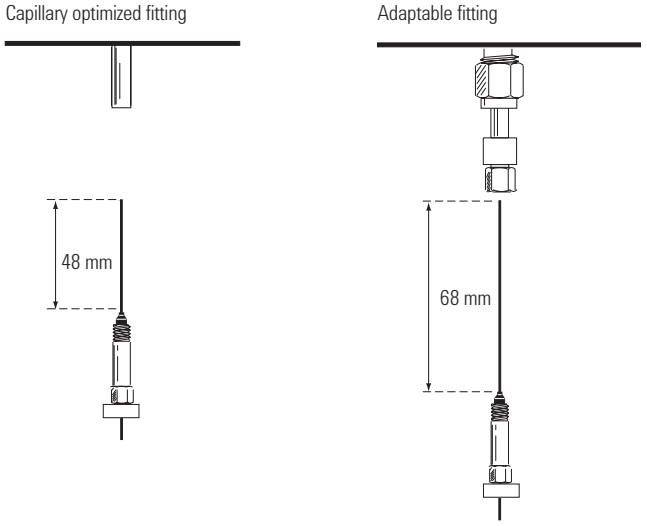
   b. Finger-tighten the column nut, then withdraw the column about 1 mm. Tighten the nut an additional 1/4 turn with a wrench.

   If the column id is 0.1 mm or less, position the column so it extends above the ferrule by 48 mm (capillary optimized fitting) or 68 mm (adaptable fitting). Slide the septum up to hold the column nut and ferrule at this fixed position.

   c. Insert the column into the detector. Slide the nut and ferrule up the column to the detector base. Finger-tighten the column nut until it grips the column.

   d. Adjust the column (not the septum) position so that the septum is even with the bottom of the column nut. Tighten the nut an additional 1/4 turn with a wrench.

Positioning the column



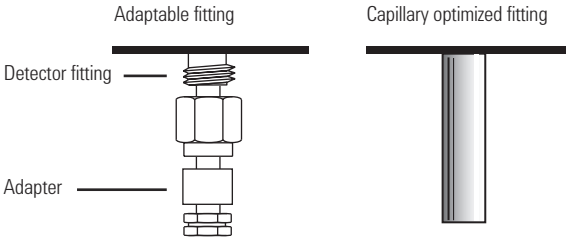
FID Jet Identification and Selection

Before ordering parts for FID maintenance, determine which type of FID is installed on your GC.
The FID is available in two versions:

- Dedicated, Capillary Optimized: for capillary columns only
- Adaptable: for packed or capillary columns

To determine the type of FID installed on your GC, open the oven door and examine the fitting at the base of the detector. Compare to the following diagram.

Hint: Adaptable jets are longer than dedicated capillary jets.



FID Jets

Description	Jet Tip ID	Length (mm)	Part No.
Jets for capillary optimized fittings			
Capillary	0.29 mm (0.011 in)	42.8	G1531-80560
Capillary Optimized for simulated distillation	0.47 mm (0.018 in)	42.8	G1531-80620
Jets for adaptable fittings			
Capillary	0.29 mm (0.011 in)	61.5	19244-80560
Capillary Optimized for simulated distillation	0.47 mm (0.018 in)	61.5	19244-80620
Packed	0.46 mm (0.018 in)	63.5	18710-20119
Packed, wide-bore Use with high-bleed applications	0.76 mm (0.030 in)	63.5	18789-80070

Plugged FID Jet, 19244-80560

Dedicated capillary, G1531-80560

Adaptable capillary, 19244-80560

Adaptable packed capillary, 18710-20119

FID cleaning kit, 9301-0985

Jet Cleaning Procedure

Use Agilent FID Cleaning Kit, part number 9301-0985

1. Run a cleaning wire through the top of the jet. Run it back and forth a few times until it runs smoothly. Be careful not to scratch the jet. (Do not force too large a wire or probe into the jet opening or the opening will become distorted. A loss of sensitivity, poor peak shape, and/or lighting difficulties may result if the opening is deformed.)
2. Fill an ultrasonic cleaning bath with aqueous detergent, and place the jet in the bath. Sonicate for five minutes.
3. Use a jet reamer to clean the inside of the jet.
4. Sonicate again for five minutes.

   Note: from this point on, handle the parts only with forceps!
5. Remove the jet from the bath and rinse it thoroughly, first with hot tap water and then with a small amount of GC-grade methanol.
6. Blow the jet dry with a burst of compressed air or nitrogen, and then place the jet on a paper towel and allow to air dry.

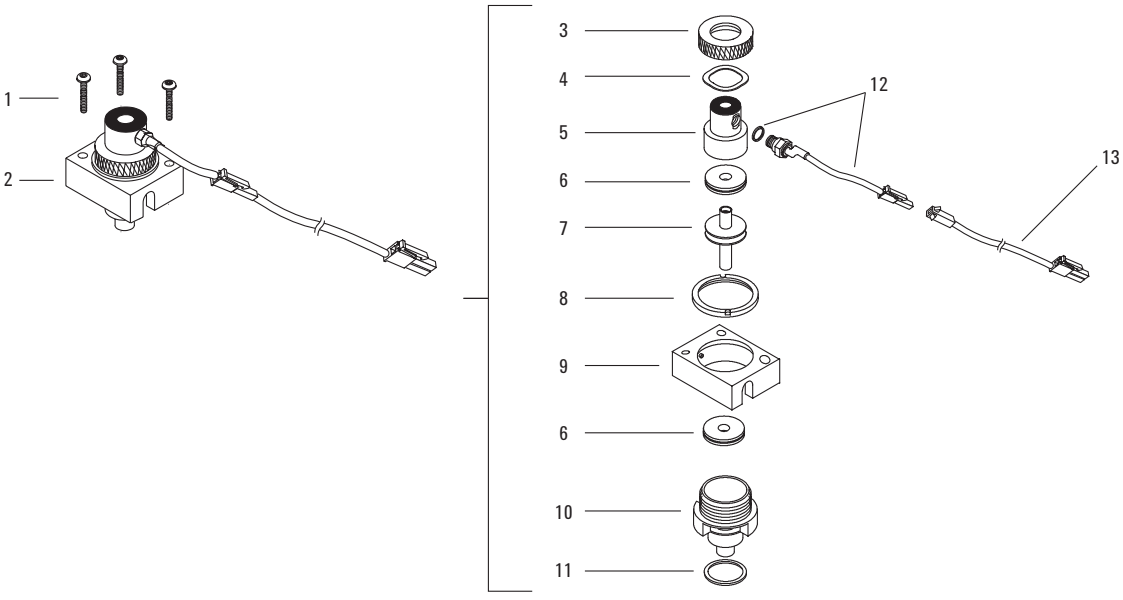
7890/6890/6850 Flame Ionization Detector (FID) Supplies

Item	Description	Unit	Part No.
	PTFE chimney (optional)		19231-21050
1	Screw, M4 x 25 mm, Torx T-20		0515-2712
2	FID collector assembly		G1531-60690
	FID collector cleaning brush	2/pk	8710-1346
	FID retainer nut wrench 5880, 5890, 6890		19301-00150
	1/4 in nut driver for FID jet, drilled shaft		8710-1561
3	Collector nut		19231-20940
4	Spring washer	10/pk	5181-3311
5	Ignitor castle		19231-20910
	Hastelloy ignitor castle (optional)		19231-21060
6	Collector insulator		G1531-20700
7	Collector body		G1531-20690
	Hastelloy collector body		G1531-21090
8	Nut, collector spanner		19231-20980
9	Collector mount		G1531-20550
10	Collector housing		G1531-20740
11	Silicone gaskets, 0.890-inch od/0.709-inch id, 12/pk		5180-4165
12	Ignitor glow plug assembly		19231-60680
13	FID ignitor cable, 7890A only		G3431-60680
	FID ignitor cable for 6890/6850 only		G1531-60680

(Continued)

7890/6890/6850 Flame Ionization Detector (FID) Supplies

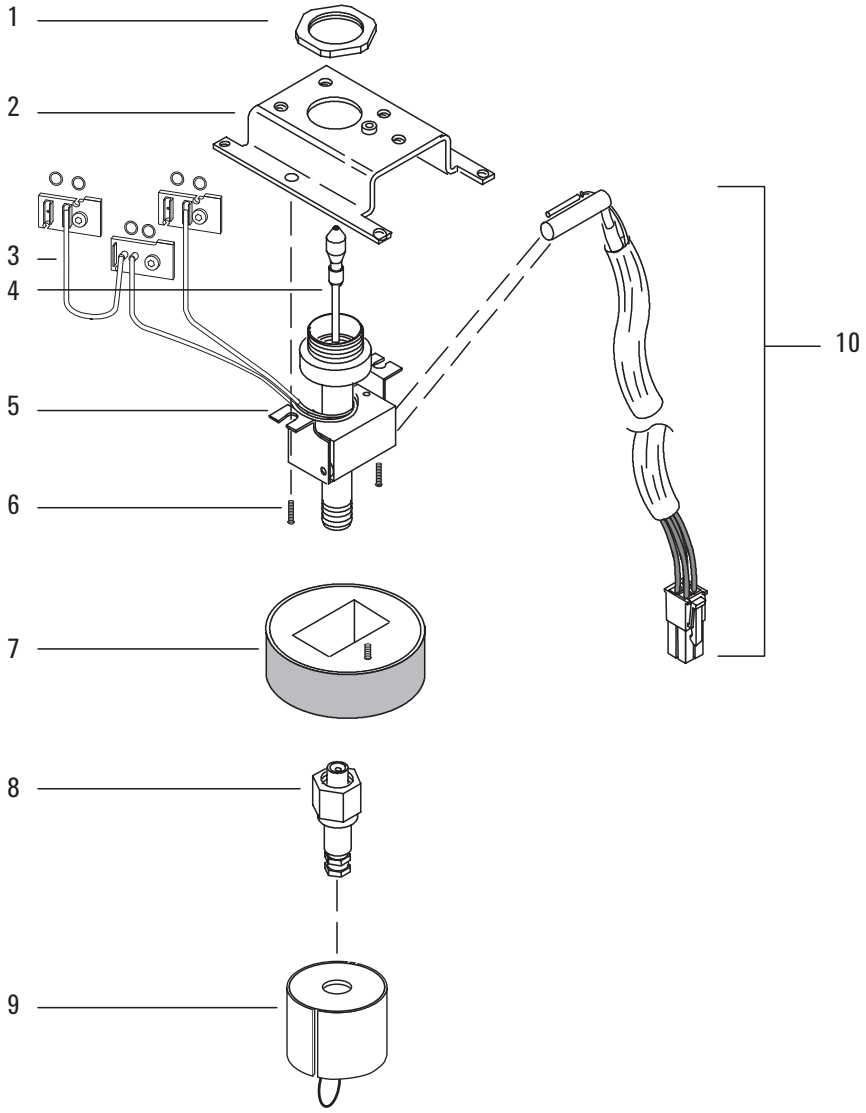
Item	Description	Unit	Part No.
	FID performance evaluation sample kit This sample is used for the HP 5880, 5890 and 6890 with a FID or TCD. Solution of 0.033% C14, C15, and C16 normal alkanes in hexane. Three 0.5 mL ampoules.		18710-60170
	FID MDL test sample for 7890 only 3 x 0.5 mL ampoules. Contains 2.36 mg/L n-Tridecane, 2.36 mg/L n-Tetradecane, 23.6 mg/mL n-Penta-decane, 23.6 mg/mL n-Hexadecane in iso-octane		5188-5372
	O-rings	12/pk	5080-4978
	FID/NPD adapter for capillary column		19244-80610
	FID/NPD 1/8 in packed column		19231-80520
	FID/NPD 1/4 in packed column		19231-80530
	1/4 in nut driver for FID jet, drilled shaft		8710-1561
	FID collector cleaning brush	2/pk	8710-1346
	FID Supplies Kit, Includes:		5182-3450
	Jet, packed standard 0.018 in id tip	3 each	18710-20119
	FID and TCD sample	2 each	18710-60170
	Ignitor glow plug assembly	2 each	19231-60680
	Jet, 0.011 in id tip, capillary adaptable	3 each	19244-80560
	FID flow measuring insert	2 each	19301-60660
	Cleaning wires for 0.03 in id jet	5/pk	5180-4150
	Cleaning wire for 0.018 in id/530 µm jet For use with 0.018 and 0.011 in id jets	5/pk	5180-4152
	Cleaning wire for 0.011 in id jet	5/pk	19301-20720
	Capillary inlet cleaning wires	5/pk	5180-4153
	FID cleaning kit		9301-0985



Flame Ionization Detector (FID) assembly

FID Base Assembly

Item	Description	Part No.
1	Base spanner nut	19231-20990
2	Thermal strap	G1531-00105
3	Screw, Torx T-10, M3 x 16 mm	G1946-20168
	Replacement O-rings	5180-4181
4	Jets	Turn to page 81.
5	Adaptable FID, base weldment with jet	G3431-80509
	Capillary column FID, base weldment with jet	G3431-80507
6	Screw, M4 x 25 mm, Torx T-20	0515-2712
7	FID block insulation	G1531-60700
8	Adaptable FID column adapters:	
	FID/NPD adapter for capillary column	19244-80610
	FID/NPD 1/8 in packed column	19231-80520
	FID/NPD 1/4 in packed column	19231-80530
9	Nut warmer insulation and cup assembly	19234-60720
10	Heater/sensor assembly	G1530-61950



FID Base Assembly

Electron Capture Detector (ECD)

The Agilent micro ECD is the most sensitive on the market, with a detection zone volume 10 times smaller than any other ECD. The replaceable liner serves as a physical stop for the column, ensuring reproducible column installation and decreasing column contamination of the cell.

Liner Selection

The only assembly that requires routine maintenance is the glass liner in the makeup gas assembly, especially for the µECD. All sample passes through the indent in the mixing liner of the µECD. The mixing liner should be replaced if there is a significant loss of sensitivity or any time the column is removed/reinstalled in the detector.

- Gigabore Liner (P/N 19233-20625): for original ECD design (5890 and 6890), brown, polyamide coating
- Mixing Liner (P/N G2397-20540): for µECD, clear glass with indent

Makeup Gas Adapter Maintenance/Installation Procedure

1. Remove the Makeup Gas Adapter from the ECD fitting with a 9/16 in wrench. Be careful not to stress the 1/16 in stainless steel gas supply tube.
2. Unscrew the end cap of the Makeup Gas Adapter and ultrasonically clean in solvent.
3. Remove the old liner.
4. Clean the Makeup Gas Adapter body with solvent in a Nalgene squeeze bottle.
5. Wipe the Makeup Gas Adapter with a clean laboratory wipe.
6. Install the replacement liner.
7. Reinstall the tip of the Makeup Gas Adapter and tighten securely.
8. Reinstall the Makeup Gas Adapter. Make sure it is fully inserted into the detector.
9. Reinstall the column.
10. Reinstall the insulation cup.

Thermal Cleaning

If your baseline is noisy or the output value is abnormally high (> 1000 Hz), and you have determined that these problems are not being caused by leaks in the GC system, you may have contamination in the detector from column bleed and sample residues. To remove contamination, you should perform a thermal cleaning (bakeout) of the detector. Bakeout the detector at 20 to 30 degrees higher than normal operating temperature (375 °C Max), with 50 to 100 mL/min of makeup gas flow.

WARNINGS & CAUTION

Detector disassembly and/or cleaning procedures other than thermal should be performed only by personnel trained and licensed appropriately to handle radioactive materials. Trace amounts of radioactive ^{63}Ni may be removed during other procedures, causing possible hazardous exposure to β and x-radiation.

Radioactivity Leak Test

Electron capture detectors must be tested for radioactive leakage at least every six months. Records of tests and results must be maintained for possible inspection by the Nuclear Regulatory Commission and/or responsible local agency. More frequent tests may be conducted when necessary.

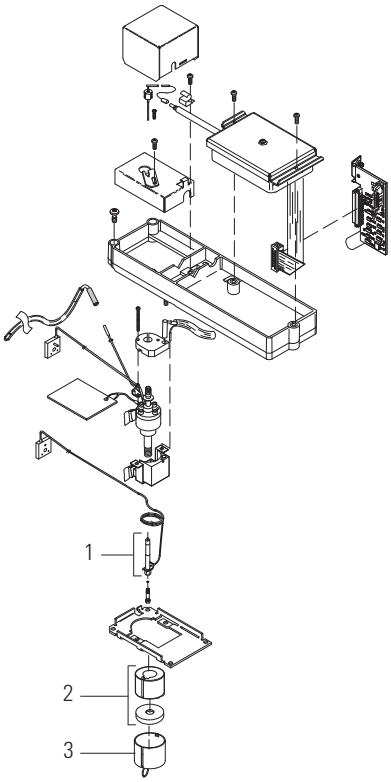
The procedure used is a "wipe test." A Wipe Test Kit is supplied with each new detector. Refer to the information card supplied in the kit for instructions on performing the test.

Gas Purity

For successful EC detection, it's important that the carrier and purge gases are very clean and dry (99.9995% minimum purity). Moisture, oxygen, or other contaminants can result in higher detector response but usually at the expense of both sensitivity and linear range. Always precondition the column before connection to the detector.

ECD Wipe Test

The Wipe Test Kit (P/N 18713-60050) included with each new ECD includes an information card with instructions for performing the test. Records of tests and results must be maintained for possible inspection by the Nuclear Regulatory Commission (NRC) and/or responsible state agency.



Electron Capture Detector (ECD) assembly

7890/6890/6850 Electron Capture Detector (ECD) Supplies

Item	Description	Part No.
1	Standard ECD makeup gas adapter*	G1533-80565
	Micro ECD makeup gas adapter	G2397-80520
	Micro ECD mixing liner, also compatible with standard ECD design	G2397-20540
	Gigabore liner for standard ECD, polyamide coating, not compatible with micro ECD	19233-20625
	ECD makeup gas adapter, 7890 only	G3433-63000
2, 3	Insulating cup	19234-60720
	ECD adapter end cap	19233-20755
	Vespel ferrule, 1/4 in	5080-8774
	1/4 in nut, brass	5180-4105
	Electron Capture Detector sample	18713-60040
	ECD test sample	5183-0379
	Micro ECD wipe test kit	18713-60050

*Includes one each of P/N 19233-20625 and 19233-20755

ECD WARNINGS

Although beta particles at this energy level have little penetrating power – the surface layer of the skin or a few sheets of paper will stop most of them – they may be hazardous if the isotope is ingested or inhaled. For this reason the cell must be handled with care. Radioactive leak tests must be performed at the required intervals, the inlet and outlet fittings must be capped when the detector is not in use, corrosive chemicals must not be introduced into the detector, and the effluent from the detector must be vented outside the laboratory environment.

Thermal Conductivity Detector (TCD)

The TCD compares the thermal conductivities of two gas flows – pure carrier gas (also called the reference gas) and carrier gas plus sample components (also called column effluent).

Filament Maintenance

The primary maintenance for a TCD involves the filament. Most procedures involve improving filament life or keeping the filament from becoming damaged or contaminated. To avoid filament damage and contamination:

- Check for leaks
- Use gas purifiers to remove oxygen
- Avoid chemically-active sample components, such as acids and halogenated compounds
- Turn off the filament when not in use

Increasing Filament Lifetime

Use the following startup process to increase filament lifetime:

Purge the detector with carrier and makeup gas for 10-15 minutes before turning on the filaments. This prevents oxidation of the filaments due to the presence of oxygen that has diffused into the cell under no flow conditions.

Cell Contamination

Cell contamination is a problem when a lower detector temperature is used to improve sensitivity. If the cell becomes contaminated, a solvent flush of the detector may help to remove the condensed material.

Solvent Flush

1. Cool the cell to room temperature and remove the column.
2. Place a septum in a nut or fitting assembly that fits onto the detector entrance (7 mm septum in a 1/8 in nut).
3. Place the nut or assembly on the detector fitting and tighten. Verify the presence of makeup gas flow.
4. Inject 20-100 µL volumes of toluene or benzene into the detector through the septum. Inject a total volume of at least 1 mL of solvent. Do not inject halogenated solvents such as methylene chloride and chloroform into the detector.
5. After the final injection, allow makeup gas to flow for 10 minutes or more. Slowly raise the temperature of the cell to 20-30 °C above the normal operating temperature.
6. After 30 minutes, decrease the temperature to the normal value and install the column as usual.

Thermal Cleaning

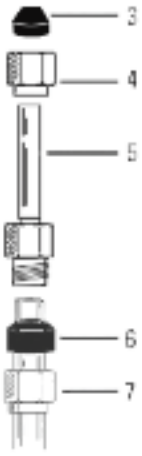
The TCD can become contaminated with deposits from such things as column bleed or dirty samples. A wandering baseline, increased noise level, or changes in response on a checkout chromatogram all indicate contamination. Thermal cleaning, or bakeout (heating the detector block to evaporate the contaminant), should be performed only after you have confirmed that the carrier gas and the flow system components are leak-free and contaminant-free.

Watch out for decreased sensitivity caused by samples that react with the filament, originating from oxygen-contaminated carrier gas, leaks in plumbing, or column bleeding. Samples with active components, such as acids and halogenated compounds can chemically attack the filament as well. Also, sample condensation will contaminate the detector cell if the temperature is too low.

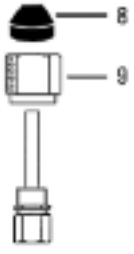
7890/6890/6850 Thermal Conductivity Detector (TCD) Supplies

Item	Description	Unit	Part No.
For 1/8 in SS Packed Column Installation			
1	Vespel/graphite ferrule, 1/8 in	10/pk	0100-1332
2	1/8 in nut, brass	10/pk	5180-4103
For 1/4 in SS Packed Column Installation			
3	Vespel/graphite ferrule, 1/8 in	10/pk	0100-1332
4	1/8 in nut, brass	10/pk	5180-4103
5	1/4 in packed column adapter		G1532-20710
6	Vespel ferrule, 1/4 in	10/pk	5080-8774
7	1/4 in nut, brass	10/pk	5180-4105
For Capillary Column Installation (Standard)			
	TCD capillary column adapter		G1532-80540
8	Vespel/graphite ferrule, 1/8 in	10/pk	0100-1332
9	1/8 in nut, brass	10/pk	5180-4103
	Universal column nut	2/pk	5181-8830
	6850 column nut	2/pk	5183-4732
	530 µm, 1.0 mm id graphite ferrule	10/pk	5080-8773
	320 µm, 0.5 mm id graphite ferrule	10/pk	5080-8853
	TCD sample		18711-60060
	FID and TCD sample		18710-60170

1/8 in SS packed column



1/4 in SS packed column



Standard design

Installing a Capillary Column in the TCD

WHAT YOU NEED:

- Front ferrule
- Back ferrule
- Column nut
- Column cutter
- 7/16 in wrench
- Lab tissue
- Lint-free gloves

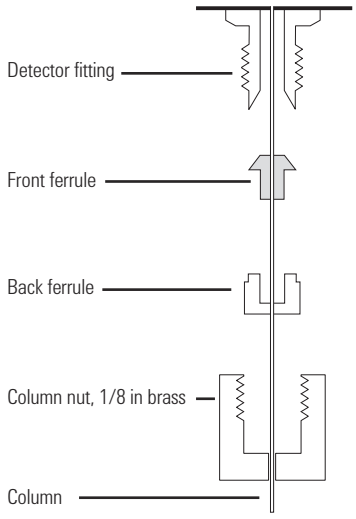
1. Gather the required supplies and tools.
2. Assemble the ferrules and 1/8 in brass Swagelok nut on the column.
3. Score the column using a glass scribing tool. The score must be square to ensure a clean break.
4. Break off the column end by supporting it against the column cutter opposite the scribe. Inspect the end with a magnifying loupe to make certain that there are no burrs or jagged edges.
5. Wipe the column walls with a tissue dampened with isopropanol to remove fingerprints and dust.
6. Insert the column into the detector until it bottoms.
7. Slide the column nut and ferrules up the column to the detector and finger tighten the nut.
8. Pull out 1 mm of column. Tighten the nut an additional 1/4 turn with a wrench or until the column does not move.

WARNINGS & CAUTION

- The oven and/or inlet may be hot enough to cause burns. If either is hot, wear heat-resistant gloves to protect your hands.
- Wear safety glasses to protect your eyes from flying particles while handling, cutting or installing glass or fused silica capillary columns. Use care in handling these columns to prevent puncture wounds.
- Wear clean, lint-free gloves to prevent contamination of parts with dirt and skin oils.

TCD Ferrules

Column ID (mm)	Back Ferrules	Front Ferrules, 10/pk
0.53	5182-3477	5182-9673
0.32	5182-3477	5182-9676
0.25/0.2/0.1	5182-3477	5182-9677
No hole	5182-3477	5182-9679
1/8 in nut, brass, 10/pk	5180-4103	



Determining the TCD Electronic Pressure Control (EPC)

If you have a 6890A or 6890A Plus GC, you may have an older design EPC flow manifold for the TCD. The older design requires removal of sheet metal panels to attach the TCD reference flow gas supply inside the GC. The new "Minifold" design allows TCD reference gas to be connected directly to the back of the GC. Replacement TCD filament block assemblies have different part numbers depending on the EPC design type.

Once you have determined the type of EPC module, consider ordering a passivated filament block assembly, which is recommended for fatty acid analysis or reactive/acidic samples.

TCD Filament Block Assemblies

Instrument	Passivated	Applications	Specifications	EPC Design	Part No.
7890A	Yes	Standard TCD Analysis Gases/Hydrocarbons	Complete Detector Assembly Includes detector palette and heater/sensor assembly	Original	G3432-60220
7890A	Yes	Standard TCD Analysis Gases/Hydrocarbons	Complete Detector Assembly Includes detector palette and heater/sensor assembly Third detector, side mounted	Original	G3432-60221
6890	No	Standard TCD Analysis Gases/Hydrocarbons	Filament Block Only Must reuse heater/sensor	Original	G1532-60675
6890	No	Standard TCD Analysis Gases/Hydrocarbons	Filament Block Only Must reuse heater/sensor	Minifold	G1532-60685
6890	Yes	Recommended for Fatty Acid Analysis	Filament Block Only Must reuse heater/sensor	Original	G1532-60690
6890/6850	Yes	Recommended for Fatty Acid Analysis	Filament Block Only Must reuse heater/sensor	Minifold	G1532-60695
6890/6850	No		Complete Detector Assembly Includes detector palette and heater/sensor assembly	Minifold	G2630-61230

Flame Photometric Detector (FPD)

In 2005, Agilent released an improved FPD with minimum detectable levels (MDL) of 3.6 pg/s for sulfur and 60 fg/s for phosphorus. This is more than a 5 times improvement for sulfur. The updated design is based on a one-piece, deactivated transfer line jet assembly and improved optics. Upgrade kits are available.

Operation

The FPD uses three gases: air and hydrogen to support the flame, and nitrogen makeup for capillary columns. The flow rates are critical for optimizing performance. Using nitrogen as a makeup gas is essential to obtaining low MDLs. Do not use helium for the makeup gas.

Recommended Gas Flows

Detector Gas Flows	Phosphorus Mode	Sulfur Mode
Air	100 mL/min	60 mL/min
Hydrogen	75 mL/min	50 mL/min
Nitrogen makeup	60 mL/min	60 mL/min

Maintenance

Managing gas purity; contamination from column bleed, sample residue, and corrosion; and air leaks can help keep your FPD at peak performance.

Glow plug, 0854-0141

Gas Purity

Sulfur contamination is a common problem and causes noise and/or a higher baseline offset in the FPD. To minimize sulfur contamination and achieve the lowest MDLs, use at least 99.9995% pure gases, clean tubing, and regulators with metal diagrams. To protect your FPD over its lifetime, Agilent recommends gas generators or supply gas filters designed to remove sulfur.

For more information on Gas Clean Filters, see pages 132-133

Contamination

The FPD is susceptible to build up of residue on the surfaces of the ignitor coil, jet, combustion chamber, and chamber window. The residue increases detector offset and reduces the signal-to-noise ratio. The sample or column bleed usually cause the residue. After a period of time, you may need to rebuild the detector and replace the transfer line. Do not clean the transfer line, jet, or other parts with brushes or solvents.

To increase the time between servicing, remove the column, cap off the detector, and run it at 250 °C with the flame to bake off some of the residue. Replacing the ignitor may reduce baseline output. If these tactics are not effective, rebuild the detector.

If your solvent or sample is corrosive, it can erode the aluminum vent tube. Agilent recommends using alternative stainless steel vent tubes for these applications.

Air Leaks

The original FPD design has three more internal seals than the new design. Temperature cycling of the detector causes the ferrules to shrink and leaks to occur. The most common leaks are around the fused silica transfer line. To eliminate these leaks, remove the detector from the GC and tighten the transfer line fittings.

For both the original and new FPD, leaks can develop at the column nut or capillary column adapter, the gang fitting at the EPC module, around the vent tube, or around the ignitor glow plug. If you are replacing fittings or O-rings, always use conditioned, graphitized-vespel ferrules and Agilent's low sulfur O-rings. Make sure ferrules are the correct size for your column.

Flame Ignition Problems

You can tell if your FPD is lit by checking the detector "Output" and "Flame" on the display. The detector senses that the flame is on by comparing the output with the offset. An optimized FPD normally runs with an output in the range of 30 to 80 with the offset point at 2.0. If the flame is out and the electrometer is on, the output usually displays less than 1.

Most FPD ignition problems are caused by incorrect gas flows, incorrect column installation, or a dirty or defective ignitor. To troubleshoot:

1. Make sure the FPD is at operating temperature before trying to light.
2. Remove the rubber drip tube while lighting the FPD.
3. Increase air supply pressure by 10-20 psi.
4. Check the detector gas flows to see if they match the Recommended Gas Flows table.
5. Check the detector output when you turn the flame on. The photomultiplier will see the glow of the ignitor and jump to about 68000 pA.
6. Remove the column and check the tip for residue or burnt polymide coating. If it appears damaged, cut off the damaged portion and reinstall to the proper height.
7. Remove the ignitor glow plug. If dirty or damaged, replace it.

Less common problems include leaks, quenching, and condensation:

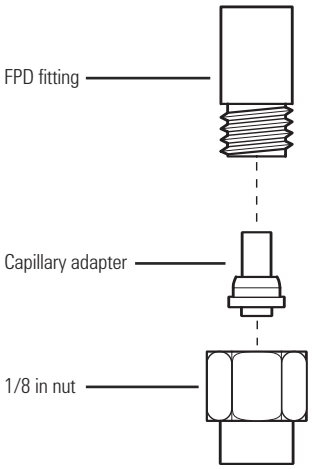
- Large air leaks at the inlet or detector can reduce the percentage of the hydrogen-air mixture at the detector and cause ignition problems.
- Large injections of certain samples can cause flameouts or quenching that cause the detector to attempt to relight, interrupting your analysis.
- Condensation is a by-product of the burning of your sample. For many analyses, the liquid is collected from the vent tube. If the liquid drips back into the detector, it will extinguish the flame. Agilent recommends that you wait to light the flame until the detector is at temperature and equilibrated.
- Light leaks at the vent tube can cause a higher baseline offset. Make sure the vent tube ferrule seals tightly against the emission block. Keep the lid closed over the detector.

TIPS & TOOLS

Helium is not a good makeup gas for the FPD. You will not be able to light or keep the detector lit in the sulfur mode with helium.

Installing a Capillary Column Adapter to the FPD

1. Gather the required supplies and tools.
2. Load the GC maintenance method and wait for the GC to become ready.
3. Insert the capillary adapter into the 1/8 inch nut as shown, then thread the nut onto the detector fitting.
4. Finger-tighten the nut, then tighten an additional 1/8 turn with a wrench.



WHAT YOU NEED:

- FPD capillary column adapter
- Column cutter
- 1/4 in and 9/16 in wrenches
- Metric ruler
- 1/8 in nut
- Lint-free gloves

WARNINGS & CAUTION

- The oven and/or inlet may be hot enough to cause burns. If either is hot, wear heat-resistant gloves to protect your hands.
- Wear safety glasses to protect your eyes from flying particles while handling, cutting or installing glass or fused silica capillary columns. Use care in handling these columns to prevent puncture wounds.
- Wear clean, lint-free gloves to prevent contamination of parts with dirt and skin oils.

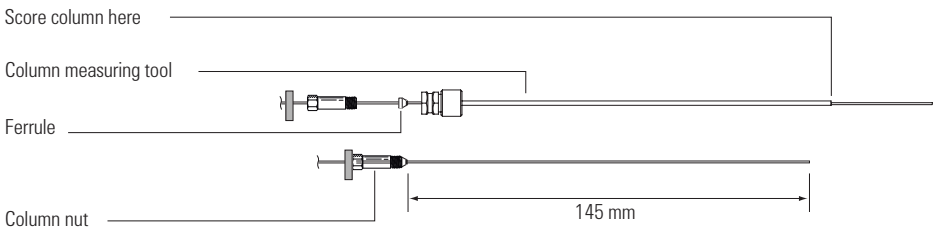
WHAT YOU NEED:

- Column measuring tool, P/N 19256-80640
- Column cutter
- 1/4 in and 7/16 in wrenches
- Column nut
- Ferrule
- Capillary column
- Lint-free gloves

Attaching a Capillary Column to the FPD

1. Gather the required supplies and tools.
2. Load the GC maintenance method and wait for the GC to become ready.
3. Assemble a septum, column nut, and ferrule on the end of the column.
4. Insert the end of the column through the column measuring tool so that the end protrudes beyond the tool.
5. Tighten the column nut until it grips the column. Tighten the nut an additional 1/8 to 1/4 turn with a pair of wrenches. Snug the septum against the base of the column nut.
6. Use a wafer cutter at 45° to score the column.
7. Snap off the column end. The column may protrude about 1 mm beyond the end of the tool. Inspect the end with a magnifying loupe to make certain that there are no burrs or jagged edges.
8. Remove the column, nut, and swaged ferrule from the tool.
9. Wipe the column walls with a tissue dampened with isopropanol to remove fingerprints and dust.
10. Verify that a capillary adapter is installed in the detector fitting.
11. Carefully thread the swaged column up into the adapter. Finger-tighten the column nut, then use a wrench to tighten an additional 1/8 turn.

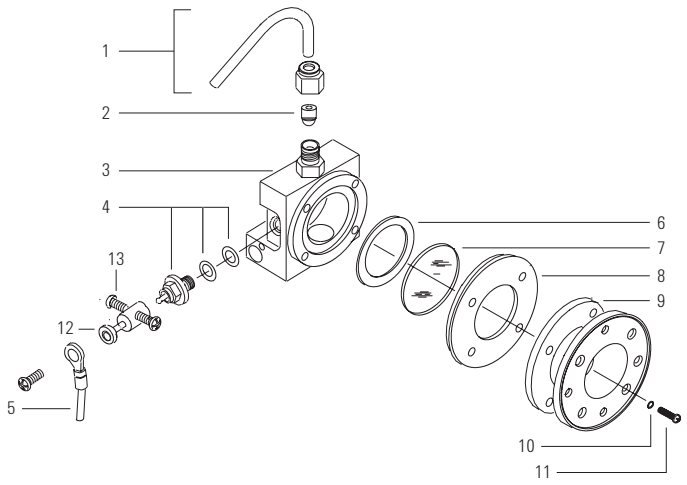
If you are using a capillary column, the tip of the column must be at least 1 mm below the surface of the jet. When you install the column, measure the distance from the sealing surface of the ferrule to the tip of the column. This measurement is 153 mm for the original FPD and 145 mm for the new FPD. For the new design, Agilent recommends using the column measuring tool, part number 19256-80640.



7890/6890/6850 FPD Ignitor and Heat Shield Assembly

Item	Description	Part No.
1	FPD Exit Tube Assembly	
	Aluminum	19256-60700
	Stainless steel	19256-20705
2	Vespel ferrule, 1/4 in, 10/pk	5080-8774
3	Emission chamber	
	FPD, single	19256-80560
	FPD, dual	19256-80600
4	FPD ignitor replacement kit	19256-60800
	O-ring, size 2-010	0905-1610
	Spacer, ignitor	19256-20590
	Glow plug	0854-0141
5	Ignitor cable assembly	G1535-60600
6	Heat shield gasket, white	19256-80045
7	First heat shield window	19256-80030
8	Heat shield disk	19256-20580
9	Stainless steel coupling	19256-20550
10	Lock washer (4 required)	2190-0584
11	Screw, M3 x 12 mm, T10 (4 required)	0515-1084
12	Collar	19256-20690
13	Screw, M3 x 66 mm, T10	0515-0680
	FPD check out sample	5188-5953
	FPD sample	5188-5245

Glow plug, 0854-0141



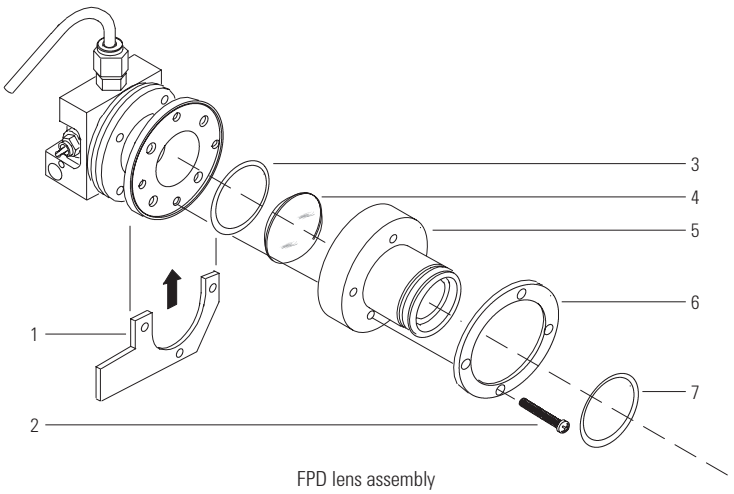
FPD ignitor and heat shield assembly

FPD Lens Assembly

Item	Description	Part No.
1	Clamp	19256-00090
2	Screw, M3 x 25 mm (4 required)	0515-0683
3	Window O-ring, inner, 0.926 in id, orange	5061-5886
4	Convex lens	1000-1438
5	Lens housing	19256-20900
6	Flange ring	19256-00200
7	Fluorocarbon Elastomer O-ring, brown, 1.239 in id	5061-5890

TIPS & TOOLS

Track detector output – when it increases by 50%, remove the column, bake it out, replace the ignitor, or rebuild the detector.



FPD lens assembly

FPD Photomultiplier Tube (PMT) and Bracket Assemblies

Description	Part No.
Chimney back cover	G1535-80520
Heator/sensor assembly	G1535-60610
Transfer line support bracket	19256-00320
Bracket/support	G1535-00010
Sulfur filter, 7890 and late model 6890*	1000-1437
Sulfur filter, blue, early model 6890*	19256-80000
Phosphorus filter, yellow	19256-80010
Filter spacer (used only with sulfur filter)	19256-20910
PMT housing assembly	19256-60510
Dual FPD chimney front	G1535-00030

*Please contact Agilent technical support for assistance in selecting the correct sulfur filter for your 6890 FPD detector.

Nitrogen Phosphorus Detector (NPD)

NPD Beads

The NPD for the 7890/6890 GC features a ceramic bead selective for nitrogen and phosphorous compounds. Agilent offers three beads:

- Blos bead
- White ceramic bead
- Black ceramic bead

Compared to the white ceramic bead, the new Blos bead provides:

- Superior bead lifetime
- Faster attainment of stable operation at initial start-up, as well as more stable operation throughout bead's lifetime
- Superior sensitivity and selectivity for phosphorous-containing compounds
- Similar sensitivity and selectivity for nitrogen-containing compounds
- Superior immunity to moisture

The white ceramic bead exhibits some tailing for phosphorous compounds. The black ceramic bead does not exhibit peak tailing and typically has a longer lifetime than the white bead; however, it is less sensitive.

All Agilent NPD beads are preconditioned, self-aligning for installation and include a proof-of-performance chromatogram.

NPD Beads

Description	Part No.
Blos NPD bead assembly	G3434-60806
NPD white ceramic bead assembly	G1534-60570
NPD black ceramic bead assembly	5183-2007

Blos NPD bead assembly, G3434-60806

NPD Gas Flow

The hydrogen, air and makeup gas flows should be measured frequently. They can drift over time or be changed unintentionally without knowledge of it occurring. Each gas flow should be measured independently to obtain the most accurate values. NPDs are very sensitive to changes in the gas flows and consistent flows are necessary to maintain performance levels.

Measuring NPD Flows

1. Set the bead voltage to 0.0 V.
2. Cool the NPD to 100 °C.
3. Remove the bead and store it carefully until re-installation.
4. Insert the NPD flow meter adapter tool into the NPD collector.
5. Attach the flow-measuring insert to the NPD flow meter adapter tool.
6. Place the flow meter tubing over the flow-measuring insert to begin measuring flows.

NPD Gas Purity

Because of its high sensitivity, the NPD requires very pure gases (99.999% or better). We strongly recommend that moisture and hydrocarbon traps be used on the carrier gas and all detector gases, including the detector hydrogen, air, and makeup gases. Dirty gases will not only give poor chromatographic performance, but will shorten the bead life as well.

TIPS & TOOLS

Agilent has a comprehensive offering of GC columns, designed and manufactured to provide excellent and reproducible performance for the benign to the most difficult types of samples. Learn more at **www.agilent.com/chem/mygccolumns**

Cleaning and Replacement

The NPD requires periodic cleaning. In most cases, this only involves the collector and the jet. Agilent provides brushes and wires that simplify the cleaning of all detector parts. The brushes are used to dislodge particulates clinging to the metal surfaces. A fine wire is used to clean the jet opening of particulates. Do not force too large a wire or probe into the jet opening or the opening will become distorted. A loss of sensitivity or poor peak shape may result if the opening is deformed. The various parts can be ultrasonicated after cleaning with a brush. Eventually the jet needs to be replaced, so it is strongly recommended to have spare jets on hand.

Over time, residue from the bead or sample can build up in the collector and cause baseline problems. You should clean the collector after you have damaged the bead two or three times.

The metal C-rings wear slightly with each assembly and disassembly. After several assemblies and disassemblies (five or more), the rings may not seal effectively, causing an erratic baseline. A ceramic insulator and seal kit is available (P/N 5182-9722). Always cool the detector to near-ambient when changing seals and insulators.

Because there is no flame in the NPD, the jet does not collect silica and soot as does the FID jet. Although you can clean the jet, it is more practical to simply replace dirty jets with new ones. If you do clean the jet, use the cleaning wire, taking care not to damage the inside of the jet. You can also use a sonicator bath to clean the jet.

Contaminants

Some chemical problems can also arise when using the NPD. Because it is a trace detector, be careful not to contaminate the analytical system.

Glassware

Glassware must be very clean. Phosphate detergents should be avoided, so acid washing of glassware followed by distilled water and solvent rinsing is recommended.

Solvents

Solvents should be checked for purity. Chlorinated solvents and silanizing reagents can decrease the useful lifetime of the alkali source; excess reagent should be removed prior to injection, if possible.

Other Contamination Sources

Phosphate-containing leak detectors, phosphoric acid-treated columns or glass wool, polyimide-coated columns, or nitrogen-containing liquid phases can add noise to the system and should be avoided.

NPD Jet Identification and Selection

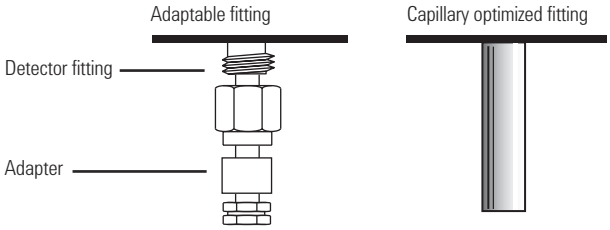
Before ordering parts for NPD maintenance, determine which type of NPD is installed on your GC. The NPD is available in two versions:

- Dedicated, Capillary Optimized: for capillary columns only
- Adaptable: for packed or capillary columns

Hint: Adaptable jets are longer than dedicated capillary jets.

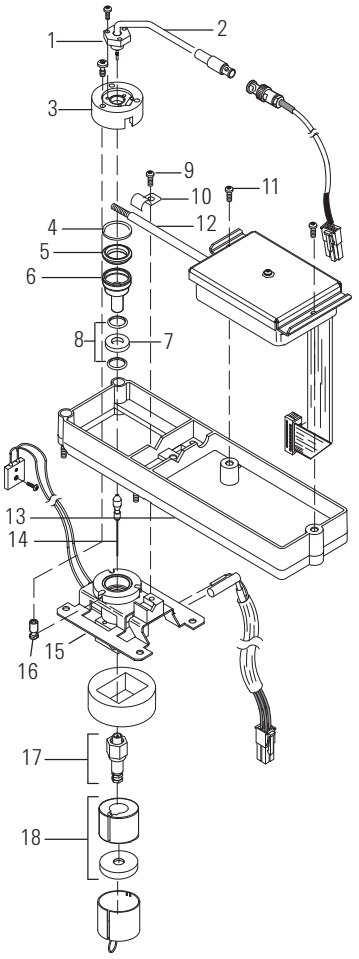
NPD Jets

Description	Jet Tip ID	Length (mm)	Part No.
Jets for capillary optimized fittings			
Capillary with extended jet (recommended)	0.29 mm (0.011 in)	51.5	G1534-80580
Capillary	0.29 mm (0.011 in)	42.8	G1531-80560
Capillary	0.47 mm (0.018 in)	42.8	G1531-80620
Jets for adaptable fittings			
Capillary with extended jet (recommended)	0.29 mm (0.011 in)	70.5	G1534-80590
Capillary	0.29 mm (0.011 in)	61.5	19244-80560
Capillary	0.47 mm (0.018 in)	61.5	19244-80620
Packed	0.46 mm (0.018 in)	63.5	18710-20119



7890/6890/6850 Nitrogen Phosphorus Detector (NPD) Supplies

Item	Description	Part No.
1	Screws, M3 x 0.5, 8 mm (Pozidriv)	0515-0655
2	NPD white ceramic bead assembly	G1534-60570
	NPD black ceramic bead assembly	5183-2007
3	Lid weldment	G1534-80510
4	Metal C-ring, top	0905-2580
5	Alumina insulator, upper	G1534-40020
6	Collector funnel	G1534-20530
7	Alumina insulator, lower	G1534-40030
8	Metal C-ring, bottom	0905-1284
9	Screw, M4 x 07, 10 mm	0515-2495
10	J-Clamp	1400-0015
11	Screw, M4 x 07, 10 mm	0515-2495
12	NPD interconnect assembly	G1534-60610
13	Mounting pallet	G1531-40020
14	Jet, 0.011 in/0.29 mm id tip, capillary dedicated	G1531-80560
	Jet, 0.011 in id tip, capillary adaptable	19244-80560
	Jet, packed standard 0.018 in id tip	18710-20119
15	Base weldment, capillary NPD for 6890/6850 only	G1534-80500
	Base weldment, packed NPD for 6890/6850 only	G1534-80540
	Base weldment, capillary NPD, 7890A	G3434-67500
	Base weldment, packed NPD, 7890A	G3434-67540
16	Lid stop	G1534-20590
	NPD ceramic insulator kit Includes items 4, 5, 7, and 8	5182-9722
17	FID/NPD adapter for capillary column	19244-80610
	FID/NPD 1/8 in packed column	19231-80520
	FID/NPD 1/4 in packed column	19231-80530
18	Insulating cup	19234-60720
	Vespel ferrule, 1/4 in, 10/pk	5080-8774
	530 µm, 1.0 mm id graphite ferrule, 10/pk	5080-8773
	320 µm, 0.5 mm id graphite ferrule, 10/pk	5080-8853
	1/4 in nut, brass, 10/pk	5180-4105
	Universal column nut, 2/pk	5181-8830
	Nitrogen Phosphorus Detector sample	18789-60060



Nitrogen Phosphorus Detector (NPD) assembly

Nitrogen Chemiluminescence Detector (NCD)

Nitrogen and Sulfur Chemiluminescence Detectors

The Agilent 355 Sulfur Chemiluminescence Detector (SCD) is the most sensitive and selective chromatographic sulfur detector available for the analysis of sulfur compounds.

The Agilent 255 Nitrogen Chemiluminescence Detector (NCD) is a nitrogen-specific detector that produces a linear and equimolar response to nitrogen compounds based on a chemiluminescent reaction of NO with ozone. Even complex sample matrices can be analyzed with little or no interference.

Dual plasma burner accessory kit, G6600-60038

Replacement oil coalescing filter, G6600-80042

Replacement oil coalescing filter for oil mist filter, G6600-80044

Replacement odor filtration element, G6600-80045

Nitrogen Chemiluminescence Detector (NCD) Supplies

Description	Part No.
Dual plasma burner accessory kit Includes ferrules, fittings and quartz tube	G6600-60038
PM Kit, DP RV5 oil pump Includes 6 chemical traps for ozone destruction, 3 oil coalescer elements and 4 (1 qt) bottles of synthetic oil	G6600-67007
PM Kit, dry piston pump Includes 4 chemical traps for ozone destruction and 2 repair kits for pump	G6600-67008
12-month maintenance kit Includes 6 qt oil, 12 chemical traps, 4 oil filter elements, 2 sets of ceramic tubes, and 2 O-rings	G6600-67009
Replacement oil coalescing filter	G6600-80042
Oil mist filter for RV5 pump	G6600-80043
Replacement oil coalescing filter for oil mist filter	G6600-80044
Replacement odor filtration element	G6600-80045
O-ring, 1.3614 in id	G6600-80050
O-ring, 1.301 in id	G6600-80051
Dual plasma quartz tube	G6600-80063
Mobil 1 synthetic oil	G6600-85001
Oil, Edwards Ultragrade for RV3 and RV5 pumps	G6600-85002
Spare column nut and ferrule kit	G6600-80018

Sulfur Chemiluminescence Detector (SCD) Supplies

Description	Part No.
PM Kit, dry piston pump Includes dry piston seal, 6 Moleculite vacuum pump traps and 1 set of ceramic tubes	G6600-67006
PM Kit, dry piston pump Includes 4 chemical traps for ozone destruction and 2 repair kits for pump	G6600-67008
Dual plasma burner accessory kit	G6600-60037
Mobil 1 synthetic oil	G6600-85001
Oil mist filter for RV5 pump	G6600-80043
Oil, Edwards Ultragrade for RV3 and RV5 pumps	G6600-85002
O-ring, 1.301 in id	G6600-80051
Ozone destruction chemical trap	G6600-85000
Replacement oil coalescing filter for oil mist filter	G6600-80044
Sulfur chemiluminescence test sample	G2933-85001
Sulfur trap For carrier H_2 and air gases; one required for each cylinder of gas (3 total)	G2933-85003
Spare column nut and ferrule kit	G6600-80018

Miscellaneous Instrument Parts and Supplies

Description	Part No.
Oven exhaust deflector for 6890	G1530-80650
Oven exhaust deflector for 6850	G2630-60710

Sulfur Chemiluminescence Detector (SCD)

PM kit, G6600-67008

Dual plasma burner accessory kit, G6600-60037

Oil mist filter, G6600-80043

GC Standards

GC Qualitative Standards

Description	Part No.
Qualitative Simulated Distallation Standards	
Boiling Point Calibration Sample No. 1	5080-8716
Low Boiling Point Calibration Sample No. 220	5080-8768
Boiling Point Calibration Sample No. 320	5080-8769
PolyWax 500, 1 g, neat	5188-5316
PolyWax 655, 1 g, neat	5188-5317
Qualitative Petrochemical Standards	
Alcohol in Gasoline Sample	18900-60640
Natural Gas Sample	5080-8756
Transformer Gas Sample	5080-8759
Refinery Gas Sample	5080-8755
Reference Gas Oil No. 1, Batch 2	5060-9086
Miscellaneous Qualitative Standards	
Nickel Catalyst Test Sample	19354-60510
Nickel Catalyst refill	5080-8761
MIDI System Calibration Standard	19298-60500
Oral Fluids Analyzer Test Sample	G1540-85010

GC/MS Parts and Supplies

Your mass spectrometer is a sensitive, specialized device that delivers a higher level of functionality than other GC detectors. To continue achieving optimal results, it is critical to maintain your system properly by performing the essential tasks within this section. Some of the benefits of maintaining your GC/MSD include:

- Less downtime for repairs
- Longer lifetime for your MSD system
- Reduction in overall operating costs

It is advisable to keep a log book of system performance, Autotune, and maintenance operations performed. This makes it easier to identify variations from normal performance and to take corrective action.

Maintenance Schedule

Task	Every week	Every 6 months	Every year	As needed
Tune the MSD				✓
Change injection port liners	✓			
Check the foreline pump oil level	✓			
Gas ballast the foreline pump	✓			
Check the calibration vial		✓		
Replace the foreline pump oil		✓		
Check the diffusion pump fluid	✓			
Replace the diffusion pump fluid			✓	
Replace the dry pump diaphragm seals (MVP55)				✓
Replace the dry pump tip seals (IDP3)			✓	
Replace the traps and filters			✓	
Clean the ion source				✓
Change the carrier gas trap(s) and purifier				✓
Replace worn out parts				✓
Lubricate seals (where appropriate)				✓
Replace column				✓

MSD Contamination

Contamination is usually identified by excessive background in the mass spectra, which can come from the GC or MSD. The source of contamination can sometimes be determined by identifying the contaminants. Some contaminants are much more likely to originate in the GC, while others are likely to originate in the MSD.

Contamination Sources in the GC

- Column or septum bleed
- Dirty injection port
- Injection port liner
- Contaminated syringe
- Poor quality carrier gas
- Dirty carrier gas tubing
- Fingerprints
- Air leaks
- Cleaning solvents and materials

Contamination Sources in the MSD

- Air leaks
- Cleaning solvents and materials
- Fingerprints inside the manifold
- Diffusion pump fluid
- Foreline pump oil

The action required to remove contamination depends on the type and level of contamination. Minor contamination by water or solvents can usually be removed by allowing the system to pump (with a flow of clean carrier gas) overnight. Serious contamination by rough pump oil, diffusion pump fluid or fingerprints is much more difficult to remove and may require extensive cleaning.

Air Leaks

Air leaks are a problem for any instrument that requires a vacuum to operate. Leaks are generally caused by vacuum seals that are damaged or not fastened correctly.

Symptoms of leaks

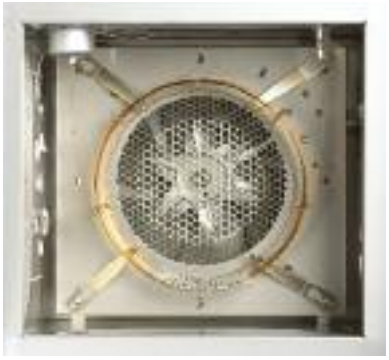
- Higher than normal vacuum manifold pressure or foreline pressure
- Higher than normal background
- Peaks characteristic of air (m/z 18, 28, 32, and 44 or m/z 14 and 16)
- Poor sensitivity
- Low relative abundance of m/z 502 (this varies with the tune program and MSD used)

Remedy

- Check interface nut for tightness. Replace if necessary.
- Check and leak test the GC injection port.

Leaks can occur in other places in the MSD, including the following:

- GC/MSD interface column nut
- Side/top plate O-ring (all the way around)
- Vent valve O-ring
- Calibration valve
- High vacuum gauge tube/controller fitting
- Cracked ion gauge tube (5973/5972/5971)
- Front and rear end plate O-rings
- GC/MSD interface O-ring (where the interface attaches to the vacuum manifold)
- Diffusion pump co-seal
- Baffle adapter O-ring
- Turbomolecular pump O-ring
- Vespel/Graphite ferrules, when heated



Cleaning Solvents

It is common to see cleaning solvent peaks in the mass spectra shortly after the ion source is cleaned.

Remedy

- Dry all cleaned metal parts in the GC oven before reassembling and reinstalling them. Refer to specific cleaning procedures in your MSD Hardware Manual or MSD Maintenance and Troubleshooting Manual.
- Use a temperature above the boiling point of the solvent but below the limit of the column.

Fingerprints

Fingerprints contain hydrocarbons that can appear in mass spectra. Hydrocarbon contamination is characterized by a series of mass peaks 14 m/z apart. The abundances of these peaks decrease as peak mass increases. Fingerprint contamination is usually caused by the failure to wear lint-free, nylon gloves during ion source cleaning, GC inlet maintenance, or from installing the column. Use special care to avoid recontamination of parts after you clean them. This typically occurs after some maintenance or part replacement.

Remedy

Reclean using clean, nylon gloves and proper cleaning techniques.

MSD Contamination Identification

The following table lists some of the more common contaminants, the ion characteristics of those contaminants, and the likely sources of those contaminants.

Common Contaminants

Ions (m/z)	Compound	Possible Source
13, 14, 15, 16	Methane	CI gas
18, 28, 32, 44 or 14, 16	H_20, N_2, O_2, CO_2, CO_2 or N, O	Residual air and water, air leaks, outgassing from Vespel ferrules
31, 51, 69, 100, 119, 131, 169, 181, 214, 219, 264, 376, 414, 426, 464, 502, 576, 614	PFTBA and related ions	PFTBA (tuning compound)
31	Methanol	Cleaning solvent
43, 58	Acetone	Cleaning solvent
78	Benzene	Cleaning solvent
91, 92	Toluene or Xylene	Cleaning solvent
105, 106	Xylene	Cleaning solvent
151, 153	Trichloroethane	Cleaning solvent
69	Foreline pump fluid or PFTBA	Foreline pump oil vapor or calibration valve leak
73, 147, 207, 221, 281, 295, 355, 429	Dimethylpolysiloxane	Septum bleed or methyl silicone column coating
77, 94, 115, 141, 168, 170, 262, 354, 446	Diffusion pump fluid	Diffusion pump fluid and related ions
149	Plasticizer (phthalates)	Vacuum seals (O-rings) damaged by high temperatures, use of vinyl or plastic gloves
Peaks spaced 14 amu apart	Hydrocarbons	Fingerprints, foreline pump oil

The easiest way to insure that you minimize background contamination and remove damaging oxygen from your carrier gas system is to use a carrier gas purifying trap right before the gas enters your GC system.

Column bleed generally appears as a continuous and increased rise in the baseline at higher column temperatures, especially at or near the upper temperature limit of the GC column. Septum bleed usually appears as discrete peaks, and can occur at any temperature.

A crude sign of a "leak-free" MS system is when the ion ratio of m/z 28 (nitrogen) over m/z 32 (oxygen) is approximately two or greater.

Even preconditioned ferrules can shrink slightly at very high temperatures. If leak problems persist upon a new column installation, check this fitting first.

Mass Spectrometer Symptoms

Mass spectrometer symptoms can typically be classified as either affecting system sensitivity or affecting the repeatability of a measurement. Most symptoms can be corrected by following the suggested corrective actions.

Mass Spectrometer Symptoms

Symptoms	Remedy
Sensitivity	
Wrong retention time	Check GC, method, application and carrier gas velocity.
Low signal	Check GC, tune vacuum system.
Leaking injection port	Clean the injection port. Replace the injection port liner and septa.
Air leak	Check and tighten interface nut, leak test GC injection port.
Peak widths	Do Autotune, check flow rate and temperature stability.
Interfering peaks	Check time parameters, coeluting peaks, column type.
Excessive background	Do Autotune and compare to background specifications. Check time parameters.
Incorrect mass assignment	Retune.
Abnormal spectra – excessive background contamination	Check for contamination.
Incorrect tuning	Check tune file, retune, check sample.
Repeller voltage is too low	Raise voltage to test for response.
Dirty ion source	Clean source.

(Continued)

Mass Spectrometer Symptoms	
Symptoms	**Remedy**
Repeatability	
Dirty syringe needle	Clean or replace the syringe.
Wrong syringe needle	Replace syringe and septa.
Leaking injection port	Perform injection port maintenance. Replace the injection port liner, septa and liner O-ring.
Injection is too large	Check method and injection volume, split ratio and/or splitless purge time.
Loose column connections	Tighten column nuts on injection port or transfer line. Replace column nuts and ferrule.
Variations in pressure, column flow and temperature	Ensure the MSD is located in an environment where the temperature is stable. Keep MSD out of drafts and direct sunlight. Check that the carrier gas is steady and well regulated. Service the foreline pump and/or diffusion pump.
Dirty ion source	Clean source.
Loose connections in the analyzer	Check internal and external analyzer wiring conections, make sure all are secure.
Ground loops	Check main electrical lines.

5975 MSD

Cleaning and Maintenance Supplies

Description	Part No.
One Year Maintenance Kit (for diffusion pump systems) Includes Big Universal Trap for He (1/8 in), abrasive sheets (5/pk), lint-free cloths (15/pk), cotton swabs (100/pk), SantoVac Ultra, 18.5 mL (2 each), rough pump oil (1 L), filament assembly, octafluoronapthalene (OFN)	5183-2096
Nylon gloves, lint-free, large, 1 pair	8650-0030
Nylon gloves, lint-free, small, 1 pair	8650-0029
Lint-free industrial wipes, 100% cotton, 9 x 9 in, 300/pk	9310-4828
Ion source cleaning kit Includes lint-free cloths (15/pk), abrasive sheets (5/pk), cotton swabs (100/pk), lint-free nylon gloves, abrasive Alumina powder	5181-8863
Cloths, lint-free, 15/pk	05980-60051
Cotton swabs, 100/pk	5080-5400
Abrasive sheets, aluminum oxide green lapping paper, 600 mesh, 5/pk	5061-5896
Alumina powder, abrasive, 1 kg	8660-0791
PFTBA sample, certified, 10 g, 5.32 mL	8500-0656
Replacement glass bulb for PFTBA and PFDTD test sample	G3170-80002
Replacement glass vial for PFTBA and PFDTD test sample	05980-20018
Activated alumina, absorbent pellets for Edwards rough pump traps, non-LC/MS, 1 lb can	8500-1233
MSD Tool Kit, 5975/5973 Includes source hold tool, lint-free cloth, cotton swabs, lint-free nylon gloves, abrasive sheets, wrenches and driving tools	G1099-60566
MSD Tool Kit, 5972/5971 Includes small cleaning rod, large cleaning rod, source hold tool, cotton swabs, lint-free nylon gloves, abrasive sheets, wrenches and driving tools	05971-60561

(Continued)

Cleaning and Maintenance Supplies

Description	Part No.
MS Interface Supplies	
MS interface column nut, female	05988-20066
Column nut for long or long two-hole ferrules	05921-21170
Universal column nut, 2/pk	5181-8830
MS interface column installation tool for 5973 and 5975	G1099-20030
Column installation tool for 5975T	G3880-20030
Tools	
Screwdriver, 3 in Pozidriv shaft No. 1 pt, fits no. 2-4 screws	8710-0899
Screwdriver, 4 in Pozidriv shaft No. 2 pt, fits no. 5-10 screws	8710-0900
Open end wrench, 1/4 and 5/16 in	8710-0510
Hex nut driver, 5.5 mm	8710-1220
Screwdriver, Torx T20	8710-1615
Screwdriver, Torx T15	8710-1622
Screwdriver, Torx T10	5182-3466
Ferrules	
0.4 mm Vespel/Graphite ferrule for 200/250 µm columns, 10/pk	5062-3508
0.5 mm Vespel/Graphite ferrule for 320 µm columns, 10/pk	5062-3506
250 µm Vespel/Graphite ferrule, 10/pk	5181-3323
SilTite metal ferrules for 1/16 in od tubing, 10/pk Includes 2 column nuts	5184-3571
SilTite metal ferrules, 1/16 in x 0.4 mm id, 10/pk Includes 2 column nuts	5184-3569
SilTite metal ferrules, 1/16 in x 0.5 mm id, 10/pk Includes 2 column nuts	5184-3570
Ferrule pre-swaging tool	G2855-60200
Plug for microfluidic manifold or unions	G2855-60570

MS interface column nut, 05988-20066

Universal column nut, 5181-8830

Column installation tool, G1099-20030

Vespel/Graphite ferrules, 5181-3323

Electron Impact (EI) Ion Source

Ion Source

The ion source operates by electron ionization (EI) or chemical ionization (CI). The sample enters the ion source from the GC/MSD interface. Electrons emitted by a filament enter the ionization chamber, guided by a magnetic field. The high-energy electrons interact with the sample molecules, ionizing and fragmenting them. The positive voltage on the repeller pushes the positive ions into the lens stack, where they pass through several electrostatic lenses. These lenses concentrate the ions into a tight beam, which is directed into the mass filter.

Maintaining the Ion Source

Cleaning procedures for MSDs vary. Refer to your Troubleshooting and Maintenance Manual for specific ion source cleaning procedures.

Common Measures of Instrument Performance

- Abundance of certain ions (e.g., percentage of the 502 ion from the Autotune report)
- Shape of lens ramps and the chosen voltages, especially Repeller Ramp
- Sensitivity obtainable for a given analysis
- Ability to tune to a given reference compound (e.g., DFTPP)

Preparing to Clean

Prior to cleaning, the mass spectrometer must be vented and the ion source must be removed. Before venting the system, the following conditions must be met:

- Heated zones are less than 100 °C
- The diffusion pump is off and cool
- The turbo pump is off and not spinning
- The rough pump is off

Always allow the automatic venting routine to run its full course. Improper venting may cause diffusion pump fluid to be deposited into the analyzer (backstreaming). It can also reduce the life of the multiplier or other sensitive MS parts.

MSD Flow Rates (mL/min)

	Min	Max Diff Pump	Max Turbo Pump	Tuning Max
5975	0.1	2.0	4.0	2.0
5973	0.1	2.0	4.0	2.0
5972	0.1	2.0	N/A	2.0
5971	0.1	1.5	N/A	1.0
GCD	0.1	1.0	N/A	1.0

WARNINGS & CAUTION

Important: Do not abrasively or ultrasonically clean the insulators.

Abrasively clean the surfaces that contact the sample or ion beam. Use an abrasive slurry of alumina powder and reagent-grade methanol on a cotton swab. Use enough force to remove all discoloration. Polishing the parts is not necessary; small scratches will not harm performance. Abrasively clean discoloration where electrons from filaments enter the source body.

Take care to avoid contaminating cleaned and dried parts. Put on new, clean gloves before handling the parts. Do not put the cleaned parts on a dirty surface. Place them only on clean, lint-free cloths.

TIPS & TOOLS

It is good practice to replace scratched lenses and other ion source parts regularly. Scratched source parts lead to poor performance.

Electron Impact (EI) Ion Source

The recommended cleaning material for the EI ion source is abrasive, aluminum oxide powder.

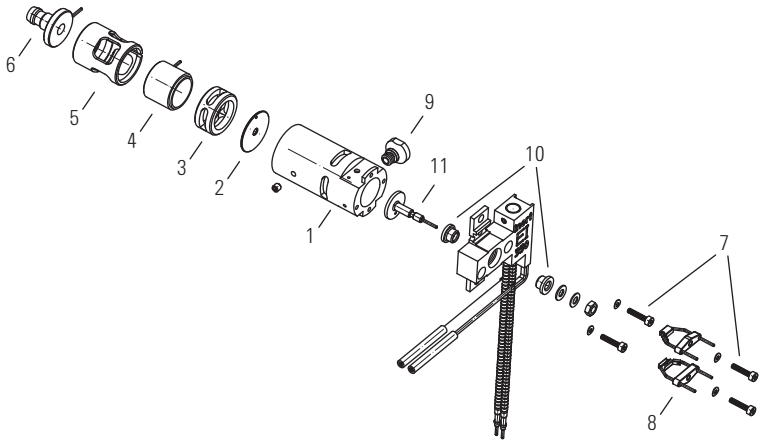
Do not immerse filaments or lens insulators in solvent. If insulators are dirty, clean them with a cotton swab dampened with reagent-grade methanol. If that does not clean the insulators, replace them.

Electron Impact (EI) Ion Source

Lens insulator, G3170-20530

5975/5973 MSD Electron Impact Ion Source Parts (EI)

Item	Description	Part No.	Inert Part No.
1	Ion source body	G1099-20130	G2589-20043
2	Drawout plate, 3 mm	05971-20134	G2589-20100
	Drawout plate, 6 mm	G3163-20530	G2589-20045
3	Drawout cylinder	G1072-20008	G1072-20008
4	Ion focus lens	05971-20143	05971-20143
4	Lens insulator	G3170-20530	G3170-20530
6	Entrance lens	G3170-20126	G3170-20126
7	Cap screw, gold plated	G1999-20021	G1999-20021
8	High temperature filament	G3170-60050	G3170-60050
9	Transfer line socket	G1099-20136	G1099-20136
10	Repeller insulator	G1099-20133	G1099-20133
11	Repeller	G1099-20132	G2589-20044



5975/5973 MSD Electron Impact (EI) ion source assembly

Chemical Ionization (CI) Ion Source

Agilent 5975 Ion Source

Because the CI ion source operates at much higher pressures than the EI ion source, it will probably require more frequent cleaning than the EI ion source.

The source should be cleaned whenever there are performance anomalies that are associated with a dirty ion source. Let analytical performance be your guide.

When cleaning the CI ion source, concentrate on the CI repeller, ion source body, and drawout plate. Be sure to clean the 0.5 mm diameter holes in the ion source body and drawout plate.

Cleaning the ion source is very similar to cleaning the EI ion source. Use the same EI cleaning procedure with the following exceptions:

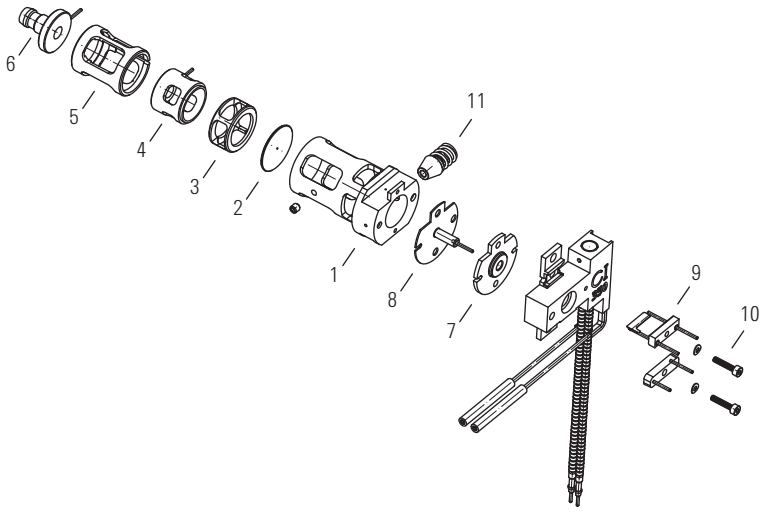
- The CI ion source may not look dirty, but deposits left by chemical ionization are very difficult to remove. Clean the CI ion source thoroughly.
- Use a round wooden toothpick to gently clean out the electron entrance hole in the source body and the ion exit hole in the drawout plate.
- Do not use halogenated solvents. Use hexane for the final rinse.

5975/5973 MSD Chemical Ionization Ion Source Parts (CI)

Item	Description	Part No.
1	Source body	G1999-20430
2	Drawout plate	G1999-20446
3	Drawout cylinder	G1999-20444
4	Ion focus lens	G1999-20443
4	Lens insulator	G3170-20540
6	Entrance lens	G3170-20126
7	Repeller insulator	G1999-20433
8	Repeller	G1999-20432
9	High temperature filament	G1099-80053
10	Cap screw, gold plated	G1999-20021
11	Interface tip seal/spring	G1999-60412

TIPS & TOOLS

Visual appearance is not an accurate guide to cleanliness of the CI ion source. The CI ion source can show little or no discoloration, yet still need cleaning.



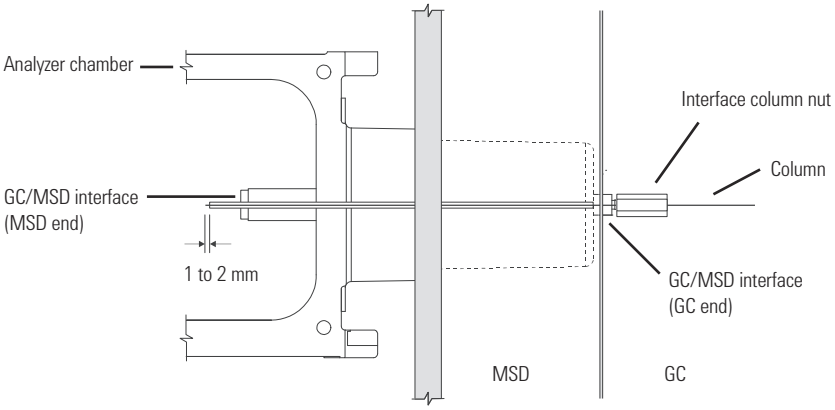
5975/5973 MSD Chemical Ionization (CI) ion source assembly

Installing a Capillary Column in the GC/MSD Interface

1. Condition the column.
2. Vent the MSD and open the analyzer chamber. Be sure you can see the end of the GC/MSD interface.
3. If the CI interface is installed, remove the spring-loaded tip seal from the MSD end of the interface.
4. Slide an interface nut and conditioned ferrule onto the free end of the GC column. The tapered end of the ferrule must point towards the nut.
4. Slide the column into the GC/MSD interface until you can pull it out through the analyzer chamber.
6. Score the column using a glass scribing tool. The score must be square to ensure a clean break.
7. Trim 1 cm off the end of the column. Do not let any column fragments fall into the analyzer chamber. They could damage the turbo pump.
8. Clean the outside of the free end of the column with a lint-free cloth moistened with methanol.
9. Adjust the column.
   - 5975 – Push the column through, and then let it pass the end of the Transferline by 1-2 mm. With the analyzer door partially open, view through the glass plate to see the column protrude.
   - 5973 – Push the column through, and then let it pass the end of the Transferline by 1-2 mm as seen with the analyzer door open from that side.
   - 5972 – Push the column in all the way and then pull it back about 1-2 mm.

   Use the flashlight and magnifying glass if necessary to see the end of the column inside the analyzer changer. Do not use your finger to feel for the column end.
10. Hand-tighten the nut. Make sure the position of the column does not change as you tighten the nut. Reinstall the spring-loaded tip seal if it was removed earlier.
11. Check the GC oven to be sure that the column does not touch the oven walls.
12. Tighten the nut 1/4 to 1/2 turn. Check the tightness after one or two heat cycles.

Installing a capillary column in the GC/MSD interface

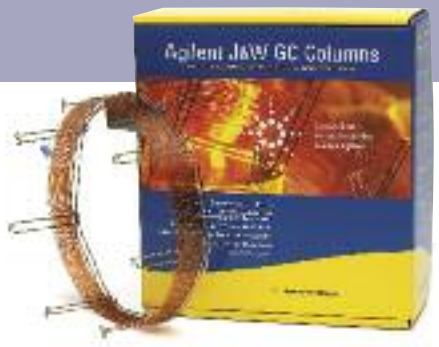


TIPS & TOOLS

The column installation procedure for 5975 MSDs is different from that for most previous MSDs. Using the procedure from another instrument may result in poor sensitivity and possible damage to the MSD.

TIPS & TOOLS

Agilent J&W GC Columns offer the lowest bleed levels, the best inertness for acids/bases/mixed functional compounds, and the tightest column-to-column reproducibility. Learn more at **www.agilent.com/chem/mygccolumns**



QuickSwap Capillary Flow Technology module

QuickSwap MS Interface Restrictors

Agilent's QuickSwap Capillary Flow Technology module and pre-swaged fused silica tubing restrictors can increase the productivity of your Agilent 5973N and 5975 Inert MSD Systems, allowing you to change columns without venting the MSD. QuickSwap not included.

These restrictors are prefabricated for convenience and ease-of-use. For applications requiring other restrictor sizes, Agilent offers a wide variety of deactivated fused silica tubing, SilTite ferrules and swaging tools.

QuickSwap MS Interface Restrictors

Description	ID (mm)	Unit	Part No.
QuickSwap restrictor	0.092	4/pk	G3185-60361
QuickSwap restrictor	0.100	4/pk	G3185-60362
QuickSwap restrictor	0.110	4/pk	G3185-60363
QuickSwap restrictor	0.120	4/pk	G3185-60364
QuickSwap restrictor variety pack, 2 each of the above id restrictors			G3185-60300

SilTite metal ferrules, 5188-5361

SilTite Metal Ferrules

Description	Unit	Part No.
For use with 0.25 mm id capillary columns	10/pk	5188-5361
For use with 0.32 mm id capillary columns	10/pk	5188-5362
For use with 1/16 in od stainless steel tubing Includes 2 column nuts	10/pk	5184-3571
For use with 0.53 mm id capillary columns	10/pk	5188-5363

MSD Filaments

Filament assembly (EI), G3170-60050

Like the filaments in an incandescent light bulb, the ion source filaments will eventually burn out. Certain practices will reduce the chance of early failure.

- When setting up data acquisition parameters, set the solvent delay so that the analyzer will not turn on while the solvent peak is eluting
- When the software prompts 'Override solvent delay at the beginning of a run' always select 'No'
- Higher emission current will reduce filament life
- If you control your MSD from the Edit Parameters screen, always select 'MS Off' before changing any of the filament parameters

MSD Filaments

Description	5975 Series	5975T Series	5973 Series	5972 Series	5971 Series
Filament assembly (EI)	G3170-60050		G3170-60050	G3170-60050	05971-60140
Filament assembly (CI)	G1099-80053		G1099-80053		
Micro ion vacuum gauge	G3170-80001				
Triode gauge tube for measuring vacuum			0960-0897		
Ion gauge controller		G3880-80010			
Ion gauge tube		G3880-80011			

TIPS & TOOLS

It is very useful to switch from one filament to the other every three months so that when a filament fails, you know the other will fail soon. This will allow you to change both filaments at the same time. Since the GC/MS system is already vented, it's a good idea to replace other supplies in the flowpath at the same time as the filaments.

Quadrupole Mass Filter

The mass filter does not require periodic maintenance. It should not be removed from the radiator or disturbed in any way.

- Never put the quadrupole in an ultrasonic cleaner.
- Never change the physical orientation of the quadrupole mass filter.
- The fused-quartz quadrupole is fragile and will break if dropped or handled roughly.
- The material in the cusps of the quadrupole is very hygroscopic. If exposed to water, the quadrupole must be dried very slowly to prevent damage.
- Cleaning techniques that are appropriate for other manufacturers' instruments are not suitable for Agilent MSDs – and may actually harm the mass filter.
- To save time and effort, use only Agilent MSD mass filters, which do not require periodic cleaning or maintenance.
- In case of extreme contamination, contact a trained Agilent service representative to perform the mass filter cleaning.

MSD Electron Multipliers and Replacement Horn

Electron multiplier replacement horn

The lifetime of an electron multiplier is directly related to the current that flows through it and the extent of contamination or condensation that it experiences. Replace the electron multiplier or replacement horn when voltage is over 2500 V. To maximize electron multiplier life:

- Maintain the best possible vacuum, especially in the analyzer manifold
- Use extreme caution and be conservative with venting, pumpdown, and all vacuum system procedures to keep pump fluid background to a minimum
- After venting, allow four hours for pumpdown and thermal equilibration before scanning
- Actively look for background contamination and leaks and repair them immediately
- Don't tune excessively – PFTBA can result in higher background over an extended period of time
- Replace the electron multiplier if vacuum is poor or voltage is over 2500 V

MSD Electron Multipliers and Replacement Horn

Description	5975 Series	5973 Series	5972/5971 Series
Electron multiplier replacement horn Use with electron multipliers with "straight" horns	05971-80103	05971-80103	05971-80103
Triple axis detector assembly*	G3170-80100		
Triple axis electron multiplier	G3170-80103		
EM signal wire, low noise detector	G3170-80008		
High energy dynode		G1099-80001	
Electron multiplier			05971-80102

*Included on 5975 triple axis detector systems

TIPS & TOOLS

The Agilent multipliers and horns listed are recommended for your MSD. Other manufacturers' products may be incompatible with Agilent instruments and can result in reduced sensitivity, lifetime, and noise problems.

Vacuum Systems and Pumps

The vacuum system creates the high vacuum (low pressure) required for the MSD to operate. Without this vacuum, the molecular mean free path is too short.

Ions cannot travel from the ion source through the mass filter to the electron multiplier (detector) without colliding with other molecules.

The main components of the vacuum system are:

- Vacuum manifold
- Foreline gauge
- Calibration valve
- Gauge controller (optional)
- Vacuum seals
- Foreline pump and/or trap
- Diffusion/turbo pump and fan
- High vacuum gauge tube

Pressure Symptoms

This section describes unusual pressure readings and their possible causes. The symptoms in this section are based on typical pressures. At typical column flow rates (0.5-2.0 mL/min), the foreline pressure will be approximately 20 to 100 m Torr. The vacuum manifold pressure will be approximately 1 x 10^{-6} to 1.4 x 10^{-4} Torr.

These pressures can vary widely from instrument to instrument, so it is important that you are familiar with the pressures that are typical for your instrument at a given carrier gas flow and oven temperature.

The foreline pressures listed can only be measured on diffusion pump-equipped systems. Turbomolecular pumps are controlled according to their speed and do not have foreline pressure gauges.

The vacuum manifold pressures can only be measured if your system is equipped with the optional gauge controller.

TIPS & TOOLS

Keeping a pan under the vacuum pump helps to detect and identify the origin of oil leaks.

Pressure Symptoms

Symptoms	Possible Causes
Foreline pressure is too high	
• Pressure is above 100 m Torr. • Pressure for a given column flow has increased over time	• Column (carrier gas) flow is too high • Wrong carrier gas • Air leak (normally at transferline interface) • Foreline pump oil level is low or oil is contaminated • Foreline hose is constricted • Foreline gauge is not working correctly • Foreline pump is not working correctly
Foreline pressure is too low	
• Pressure is below 20 m Torr.	• Column (carrier gas) flow is too low • Wrong carrier gas • Column plugged or crushed by an overtightened nut • Empty or insufficient carrier gas supply • Bent or pinched carrier gas tubing • Foreline gauge is not working correctly
Vacuum manifold pressure is too high	
• Pressure is above 1.4×10^{-4} Torr. • Pressure for a given column flow has increased over time	• Column (carrier gas) flow is too high • Wrong carrier gas • Air leak • Foreline pump is not working correctly • Diffusion pump fluid level is low or fluid is contaminated • Defective gauge controller • Faulty ion gauge tube
Vacuum manifold pressure is too low	
• Pressure is below 1.4×10^{-4} Torr.	• Column (carrier gas) flow is too low • Wrong carrier gas • Column plugged or crushed by an overtightened nut • Empty or insufficient carrier gas supply • Bent or pinched carrier gas tubing • Defective gauge controller • Faulty ion gauge tube

Diffusion Pump

It is not necessary to change the diffusion pump fluid more than once a year, unless you observe symptoms that suggest a problem with the fluid. The MSD must be vented in order to check the diffusion pump fluid (except for the 5975/5973). Therefore, the best time to check the fluid is when the instrument is already vented for other maintenance.

How to Check the Fluid Level

5972/5971 Series

1. If it is not vented already, shut down and vent the MSD according to instrument manual.
2. Unplug the MSD power cord.
3. Remove the pump and cover the top with aluminum foil.
4. After heating the pump in a GC oven at 60 °C for 15 minutes to make the fluid flow down into the reservoir at the bottom, remove the stack parts.
4. Inspect the pump fluid. If the fluid is discolored or contains particulate material, the fluid must be changed.
6. Use a metal ruler to determine the depth of the fluid. A pump that has been in operation should have a pool 9 mm +/- 1 mm deep. Fluid in freshly charged pumps will be 12 mm deep. It is normal that up to 2 mL of oil may be in the rear portion of the vacuum manifold. The recommended total fluid charge for the 5971/5972 is 18 mL (+/- 2 mL).

5975/5973 Series

- Use the sight glass to determine the depth of the fluid. The recommended total fluid charge is approximately 37 mL.

Foreline Pump

The oil in the foreline or rough pump should be replaced on average once every six months, but can vary depending upon applications. If a foreline trap is present, the molecular sieves should also be replaced after an oil change.

Avoid contact with the pump oil. The residue from some samples may be toxic. Dispense of used oil properly.

Foreline Pump

Pump Oils

Description	Part No.
Foreline pump (rotary pump) oil, Inland 45, 1 L	6040-0834
High vacuum grease, 25 g	6040-0289
Diffusion pump fluid, 18.5 mL	6040-0809*
IDP Series tip seal kit for 5975T	IDP3TS
Oil mist exhaust filter	G1099-80039

*2 required for 5975 and 5973 Series

General Instructions on How to Replace the Pump Oil

1. Vent and shut down the MSD.
2. Place a container under the drain plug on the foreline pump.
3. Remove the fill cap from the top of the pump to expose the fill hole.
4. Remove the drain plug from the pump.
5. Reconnect the MSD to its power source. Switch on for 2 or 3 seconds, and then switch it off again. This displaces old oil from the internal pump cavities. Disconnect the power cord again.
6. Reinstall the drain plug and pour pump oil into the fill hole.
7. Reinstall the fill cap.
8. Reconnect the MSD power cord.
9. Start up and pump down the MSD according to the Instrument Manual procedure.

7000A Triple Quadropole GC/MS

7000A Triple Quadropole GC/MS Parts and Supplies

Engineered from the ground up for ease-of-use and routine high performance operation, the 7000A Triple Quadrapole GC/MS delivers advanced high-speed GC/MS/MS quantitation for ultra-trace analysis of even the most complex samples. Combined with the Agilent 7890 GC, the result is an optimally robust GC/MS/MS system.

Gas Filters

Description	Part No.
Chemical Ionization Gas Purifier	G1999-80410
Gas Clean GC/MS starter kit 1/8 in	CP17974
Agilent Gas Clean GC/MS filter	CP17973
Mounting clip	UMC-2

Agilent Gas Clean GC/MS filter, CP17973

Foreline Pump Supplies

Description	Part No.
Diffusion pump fluid, 18.5 mL	6040-0809
Foreline pump oil, P3, 0.5 L	6040-0621
Rough pump inlet flange	0905-1463
Oil return kit	3162-1057
Pump oil drip pan	G1946-00034
Oil mist exhaust filter	G1099-80039
Oil mist filter for RV5 pump	G6600-80043

Oil mist filter, G6600-80043

Maintenance Supplies

Description	Part No.
Abrasive sheets	5061-5896
Alumina powder, abrasive, 1 kg	8660-0791
Cloths, lint-free	05980-60051
Lint-free industrial wipes, 100% cotton	9310-4828
Cotton swabs	5080-5400
Nylon gloves, lint-free, large	8650-0030
Nylon gloves, lint-free, small	8650-0029
High vacuum grease, 25 g	6040-0289
Electron multiplier replacement horn	05971-80103
Low noise EM horn	G3170-80103
Filament assembly, high temperature (EI)	G3170-60050
Filament assembly (CI)	G1099-80053
Micro ion vacuum gauge	G3170-80001
Replacement glass bulb for PFTBA and PFDTD test sample	G3170-80002

Low noise EM horn, G3170-80103

Filament assembly (EI), G3170-60050

240-MS Ion Trap Parts and Supplies

The Agilent 240-MS Ion Trap delivers unparalleled capabilities for both research and routine applications. Advanced ionization, including positive and negative chemical ionization, improves selectivity and limits of detection. Enhanced scanning techniques ensure compound confirmation. The MS/MS and MS^n reduce matrix influences and provide more detailed structural information. The software comes with a full complement of productivity, reporting, and regulatory compliance tools.

- Accurate identification and quantification of trace analytes
- Unsurpassed sensitivity (200 femtogram OFN full scan)
- Choice of internal or external ionization configurations
- Powerful MS/MS and CI options
- Low maintenance and high reliability
- Intuitive software for increased productivity

240-MS Ion Trap Parts and Supplies

Description	Part No.
Manifold O-ring	393010924
Transfer line inner O-ring	393010920
Transfer line outer O-ring	393010918
Internal filaments (2 filaments on one disk)	392017401
Internal transfer line tip	393171201
External filament (single filament)	393161001
Electrode, end cap, SilChrom	393164493
Electrode set kit, SilChrom, DFC (inert) tested Includes 2 end cap electrodes, 1 RF electrode, cleaning instructions	9300003590
Electrode, RF, SilChrom	393167593
Spacer, RF, Silco-quartz	393053502
Electron multiplier	393175101
Transfer line assembly upgrade field kit Contains a complete transfer line and side-mounted block for vacuum manifold	393101291
EPA volatile kit for EPA methods 524.2 & 8260B	393082491
ChromatoProbe microvials, 100/pk	392567111

TIPS & TOOLS

Need GC supplies for your non-Agilent instruments? Check out the Agilent CrossLab supplies for Bruker/Varian GC Systems.

See pages 154-168

240-MS Ion Trap Parts and Supplies

Description	Part No.
GC/MS Standards	
Evaluation standard (Internal EI & CI) 2 pg/µL OFN, 5 pg/µL	393112601
Test standard for external EI (5 pg/µL OFN)	393112702
Benzophenone CI sensitivity standard 50 pg/mL	392030500
Test standard for external NCI (1 pg /µL DFB)	393113001
Tuning calibration compound PFTBA (FC-43)	392035300
GC/MS column test mix	392027300
Vacuum Supplies	
Oil mist exhaust filter, DS42	393847701
Oil mist eliminator	2735000500
Replacement cartridge for oil exhaust filter, 2/pk	2710100200
Foreline (roughing) pump oil, 1 L	8829951700
Premium foreline (roughing) pump oil, 1 L	8829953800
IDP-3 dry scroll pump tip seal maintenance kit	2710100400
IDP-3 dry scroll replacement module	2710100500

220-MS Parts and Supplies

The 220-MS is a high sensitivity, flexible gas chromatograph/mass spectrometer that delivers outstanding qualitative and quantitative data in a range of applications. This simple and robust system is easy to operate and maintain.

- Accurately identify and quantify trace analytes
- Take advantage of powerful CI and MS/MS upgrades for advanced applications
- Spend less time on maintenance and more time on analysis

220-MS Parts and Supplies

Description	Part No.
Electron multiplier assembly	393031501
Exit end cap electrode, chrome	393050292
Exit end cap electrode, SilChrom	393050293
Filament end cap electrode, chrome	393050392
Filament end cap electrode, SilChrom	393050393
RF ring electrode, chrome	393050492
RF ring electrode, SilChrom	393050493
Complete set of SilChrom electrodes and Silco-quartz spacers	393001991
Spacer, RF, quartz	393053501
Spacer, RF, Silco-quartz	393053502
Filament disk assembly with wire connectors	393060191
Filament disk assembly User must solder on 3 wire connectors	392043700
Thermocouple vacuum gauge	2722990700
Mass spectrometer expendable supplies kit for 2x0MS Includes PFTBA calibration compound, cal-gas glass chamber, capillary injector nut, O-rings, cotton tipped applicators, end cap insulator, vacuum pump oil	393011391
GC/MS Standards	
Hexachlorobenzene EI sensitivity standard 100 pg/mL	392027500
Benzophenone CI sensitivity standard 50 pg/mL	392030500
Tuning calibration compound PFTBA (FC-43)	392035300
Hexachlorobenzene EI sensitivity standard 2 pg/mL	392047100
GC/MS column test mix	392027300

GC/MS Standards

MS standards

GC/MS Analyzer Kit Standards

Description	Part No.
GC/MS semivolatiles analyzer checkout mixture	5190-0473
GC/MS pesticide analyzer internal standard, phenanthrene-d10 at 1000 µg/mL in methylene chloride, 4 x 1 mL	5190-0472
Pesticide analyzer checkout solution, 20 pesticides at 10 µg/mL each in acetone, 3 x 1 mL	5190-0468
Pesticide checkout standard, 100 µg/L, 3 x 1 mL	5190-0494
GC/MS toxicology checkout mixture	5190-0471
Residual solvent revised method 467, class C	5190-0493
Residual solvent revised method 467, class 1	5190-0490
Butanetriol internal standard #1 for biodiesel	5982-0024
Tricaprin internal standard #2 for biodiesel	5982-0025
Pesticide retention locking standard, 3 pesticides at 10 µg/mL each in n-hexane, 3 x 1 mL	5190-1441

MS Test and Performance Samples

	Description	Part No.	5975 Series	5973 Series	5972 Series	5971 Series	GCD	7000 Series	7200 Series
Tuning Samples									
EI Tune	PFTBA sample, certified, 10 g, 5.32 mL	8500-0656	✓	✓	✓	✓	✓	✓	✓
CI Tune	PFDTD calibrant	8500-8510	✓	✓				✓	✓
Performance Verification Samples									
EI	OFN, 1 pg/µL	5188-5348	✓	✓					
	Hexachlorobenzene 10 pg/µL, 1 ng/µL	8500-5808			✓				
	Methyl stearate (in methanol), 1 ng/µL, 2 ea	05990-60075				✓			
	MSD Sampler	05970-60045					✓	✓	
Negative Mode CI	OFN, 100 fg/µL	5188-5347	✓						
Positive Mode CI	Benzophenone, 100 pg/µL	8500-5440	✓	✓	✓	✓			
	1 pg/µL OFN, 5 pg/µL BZ	393065201						✓	
Checkout Samples									
HighMass	PHFT, 100 pg/µL	5188-5357	✓						
Semivolatile	GC/MS tuning standard, DFTPP	8500-5995	✓	✓	✓	✓	✓		
Volatile	p-Bromofluorobenzene (BFB), 25 µg/mL	8500-5851	✓	✓	✓	✓	✓		
MSD sampler	Solution of dodecane, biphenyl, p-cholorodiphenyl, and methyl palmitate in isooctane. Six 1.0 mL ampoules: 4 at 10 ng/µL, 1 at 100 ng/µL, 1 at 100 pg/µL.	05970-60045	✓	✓	✓	✓	✓	✓	

TIPS & TOOLS

Each GC/MS has a specific test and performance sample. Refer to the chart above for the exact sample. All volumes are approximately 0.5-1 mL unless otherwise specified.

Agilent CrossLab

Supplies for Non-Agilent GC Systems

Agilent CrossLab is a growing portfolio of supplies critical to instrument performance and productivity. Agilent CrossLab GC supplies are designed and manufactured to perform seamlessly with a variety of non-Agilent GCs in your lab. Look inside this catalog to find a comprehensive range of GC supplies to use across your lab.

We currently support:

- Bruker, Varian*
- CTC
- PerkinElmer
- Shimadzu
- Thermo Scientific

*Formerly Varian GC systems, now Bruker products

Our growing GC Supplies portfolio includes the following products, featuring easy-to-use packaging for improved productivity:

- Premium non-stick inlet septa
- Ultra Inert inlet liners
- Liner O-rings
- Column ferrules and nuts
- Autosampler syringes
- Vials and closures
  (See the complete CrossLab Vials and Closures section of our General Chromatography catalog, publication number 5991-1056EN)

Agilent CrossLab is more than supplies:

- Offering a comprehensive portfolio of GC supplies
- Over 40 years of chromatography expertise and ongoing innovation
- Optimal performance for both routine and challenging applications
- Dependable worldwide product availability and delivery
- Convenience of consolidated purchasing

Agilent CrossLab works with BRUKER | CTC | PERKINELMER | SHIMADZU | THERMO SCIENTIFIC | AND MORE

Agilent CrossLab Inlet Liners

Liners are the centerpiece of the inlet system where sample is vaporized and mixed with the carrier gas. CrossLab GC inlet liners have the perfect mix of liner configurations and chemistries to solve your application challenges.

Choose from split, splitless, PTV, and other inlet liner designs in either the new, innovative Ultra Inert deactivation or Agilent's popular proprietary deactivation, now referred to as Agilent Original deactivation. With part number and lot number silk screened on CrossLab liners, identification and re-ordering have never been easier.

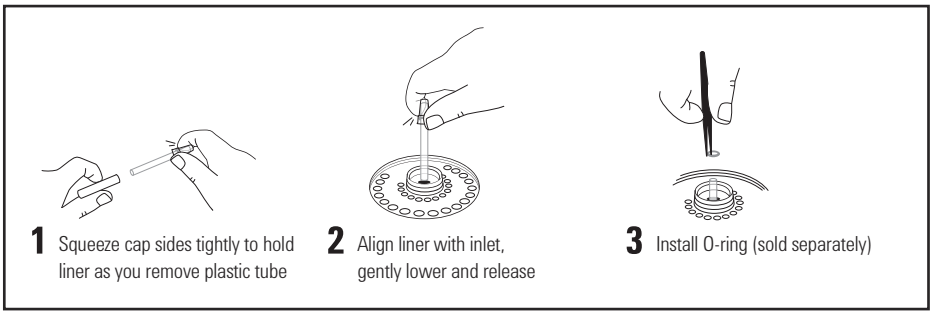
Agilent CrossLab Liners with Ultra Inert Deactivation

Developed for high sensitivity analysis, Agilent's Ultra Inert deactivation provides extreme surface inertness – even for liners containing glass wool. Ultra Inert chemistry was developed using a suite of tests specifically designed to stress then evaluate liner activity, resulting in liners featuring:

- **Reproducibility** – highest level and consistent inertness for active compounds such as acids and bases
- **Robustness** – tested with a sequence of 100 injections of Endrin/DDT with < 20% degradation, allowing use of glass wool even with highly active compounds at trace (0.5 ng on-column) levels
- **Reliability** – lot-tested for inertness to ensure consistent and efficient deactivation using both acidic and basic probes at trace level (2 ng) on-column, with low to no bleed or background contamination

Ultra Inert liners are delivered in Agilent's exclusive Touchless packaging. Touchless packaging aids in easy installation of the new, clean, preconditioned liner – without risk of contamination from touching.

To view a demonstration of the Touchless Packaging for CrossLab Ultra Inert Liners please visit **www.agilent.com/chem/CLTouchless**



CrossLab Ultra Inert Touchless liner packaging includes visual installation guide.

Consider the following to determine how often to change your liners:

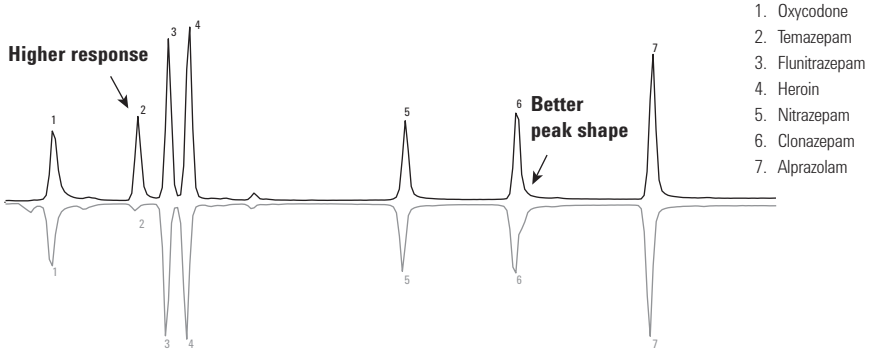
- Previous use pattern
- Sample cleanliness
- Chromatographic abnormalities, such as
  - ✓ Peak shape changes
  - ✓ Peak discrimination
  - ✓ Poor reproducibility
  - ✓ Sample pyrolysis
  - ✓ Active analyte response loss or decomposition

Get a robust, reproducible, and reliable inert flow path with Agilent CrossLab Ultra Inert Inlet Liners – even when containing glass wool

Forensic basic drugs test conditions

Column:	**DB-5ms Ultra Inert 122-5512UI 15 m x 0.25 mm, 0.25 µm**
Sample:	5 mg/L Checkout mixture for GC/MS forensic/toxicology analyzer (P/N 5190-0471)
Injection:	1 µL splitless @ 280 °C (hold 0.75 min)
Oven:	100 °C (0.5 min) to 325 °C at 20 °C/min and hold 2.5 min
Carrier:	He, 18.74 psi (adj to RT lock), constant pressure
Detector:	MSD; Source temp @ 300 °C, Quad temp @ 150 °C, Transfer line @ 300 °C; Acquisition mode, SIM/scan

Agilent CrossLab Ultra Inert single taper liner with wool



Restek Siltek deactivated gooseneck liner with deactivated wool (cat. no. 22406.213.5)

Agilent CrossLab Ultra Inert deactivated liners with wool contribute to higher response and better peak shape for very active forensic basic drug compounds than similar Restek Siltek liners.

Agilent CrossLab Liners with Agilent Original Deactivation

Developed to complement fused silica capillary column technology, Agilent's proprietary deactivation, now referred to as Agilent Original deactivation, has been successfully used for years. Proven to deliver a long-lasting surface deactivation, this proprietary chemistry and manufacturing process was previously available for Agilent gas chromatographs only, but is now available for other GC systems. Agilent Original deactivation is recommended for everyday analysis.

Agilent CrossLab Liner O-rings

- Liners are sealed in the inlet with fluoroelastomer or graphite O-rings
- Graphite O-rings are used when inlet temperatures exceed 350 °C
- Fluoroelastomer O-rings are easier to replace than graphite O-rings, which deform and flake apart more easily

Ready for chromatographic use, CrossLab fluoroelastomer O-rings feature:

- Proprietary two-step cleaning and conditioning process eliminates out-gassing of contaminants, which is especially important for trace, ECD, and MSD analyses
- Plasma-treatment for a non-stick, contaminant-free surface that won't stick to the inlet metal surface
- Novel translucent dial package that conveniently delivers one clean O-ring at a time and makes it easy to know when to reorder

Agilent CrossLab Column Ferrules

A variety of column ferrules are available to meet your application requirements, including 100% Graphite, 100% Vespel, and Vespel/Graphite ferrules.

Using the wrong ferrule or a worn-out ferrule to seal your column connection can result in inconsistent and unreliable chromatography. An improper ferrule can cause leaks, which allow air and other contaminants to enter the instrument through the column seal, causing major interference with column and detector performance.

The ideal ferrule provides a leak-free seal, accommodates various column outer diameters, seals with minimum torque, withstands temperature cycling, and does not stick to the column or fittings.

For optimum performance, ferrules should be replaced every time the column is replaced and when performing column maintenance.

To minimize problems, follow these general techniques for ferrule installation:

- Don't overtighten – finger tighten the column nut, then use wrench to tighten
- Maintain cleanliness
- Bake out ferrules prior to use (Vespel and Vespel/Graphite only)
- Avoid contamination, such as fingerprint oils
- Inspect used ferrules with magnifier for cracks, chips, or other damage before reusing them
- Change ferrules when new columns or injector/detector parts are installed

TIPS & TOOLS

Look for the following signals that indicate ferrule damage:

- Background noise from oxygen diffusing into the system
- Column bleed catalyzed by oxygen
- Sample degradation
- Sample loss
- Increase in detector signal/noise
- Poor retention time reproducibility

Ferrule Selection Recommendations

Ferrule Type	Upper Temp. Limit	Usages	Advantages	Limitations
Graphite (100%)	450 °C	• General purpose for capillary columns • Suitable for FID and NPD • Recommended for high temperature and cool on-column applications	• Easy-to-use stable seal • Higher temperature limit • Can be removed easily	• Not for MS or oxygen-sensitive detectors • Soft, easily deformed or destroyed • Possible system contamination
Vespel/Graphite (85%/15% or 60%/40%)	350 °C	• General purpose for capillary columns • Recommended for MS and oxygen-sensitive detectors • Most reliable leak-free connection	• Mechanically robust • Long lifetime	• Not reusable • Flows at elevated temperature • Must re-tighten frequently
Vespel (100%)	280 °C	• Isothermal operation • Can be reused or removed easily • Excellent sealing material when making metal or glass connections	• Mechanically robust • Long lifetime • Can be reused or removed easily	• Leaks after temperature cycle • Flows at elevated temperature • Must re-tighten frequently

TIPS & TOOLS

100% Vespel ferrules should only be used for isothermal applications.

Agilent CrossLab Autosampler Syringes

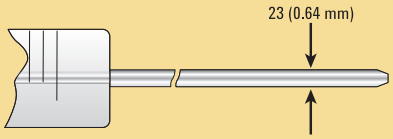
With a broad selection of syringes for auto injection, CrossLab autosampler syringes provide what you need for accurate and effective sampling. CrossLab syringes meet all fit, form, and function criteria for specific autosampler models. Agilent delivers more value in every autosampler syringe:

- Lot number printed directly on the barrel with a corresponding Certificate of Conformance
- Illuminating backing strip, for effortless viewing of the volume scale
- Environmentally friendly packaging and improved design that reduces waste
- Individually packaged for contaminant-free use right out of the box

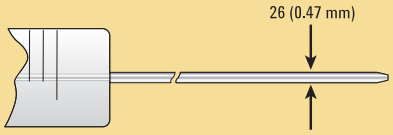
Typical Needle Gauge Dimensions

	OD		ID	
Gauge	**mm**	**inches**	**mm**	**inches**
23	0.64	0.0248	0.11	0.0043
25	0.50	0.0197	0.20	0.0079
26	0.47	0.0184	0.11	0.0043

Needle Gauge



Single Gauge 23 (0.64 mm)
Packed column injector ports
Split/splitless injector ports



Single Gauge 26 (0.47 mm)
Packed column injector ports
Split/splitless injector ports

Needle Termination

Needle terminations are available in fixed or removable, with various tip styles.

Fixed (cemented)

- Economical, reproducible injections for autosamplers
- Preferred for applications requiring trace level samples
- Recommended for use where probability of needle bending is minimal
- Can be heated up to 70 °C

Removable needle

- Versatile option for injections
- Needle can be replaced if damaged or clogged
- Allows needle to be changed for different applications
- Can be heated up to 120 °C

Agilent CrossLab Inlet Septa

Inlet septa are a key component of sample introduction. Septa maintain the leak-free seal and exclude air from the inlet. They come in many different sizes and are made from different types of materials specific to inlet type and analysis needs.

Replace septa regularly to avoid:

- Leaks
- Decomposition
- Sample loss
- Reduced column or split vent flow
- Ghost peaks
- Column degradation

Septa are available for a variety of different applications and have different upper temperature limits. Lower temperature septa are usually softer, seal better, and can withstand more punctures (injections) than their high-temperature counterparts. If septa are used above their recommended temperatures, they can leak or decompose, causing sample loss, lower column flow, decreased column life, and ghosting. To minimize problems:

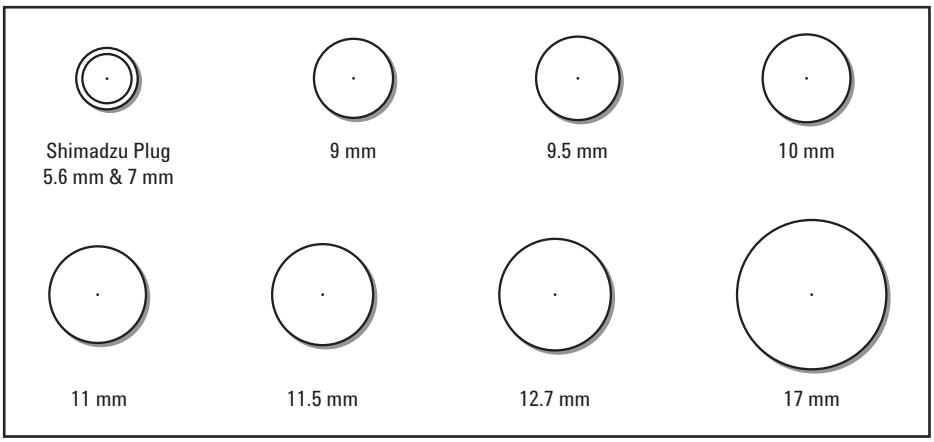
- Use within the recommended temperature range
- Change regularly
- Use septum purge when available
- Use autoinjectors
- Regularly inspect needle tips for wear

Agilent CrossLab Inlet Septa Selection Guide

GC Manufacturer	Instrument Model	Diameter (mm)	Diameter (in)
Bruker, Varian*	1177 Split/Splitless Injector	9	
	1078/1079 Programmable Temperature Vaporizing Injector	11.5	
	1093 Cold On-Column Injector	11	7/16
	1075/1077 Split/Splitless Injector	11	7/16
	1061 Packed/0.53 mm Capillary Column Flash Vaporization Injector	9.5	3/8
	1041 Packed/Wide Bore On-Column Injector	9.5	3/8
PerkinElmer	Clarus System	11	7/16
	AutoSystem	11	7/16
	AutoSystem XL	11	7/16
	8000 Series	11	7/16
	Sigma Series	11	7/16
Thermo Scientific Trace GC Ultra and Focus GC	Split/Splitless Injector	17	
	Large Volume Splitless Injector	9	
	Programmable Temperature Vaporizing Injector	12.7	1/2
	Purged Packed Column Injector	11	
	Packed Column Injector	11	
Thermo Scientific Finnigan	Trace 2000 Series	9.5	
	9001 GC	9.5	
Shimadzu	All Models	Shimadzu Plug	

*Formerly Varian GC systems, now Bruker products

Septa Diameters



Premium Non-Stick Septa

CrossLab premium non-stick inlet septa are designed and manufactured to provide a reliable noncontaminating seal. Our tri-fold blister pack ensures that each septum remains clean and ready to use.

- Proprietary plasma treatment prevents sticking and unnecessary inlet cleaning
- Innovative blister packaging keeps each septum clean and ready for use
- Center point guides the needle for easy penetration, less coring, and longer life
- Precision molding assures accurate fit in the inlet
- Each batch is tested for bleed
- Premium formulations selected for sealing and chromatographic cleanliness
- No need to bake septa before using

Summary of Premium Inlet Septum Characteristics

Septum Type	Bleed	Lifetime	Temperature Limits
Non-Stick BTO (Bleed and Temperature Optimized)	✓✓✓	✓	to 400 °C injection port temp
Non-Stick Advanced Green	✓✓	✓✓	to 350 °C
Non-Stick Long-Life	✓	✓✓✓	to 350 °C

✓✓✓ = best ✓✓ = very good ✓ = good

Agilent CrossLab Non-Stick Bleed Temperature Optimized (BTO) Inlet Septa

- Extended temperature range, lowest bleed
- Maximum injection port temperature 400 °C
- Plasma treatment eliminates sticking in the injection port
- Pre-conditioned; ready to use
- Blister packaging maintains cleanliness and convenience
- Ideal for use with low-bleed, "Mass Spec" capillary columns

BTO septa, 8010-0223, 8010-0224

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0217	8010-0218
9.5 mm	8010-0219	8010-0220
10 mm	8010-0221	8010-0222
11 mm, CenterGuide	8010-0223	8010-0224
11.5 mm, CenterGuide	8010-0225	8010-0226
Shimadzu plug	8010-0231	8010-0232
Description	**24/pk**	**48/pk**
12.7 mm, CenterGuide	8010-0227	8010-0228
17 mm, CenterGuide	8010-0229	8010-0230

Comparison of Coring, With and Without CenterGuide (30x magnification)

High-Temperature Septa without CenterGuide

Major coring before 100 autoinjections

CrossLab BTO Septa with CenterGuide

Very little coring, even after 700 autoinjections

Agilent CrossLab Non-Stick Advanced Green Inlet Septa

- True long-life, high-temperature green septa
- More injections per septum
- Plasma treatment eliminates sticking in the injection port
- Maximum injection port temperature 350 °C
- High-performance alternative to competitors' "green" septa
- Blister packaging for cleanliness and convenience

Non-Stick Advanced Green Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0201	8010-0202
9.5 mm	8010-0203	8010-0204
10 mm	8010-0205	8010-0206
11 mm, CenterGuide	8010-0207	8010-0208
11.5 mm, CenterGuide	8010-0209	8010-0210
Shimadzu plug	8010-0215	8010-0216
Description	**24/pk**	**48/pk**
12.7 mm, CenterGuide	8010-0211	8010-0212
17 mm, CenterGuide	8010-0213	8010-0214

Advanced green septa, 8010-0207, 8010-0208

Agilent CrossLab Non-Stick Long-Life Inlet Septa

- Preferred septa for autosamplers
- Pre-pierced for extended life and reduced coring
- Ideal for overnight runs
- Up to 400 injections per septum
- Plasma treatment eliminates sticking
- Maximum injection port temperature 350 °C
- Soft, 45 durometer, easy on autosampler needles
- Blister packaging for cleanliness and convenience

Long-life septa, 8010-0239, 8010-0240

Non-Stick Long-Life Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0233	8010-0234
11 mm, CenterGuide	8010-0239	8010-0240
11.5 mm, CenterGuide	8010-0241	8010-0242
Description	**24/pk**	**48/pk**
12.7 mm, CenterGuide	8010-0243	8010-0244
17 mm, CenterGuide	8010-0245	8010-0246

Agilent CrossLab Gray General Purpose Inlet Septa

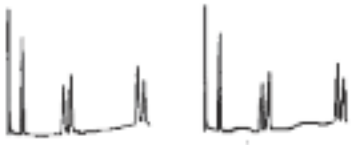
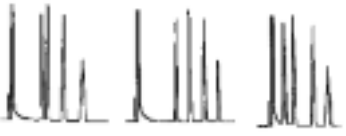
Agilent CrossLab general purpose septa are made from an enhanced injection-molded silicone rubber and are good for routine use. The septa material, gray in color, is specified to withstand over 200 automatic injections at an injection port temperature of 350 °C.

CrossLab general purpose inlet septa, 8010-0257

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm	8010-0249	8010-0250
9.5 mm	8010-0251	8010-0252
10 mm	8010-0253	8010-0254
11 mm	8010-0255	8010-0256
11.5 mm	8010-0257	8010-0258
12.7 mm	8010-0259	8010-0260
17 mm	8010-0261	8010-0262
Shimadzu plug	8010-0263	8010-0264

Septa Troubleshooting

Symptom	Possible Causes	Remedy
Extra Peaks/Humps 	Septum bleed	Turn off injector heater. If extra peaks disappear, use septum specified for higher temperature or analyze at lower inlet temperature.
Baseline Change After Large Peak 	Large leak at septum during injection and for a short time thereafter (common with large diameter needles)	Replace septum and use smaller diameter needles.
Retention Times Prolonged 	Carrier gas leaks at septum or column connection	Check for leaks. Replace septum or tighten connections if necessary.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Liners for 1177 Split/Splitless Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	Single taper	4.0	6.3	78.5	1000	5/pk	RT207992145 SG092017	8004-0151	SG092017	8004-0101
	Single taper, with wool	4.0	6.3	78.5	1000	5/pk	SG092019	8004-0152	SG092019	8004-0102
	Double taper	4.0	6.3	78.5	1000	5/pk	SG092018	8004-0155	SG092018	8004-0105
	Gooseneck, with wool	4.0	6.5	78.5	1000	5/pk	392611936	8004-0170	392611936	8004-0114
	Recessed gooseneck, with wool	4.0	6.3	78.5	1000	5/pk	SG092010	8004-0153	SG092010	8004-0103
	Gooseneck	2.0	6.5	78.5	250	5/pk	392611926	8004-0178	392611926	8004-0119
Splitless Liners										
	Straight, with wool	4.0	6.5	78.5	1000	5/pk	392611937	8004-0173	392611937	8004-0116
	Gooseneck	4.0	6.5	78.5	1000	5/pk	392611927	8004-0165	392611927	8004-0113
Split Liners										
	Straight-through	4.0	6.3	78.5	1000	5/pk	RT207732145 SG092007	8004-0156	SG092007	8004-0106
	Straight, with wool	4.0	6.3	78.5	1000	5/pk	SG092001 392611934	8004-0154	SG092001 392611934	8004-0104
	With frit, gooseneck	4.0	6.3	78.5	1000	5/pk	RT210462145	8004-0158		
Direct Liners										
	Straight-through	1.2	6.3	78.5	90	5/pk	SG092016	8004-0157	SG092016	8004-0107

***Formerly Varian GC systems, now Bruker products**

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Liners for 1078/1079 Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	Single taper	3.4	5.0	54	500	5/pk	RT209012145 SG092038	8004-0160	SG092038	8004-0108
	Gooseneck, with wool	2.0	5.0	54	250	5/pk			392611953	8004-0118
Splitless Liners										
	Single taper	2.0	5.0	54	170	5/pk	RT207122145 SG092039	8004-0161	SG092039	8004-0109
Split Liners										
	Gooseneck	3.4	5.0	54	500	5/pk	392611945	8004-0164	392611945	8004-0112
	With frit, gooseneck	3.4	5.0	54	500	5/pk	RT217092145	8004-0159		
	With frit, gooseneck	3.4	5.0	54	500	5/pk	392611946	8004-0171		
Other Liners										
	SPME, straight	0.8	5.0	54	30	5/pk	392611948	8004-0176		

Liners for 1093/1094 Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Direct Liners										
	SPI for 0.25/0.32 mm id columns	0.5	4.6	54	10	5/pk	190010906	8004-0167		
	SPI with 0.5 mm restriction for 0.53 mm id on-column	0.8	4.6	54	30	5/pk	SG092034 190010907	8004-0162	SG092034 190010907	8004-0110

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Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Liners for 1075/1077 Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split Liners										
	With wool	4.0	6.3	72	1000	5/pk	SG092021 190010901	8004-0163	SG092021 190010901	8004-0111

Liners for 1060/1061 Injector Ports

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Direct Liners										
	Double gooseneck	0.9	6.3	72	1000	5/pk	392611943	8004-0168		

Graphite O-ring, 8004-0202

Liner O-rings

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Non-stick fluoroelastomer O-ring, 1177 split/splitless, 6.3/6.5 mm od	10/pk	8850103100	8004-0201
Graphite O-ring, 1177 split/splitless, 6.5 mm od	10/pk	392611930	8004-0202
Graphite O-ring, 1177 split/splitless, 6.3 mm od	10/pk	392611935	8004-0203
Graphite liner seal, 1078/1079 injector, 5 mm id	10/pk	392534201	8004-0204

***Formerly Varian GC systems, now Bruker products**

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Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Column Ferrules

Capillary Column Ferrules

Injector	Fitting Size (in)	Ferrule ID (mm)	Column ID (mm)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
60% Vespel/40% Graphite Capillary Column Ferrules							
1177, 1079	1/16	0.3	0.18 or smaller	1	10/pk	CR213103	8004-0211
	1/16	0.4	0.25	2	10/pk	CR213124	8004-0213
	1/16	0.425	0.25	1	10/pk	CR213104	8004-0212
	1/16	0.5	0.32	1	10/pk	CR213105	8004-0214
	1/16	0.5	0.32	2	10/pk	CR213125	8004-0215
1177, 1079, 1061, 1041	1/16	0.8	0.53	1	10/pk	CR213108	8004-0216
Vespel Capillary Column Ferrules							
1177, 1079	1/16	0.3	0.18	1	10/pk	CR212103	8010-0306
	1/16	0.4	0.25	1	10/pk		8010-0307
	1/16	0.425	0.25	1	10/pk	CR212104	8004-0219
	1/16	0.5	0.32	1	10/pk	CR212105	8010-0308
	1/16	0.5	0.32	2	10/pk	CR212125	8004-0218*
1177, 1079, 1061, 1041	1/16	0.8	0.53	1	10/pk	CR212108	8010-0309
Graphite Capillary Column Ferrules							
1177, 1079	1/16	0.4	0.25	1	10/pk	CR211104	8010-0301
	1/16	0.5	0.32	1	10/pk	CR211105	8010-0302
	1/16	0.5	0.32	2	10/pk	CR211125	8010-0303
1177, 1079, 1061, 1041	1/16	0.8	0.53	1	10/pk	CR211108	8010-0304

*1177 Injector only

***Formerly Varian GC systems, now Bruker products**

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Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Packed Column Ferrules

Injector	Fitting Size (in)	Ferrule ID (in)	Column OD (in)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
60% Vespel/40% Graphite Packed Column Ferrules							
1093, 1061, 1041	1/4	1/4	1/4	1	10/pk	CR213400	8004-0217*
Graphite Packed Column Ferrules							
1093, 1061, 1041	1/4	1/4	1/4	1	10/pk	CR211400	8010-0305*

*Straight body

Column Nuts

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Column nut, brass, 1177, 1079, 1061, or 1041 injector	2/pk	394955100	8004-0311
Column nut, stainless steel, 1093 injector	2/pk	CP743117	8004-0312

Autosampler Syringes for Bruker/Varian GC Systems, 1/pk

Model	Volume (µL)	Description	Needle Gauge/Length (mm)/Tip	Similar to OEM syringe Part No.	Agilent CrossLab Syringe Part No.	Agilent CrossLab Replacement Needle Part No.	Agilent CrossLab Replacement Plunger Part No.
Varian* CP8400, CP8410, CP9010, CP9050	10	Fixed needle	23/50/cone tip	SG002981	8010-0351		
		Fixed needle	26/50/bevel tip		8004-0001		
		Removable needle	26/50/cone tip	SG002982	8004-0003	8004-0004, 2/pk	
Varian* 8035, 8100, 8200		Fixed needle, gas tight	26/53/side hole tip		8004-0002		8004-0007
		Removable needle, gas tight	25/53/side hole tip		8004-0005	8004-0006, 2/pk	8004-0007

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The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts.

Autosampler syringe, 10 µL fixed needle, 8010-0351

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Inlet Septa

Non-stick bleed and temperature optimized septa, 10 mm, 50/pk, 8010-0221

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0217	CR298713	8010-0218
9.5 mm	8010-0219	CR298705	8010-0220
10 mm	8010-0221	CR298745	8010-0222
11 mm, CenterGuide	8010-0223	CR298717	8010-0224
11.5 mm, CenterGuide	8010-0225	CR298777	8010-0226

Non-Stick Advanced Green Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0201	CR246713	8010-0202
9.5 mm	8010-0203	CR246124	8010-0204
10 mm	8010-0205		8010-0206
11 mm, CenterGuide	8010-0207	CR246225	8010-0208
11.5 mm, CenterGuide	8010-0209	CR246725	8010-0210

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The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Long-life septa, 8010-0239, 8010-0240

Non-Stick Long-Life Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0233	CR239778	8010-0234
11 mm, CenterGuide	8010-0239	CR239287	8010-0240
11.5 mm, CenterGuide	8010-0241	CR239287	8010-0242

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
General Purpose Septa		
9 mm	8010-0249	8010-0250
9.5 mm	8010-0251	8010-0252
10 mm	8010-0253	8010-0254
11 mm	8010-0255	8010-0256
11.5 mm	8010-0257	8010-0258

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TIPS & TOOLS

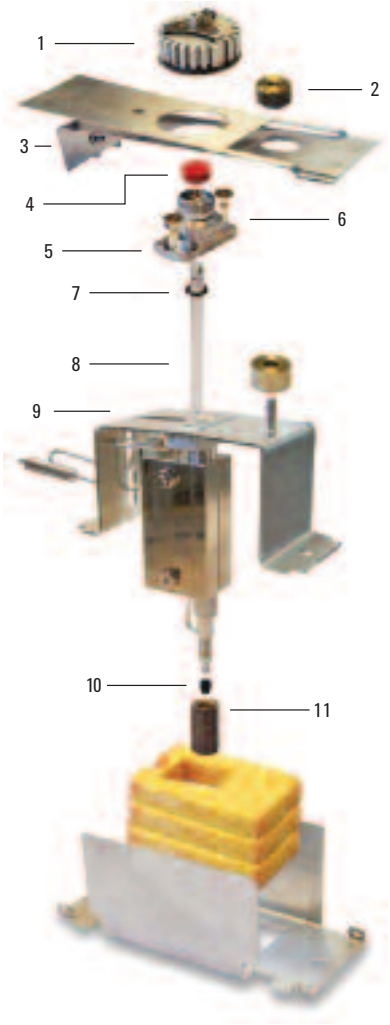
For a comprehensive vial compatibility chart, identification guide, septum recommendations, and ordering information, see the complete CrossLab Vials and Closures section of our General Chromatography catalog, publication number 5991-1056EN.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Injector Replacement Parts and Supplies

1177 Split/Splitless Injector

Item	Description	Agilent CrossLab and Agilent Part No.
1	Injector nut	392597501
	Injector nut wrench	390842300
2	Knob	392597101
3	Automatic start switch	390820601
4	Septum, 9 mm	
	BTO	8010-0217
	Long Life	8010-0233
	Advanced Green	8010-0201
	Septum pick	7200008400
5	Septum purge head	
	EFC21 (stainless steel)	392597301
	EFC21 (UltiMetal)	392597303
	EFC25 or Manual Pneumatics	392597302
6	Purge head screw	391866308
7	Graphite liner O-ring, splitless, 6.5 mm	8004-0202
	Non-stick fluoroelastomer liner O-ring, 6.3 mm	8004-0201
8	Glass liner	8004-0165
9	Injector body	
	Stainless steel	392599401
	UltiMetal	392599411
	Manual	392599501
10	For replacement ferrules, see complete CrossLab column ferrules ordering information, see page 157	
11	Bottom nut	8004-0311



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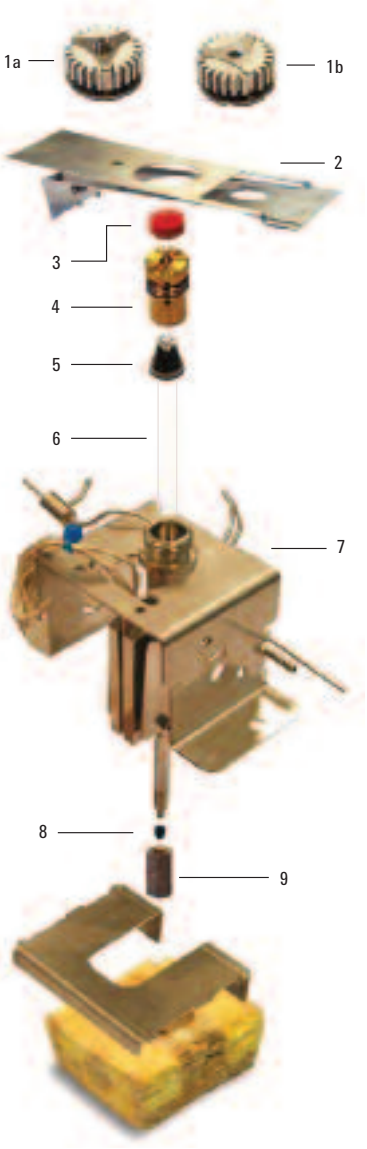
Agilent CrossLab Supplies for Bruker, Varian* GC Systems



1079 Large Volume Injector (LVI)

Item	Description	Agilent CrossLab and Agilent Part No.
1a	Injector nut	394966601
1b	Injector nut	394966601
	Injector nut wrench	390842300
2	Automatic start switch	390820601
3	Septum, 11.5 mm	
	BTO	8010-0225
	Long Life	8010-0241
	Advanced Green	8010-0209
	Septum pick	7200008400
4	Septum support	391867600
5	Graphite liner seal	8004-0204
6	Glass liner	8004-0164
7	Injector body, EFC type	
	Stainless steel	392544001
	UltiMetal	392544011
8	For replacement ferrules, see complete CrossLab column ferrules ordering information, see page 157	
9	Bottom nut	8004-0311

***Formerly Varian GC systems, now Bruker products**

TIPS & TOOLS

For a comprehensive vial compatibility chart, identification guide, septum recommendations, and ordering information, see the complete CrossLab Vials and Closures section of our General Chromatography catalog, publication number 5991-1056EN.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

1093 Cool On-Column (COC) Injector

Item	Description	Agilent CrossLab and Agilent Part No.
1	Injector nut	394966601
	Injector nut wrench	390842300
2	Automatic start switch	390820601
3	Septum, 11.5 mm	
	BTO	8010-0225
	Long Life	8010-0241
	Advanced Green	8010-0209
	Septum pick	7200008400
4	Septum support	391821100
5	Glass liner	
	Default	8004-0162
	High performance	8004-0167
6	Screw	391866306
7	Graphite/Vespel ferrule	8004-0217
	Graphite ferrule	8010-0305
8	Bottom nut	
	Brass	8004-0311
	Stainless steel	8004-0312

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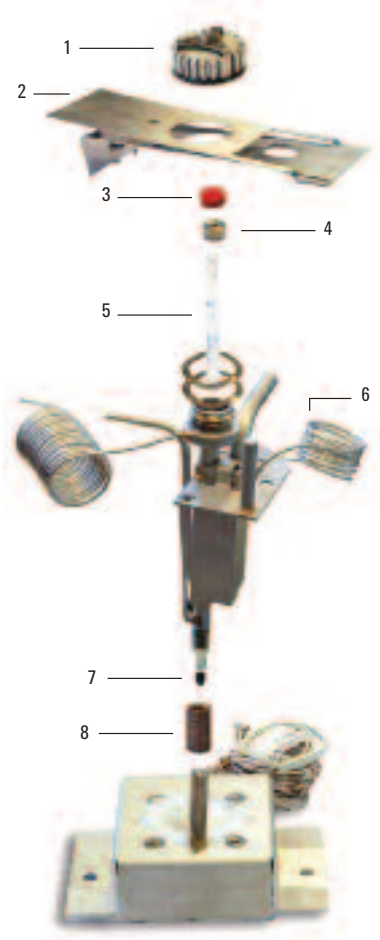
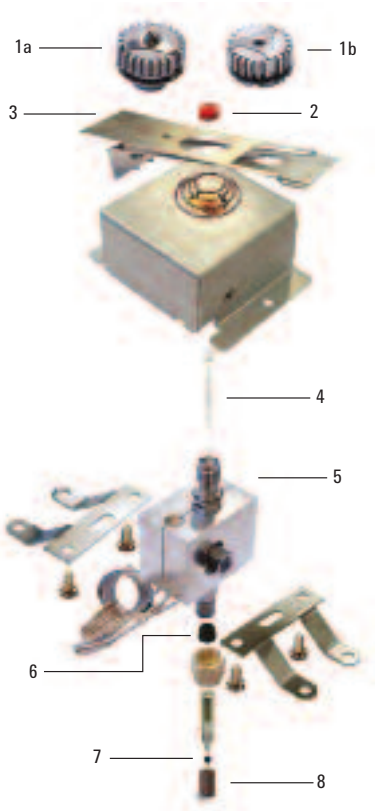


Agilent CrossLab Supplies for Bruker, Varian* GC Systems



1061 Packed/530 µm Capillary Column Injector

Item	Description	Agilent CrossLab and Agilent Part No.
1a	Injector nut	390812700
1b	Injector nut	392595501
	Injector nut wrench	390842300
2	Septum, 9.5 mm	
	BTO	8010-0219
	Advanced Green	8010-0203
	Septum pick	7200008400
3	Automatic start switch	390820601
4	Glass liner	8004-0168
5	Injector body, EFC23	392548301
6	Graphite/Vespel ferrule	8004-0217
	Graphite ferrule	8010-0305
7	For replacement ferrules, see complete CrossLab column ferrules ordering information, see page 157	
8	Bottom nut	8004-0311

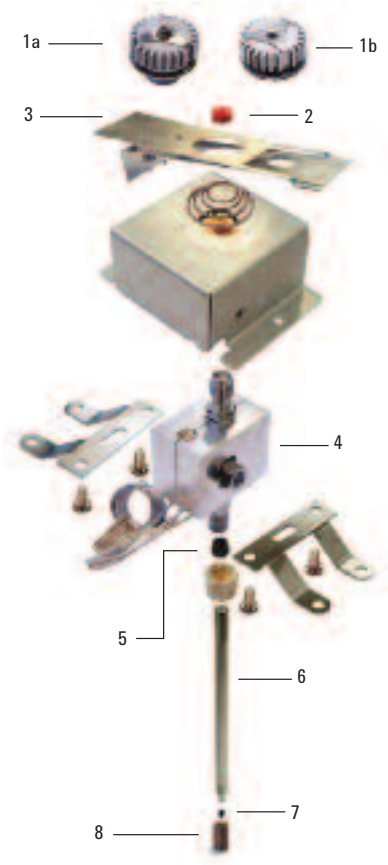
***Formerly Varian GC systems, now Bruker products**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

1041 Packed/Wide Bore On-Column (PWOC) Injector

Item	Description	Agilent CrossLab and Agilent Part No.
1a	Injector nut	390812700
1b	Injector nut	392595501
	Injector nut wrench	390842300
2	Septum, 9.5 mm	
	BTO	8010-0219
	Advanced Green	8010-0203
	Septum pick	7200008400
3	Automatic start switch	390820601
4	Injector body, EFC type	392548201
5	Graphite/Vespel ferrule	8004-0217
	Graphite ferrule	8010-0305
6	Injector insert, stainless steel	392543101
7	For replacement ferrules, see complete CrossLab column ferrules ordering information, see page 157	
8	Bottom nut	8004-0311

***Formerly Varian GC systems, now Bruker products**



Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Detector Replacement Parts and Supplies

Thermal Conductivity Detector (TCD)

Description	Agilent Part No.
Adapter TCD/DEFC capillary make-up	392585291
Adapter TCD/DEFC reference gas kit	392585292
Adapter TCD capillary make-up, MPC, 3800	392560591
TCD DEFC 14 (Non-H_2), 2 channels	392561290

Flame Ionization Detector (FID)

Description	Agilent Part No.
Tube collector	394958700
Lower FID insulator #17311	2100003200
FID flame tip jet, 0.010 in	200187500
FID flame tip jet with nut, 0.020 in	200193800
Crunch washer, 25/pk	1500334701

***Formerly Varian GC systems, now Bruker products**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Pulsed Flame Photometric Detector (PFPD)

Description	Agilent Part No.
Photomultiplier tube (PFPD) #R647-08	392517100
O-Ring, silicone, 0.53 in id, PFPD	2740292400
PFPD light pipe	392515500
Sapphire window assembly	392514500
Sapphire window washer	392514300
Wrench, PFPD combustor support	392519200
Seal, combustor support	392513800
Combustor holder (2 mm)	392517800
Combustor Sulfur (2 mm), cleaned	392517600
Holder, combustor, 3 mm, cleaned	392517901
Combustor Phosphorus, 3 mm, cleaned	392517700

PFPD Filter Assemblies

Description	Agilent Part No.
Arsenic (As)	392515105
Manganese (Mn)	392544391
Nitrogen (N)	392511901
Sulfur and Phosphorus (S and P)	392515104
Phosphorus (P)	392515102
Sulfur (S)	392515101
Tin (Sn)	392515103

***Formerly Varian GC systems, now Bruker products**

TIPS & TOOLS

For a comprehensive vial compatibility chart, identification guide, septum recommendations, and ordering information, see the complete CrossLab Vials and Closures section of our General Chromatography catalog, publication number 5991-1056EN.

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

PFPD Nitrogen Mode Maintenance

Description	Agilent Part No.
Photomultiplier tube, Nitrogen R-5070A	392512800
O-Ring, 0.987 in id	2740236100
PFPD filter assembly, Nitrogen	392511901
PFPD light pipe	392515500
Sapphire window assembly	392514500
Sapphire window washer	392514300

Thermionic Specific Detector (TSD)

Description	Agilent Part No.
TSD bead probe, unconditioned and untested	390607400
TSD bead probe, conditioned and tested	390607401
Upper TSD insulator #17310 TSD	2100003100
O-Ring, 30/pk	2740928202
TSD collector assembly	390607900
Lower FID insulator #17311	2100003200
Crunch washer, 25/pk	1500334701
FID flame tip jet with nut, 0.020 in	200193800
Flow tube assembly	200187600

***Formerly Varian GC systems, now Bruker products**

Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Liners for AutoSystem, AutoSystem XL, Clarus Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	PSS straight	2.0	4.0	86.2		5/pk	N6502002	8003-0153		8003-0103
	PSS straight with bottom restriction	2.0	4.0	86.2	260	5/pk	N6121004	8003-0158		
	PSS on-column	2.0	4.0	86.2	250	5/pk	N6101539	8003-0165	N6101539	8003-0110
	PSS straight	1.0	4.0	86.2	65	5/pk	N6121006	8003-0157		
Split/Large Volume Splitless Liners										
	Straight with bottom restriction	4.0	6.2	92.1	1150	5/pk	N6121001	8003-0159	N6121001	8003-0105
Splitless Liners										
	Straight	2.0	6.2	92.1	300	5/pk	N6101372	8003-0162	N6101372	8003-0107
	Straight-through	2.0	6.2	92.1	300	5/pk	N6502004	8003-0152	N6502004	8003-0102
Split Liners										
	Straight-through	4.0	6.2	92.1	1150	5/pk		8003-0151		8003-0101
	Straight, wool	4.0	6.2	92.1	1100	5/pk	N6121020	8003-0160	N6121020	8003-0106
	Straight with bottom restriction	4.0	6.2	92.1	1100	5/pk	N6101052	8003-0166	N6101052	8003-0111

(Continued)

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Liners for AutoSystem, AutoSystem XL, Clarus Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Direct Liners										
	Gooseneck, drilled hole on top, wool	4.0	6.2	92.1		5/pk	N6121022	8003-0155		
Other Liners										
	Packed column, straight	3.0	6.2	112	800	5/pk	N6121000	8003-0163	N6121000	8003-0108
	Programmable on-column, hour glass	2.2	4.0	16		5/pk			N6101703	8003-0109*
	PTV, 0.25 mm id restriction, recessed gooseneck	1.0	2.0	88	70	5/pk		8003-0154		8003-0104

*P/N 8003-0109 is not deactivated

Graphite O-rings, 8003-0205

Liner O-rings

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Non-stick fluoroelastomer O-ring	10/pk	N9302783	8010-0401
Non-stick fluoroelastomer O-ring, PSS Injector	10/pk	N6101747	8003-0202
Silicone O-ring	10/pk	N6101374	8003-0203
Graphite O-ring, PSS Injector	10/pk	N6101751	8003-0204
Graphite O-ring	10/pk	N6101378	8003-0205

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Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Column Ferrules

Capillary Column Ferrules

Model	Fitting Size (in)	Ferrule ID (mm)	Column ID (mm)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Vespel/15% Graphite Capillary Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/16	0.4	0.25	1	10/pk	09920104	8010-0310
	1/16	0.4	0.25	2	10/pk	04972392	8010-0312
	1/16	0.5	0.32	1	10/pk	09920105	8010-0311
	1/16	0.5	0.32	2	10/pk	N9306000	8003-0216
	1/16	0.8	0.53	1	10/pk	09920107	8010-0313
Graphite Capillary Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/16	0.4	0.25	1	10/pk		8010-0301
	1/16	0.5	0.32	1	10/pk	09903700	8010-0302
	1/16	0.5	0.32	2	10/pk	N9306001	8010-0303
	1/16	0.8	0.53	1	10/pk	09920141	8010-0304
Vespel Capillary Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/16	0.3	0.18 or smaller	1	10/pk		8010-0306
	1/16	0.4	0.25	1	10/pk		8010-0307
	1/16	0.5	0.32	1	10/pk		8010-0308
	1/16	0.8	0.53	1	10/pk		8010-0309

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Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Packed Column Ferrules

Model	Fitting Size (in)	Ferrule ID (in)	Column OD (in)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Vespel/15% Graphite Packed Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/4	1/4	1/4	1	10/pk	09903739	8010-0314
	1/8	1/8	1/8	1	10/pk	N9302081	8003-0219
	1/16	1/16	1/16	1	10/pk	09920127	8010-0315
Graphite Packed Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/4	1/4	1/4	1	10/pk	09920140	8010-0305
	1/8	1/8	1/8	1	10/pk	09903915	8003-0212
	1/16	1/16	1/16	1	10/pk	02450972	8003-0211
Vespel Packed Column Ferrules							
AutoSystem, AutoSystem XL, Clarus	1/4	1/4	1/4	1	10/pk	N9301361	8003-0223
	1/8	1/8	1/8	1	10/pk	N9301360	8003-0222
	1/16	1/16	1/16	1	10/pk		8003-0221

Column Nuts

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Column nut, 1/16 in	2/pk	09903392	8003-0311

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Autosampler Syringes for PerkinElmer GC Systems, 1/pk

Model	Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Similar to OEM Syringe Part No.	Agilent CrossLab Syringe Part No.	Similar to OEM Replacement Needle and Plunger Repair Kit Part No.	Agilent CrossLab Replacement Needle and Plunger Repair Kit Part No.
AutoSystem, AutoSystem XL, Clarus	0.5	Removable needle	23/70/cone tip	N6101252	8003-0005	N6101469	8003-0006
AutoSystem, AutoSystem XL, Clarus		Removable needle	26/70/bevelled cone tip		8003-0007		8003-0008
AutoSystem, AutoSystem XL, Clarus	5	Fixed needle	23/70/cone tip	N6101251	8003-0001		
AutoSystem, AutoSystem XL, Clarus		Fixed needle, gas tight	23/70/cone tip	N6101390	8003-0002		
AutoSystem, AutoSystem XL, Clarus		Fixed needle	26/70/cone tip	N6101380	8003-0003		
AutoSystem, AutoSystem XL, Clarus	50	Fixed needle	23/70/cone tip	N6101760	8003-0004		

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Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Inlet Septa

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
11 mm, CenterGuide	8010-0223	N9302972	8010-0224

Non-Stick Advanced Green Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
11 mm, CenterGuide	8010-0207	N6621028 N9306219	8010-0208

Long-life septa, 8010-0239, 8010-0240

Non-Stick Long-Life Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
11 mm, CenterGuide	8010-0239	8010-0240

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
11 mm	8010-0255	54019985	8010-0256

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TIPS & TOOLS

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Agilent CrossLab Supplies for Shimadzu GC Systems

Liners for 2014 Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Splitless Liners										
	Single taper, wool	3.5	5.0	95		5/pk	221-48876-02	8001-0160		
	Double taper, drilled hole near top	3.5	5.0	95		5/pk	220-94734-01	8001-0158		
	Double taper, drilled hole near bottom	3.5	5.0	95		5/pk	220-94734-02	8001-0159		
	Straight-through	2.6	5.0	95	500	5/pk	220-94767-00	8001-0151	220-94767-00	8001-0101
Split Liners										
	Straight with middle restriction	3.5	5.0	95	800	5/pk	221-41444-01	8001-0156	221-41444-01	8001-0106
	Straight with middle restriction, wool	3.5	5.0	95	800	5/pk	220-90784-00	8001-0157		
	Straight-through	3.4	5.0	95	860	5/pk		8001-0153		8001-0103
Direct Liners										
	For 0.53 mm id column	2.6	5.0	95	450	5/pk	220-94768-00	8001-0152	220-94768-00	8001-0102

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Shimadzu GC Systems

Liners for 2010 and 2010 Plus Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	Single taper	3.4	5.0	95		5/pk	961-01480-07 221-48335-01	8001-0154	221-48335-01	8001-0104
Splitless Liners										
	Single taper, wool	3.5	5.0	95		5/pk	221-48876-02	8001-0160		
	Double taper, drilled hole near top	3.5	5.0	95		5/pk	220-94734-01	8001-0158		
	Double taper, drilled hole near bottom	3.5	5.0	95		5/pk	220-94734-02	8001-0159		
	Straight-through	2.6	5.0	95	500	5/pk	220-94767-00	8001-0151	220-94767-00	8001-0101
Split Liners										
	Straight-through	3.4	5.0	95	860	5/pk		8001-0153		8001-0103
	Straight with middle restriction	3.5	5.0	95	800	5/pk	221-41444-01	8001-0156	221-41444-01	8001-0106
	Straight with middle restriction, wool	3.5	5.0	95	800	5/pk	220-90784-00	8001-0157		
Other Liners										
	PTV	1.25	3.5	95	100	5/pk	221-49300-00	8001-0163		
	SPME or Purge and Trap, straight	0.75	5.0	95	50	5/pk	220-94769-00	8001-0162		

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Agilent CrossLab Supplies for Shimadzu GC Systems

Liners for 17A Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Splitless Liners										
	Single taper, wool	3.5	5.0	95		5/pk	221-48876-02	8001-0160		
	Double taper, drilled hole near top	3.5	5.0	95		5/pk	220-94734-01	8001-0158		
	Double taper, drilled hole near bottom	3.5	5.0	95		5/pk	220-94734-02	8001-0159		
	Straight-through	2.6	5.0	95	500	5/pk	220-94767-00	8001-0151	220-94767-00	8001-0101
Split Liners										
	Straight with middle restriction, wool	3.5	5.0	95	800	5/pk	220-90784-00	8001-0157		
	Straight-through	3.4	5.0	95	860	5/pk		8001-0153		8001-0103
Direct Liners										
	For 0.53 mm id column	2.6	5.0	95	450	5/pk	220-94768-00	8001-0152	220-94768-00	8001-0102

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Shimadzu GC Systems

Liners for 14 Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Agilent Ultra Inert Deactivation	Agilent Original Deactivation
Split/Splitless Liners								
	2.0 mm middle gooseneck	3.4	5.0	99	850	5/pk	8001-0155	8001-0105

Graphite O-rings

Liner O-rings

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Non-stick fluoroelastomer O-ring	10/pk	036-11203-84	8001-0201
Graphite O-ring, split	10/pk	221-48393-91	8001-0202
Graphite O-ring, splitless	10/pk	221-47222-91	8001-0203

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Agilent CrossLab Supplies for Shimadzu GC Systems

Column Ferrules

Capillary Column Ferrules

Model	Fitting Size (in)	Ferrule ID (mm)	Column ID (mm)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Vespel/15% Graphite Capillary Column Ferrules							
QP5000/5050 Standard MS	1/16	0.3	0.18 or smaller	1	10/pk	220-90700-01	8001-0224
	1/16	0.4	0.25	1	10/pk	220-90700-02	8001-0221
	1/16	0.5	0.32	1	10/pk	220-90700-03	8001-0222
	1/16	0.8	0.53	1	10/pk	220-90700-04	8001-0223
QP2010	1/16	0.4	0.25	1	10/pk	220-90418-14	8010-0310
	1/16	0.4	0.25	2	10/pk	225-19056-00	8010-0312
	1/16	0.5	0.32	1	10/pk	220-90418-15	8010-0311
	1/16	0.8	0.53	1	10/pk	220-90418-18	8010-0313
Graphite Capillary Column Ferrules							
2010, 2010 Plus, 2014, 17A, 14A	1/16	0.4	0.25	1	10/pk	220-90765-00	8001-0211
	1/16	0.5	0.32	1	10/pk	221-32126-05	8001-0212
	1/16	0.8	0.53	1	10/pk	221-32126-08	8001-0213

Packed Column Ferrules

Model	Fitting Size (in)	Ferrule ID (in)	Column OD (in)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Vespel/15% Graphite Packed Column Ferrules							
QP5000/5050 Standard MS	1/4	1/4	1/4	1	10/pk	225-09028-00	8010-0314
QP5000/5050 Wide Bore MS	1/16	1/16	1/16	1	10/pk	220-90418-28	8010-0315
QP2010	1/16	1/16	1/16	1	10/pk		8010-0315
17A	5 mm	5 mm	5 mm od	1	10/pk	221-46403-92	8001-0214

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Graphite capillary column ferrules, 8001-0213

Agilent CrossLab Supplies for Shimadzu GC Systems

Column Nuts

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Column nut, slotted, 6-sided	2/pk	221-32705-00	8001-0311
Column nut, no slot, 6-sided	2/pk	221-41533-00	8001-0312

Autosampler Syringes for Shimadzu GC Systems, 1/pk

Model	Volume (µL)	Description	Needle Gauge/ Length (mm)/ Tip	Similar to OEM Syringe Part No.	Agilent CrossLab Syringe Part No.	Similar to OEM Replacement Needle and Plunger Repair Kit Part No.	Agilent CrossLab Replacement Needle Part No.
AOC-14, AOC-17, AOC-20	5	Removable needle	23/42/cone tip		8001-0010		8001-0011
AOC-14, AOC-17, AOC-20	10	Removable needle	23/42/cone tip	220-90282-20	8001-0004	220-90281-20	8001-0005, 2/pk
AOC-14, AOC-17, AOC-20		Removable needle	26/42/cone tip	220-90282-21	8001-0006	220-90281-21	8001-0007, 2/pk
AOC-14, AOC-17, AOC-20	50	Removable needle	23/42/cone tip	221-45243-00	8001-0012		8001-0014
AOC-14, AOC-17, AOC-20	250	Removable needle, gas tight	23/42/cone tip	221-45244-00	8001-0013		8001-0014

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TIPS & TOOLS

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Agilent CrossLab Supplies for Shimadzu GC Systems

Inlet Septa

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
Shimadzu plug	8010-0231	8010-0232

Non-Stick Advanced Green Septa

Description	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
Shimadzu plug	8010-0215	220-90547-00 220-94781-00	8010-0216

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
Shimadzu plug	8010-0263	8010-0264

The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab products may have slightly different designs as compared to the OEM counterparts. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Thermo Scientific GC Systems

Liners for Trace, Focus Systems

	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Splitless Liners										
	Single taper	5.0	8.0	105	1750	5/pk	45350033	8002-0153	45350033	8002-0103
	Single taper	3.0	8.0	105		5/pk	45350032	8002-0154	45350032	8002-0104
Split Liners										
	Straight	5.0	8.0	105	2000	5/pk	45350030	8002-0151	45350030	8002-0101
	Straight	3.0	8.0	105	750	5/pk	45350031	8002-0152	45350031	8002-0102
PTV Liners										
	Straight	2.0	2.75	120	375	5/pk	45322045	8002-0156*	45322045	8002-0106*
	Straight with bottom restriction	2.0	2.75	120	375	5/pk	45352057	8002-0157	45352057	8002-0107
	6 baffles	2.0	2.75	120		5/pk	453T2120	8002-0160*		
	Straight	1.75	2.75	120	300	5/pk		8002-0155		8002-0105
	Straight	1.0	2.75	120	90	5/pk	45352054	8002-0161		
	3 baffles	1.0	2.75	120		5/pk	45352062	8002-0159*		

*Use in Trace systems only

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Agilent CrossLab Supplies for Thermo Scientific GC Systems

Liner O-rings

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Non-stick fluoroelastomer O-ring, sintered liner	10/pk	29031305	8002-0201
Non-stick fluoroelastomer O-ring	10/pk	29030306	8010-0401
Graphite O-ring, 8 mm od	2/pk	29033406	8002-0203
Graphite O-ring, PTV	2/pk	29013417	8002-0204

Column Ferrules

Capillary Column Ferrules

Model	Fitting Size (in)	Ferrule ID (mm)	Column ID (mm)	Hole	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
85% Vespel/15% Graphite Capillary Column Ferrules							
Injectors/Detectors	1/16	0.4	0.25	1	10/pk	290VT186	8002-0220
	1/16	0.5	0.32	1	10/pk	290VT187	8002-0221
	1/16	0.8	0.53	1	10/pk	290VT188	8002-0222
Any GC/MS Interface	1/16	0.4	0.25	1	10/pk	29033496	8010-0310
	1/16	0.5	0.32	1	10/pk	29033497	8010-0311
Graphite Capillary Column Ferrules							
Trace/Focus Injectors/Detectors (not for GC/MS Interface)	M4	0.3	0.18	1	10/pk		8002-0211
	M4	0.4	0.25	1	10/pk	29053488	8002-0212
	M4	0.5	0.32	1	10/pk	29053487	8002-0213
	M4	0.8	0.53	1	10/pk	29053486	8002-0214
Injectors/Detectors	1/16	0.4	0.25	1	10/pk		8002-0215
	1/16	0.5	0.32	1	10/pk		8002-0216
	1/16	0.8	0.53	1	10/pk		8002-0217

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Agilent CrossLab Supplies for Thermo Scientific GC Systems

Column Nuts

Description	Unit	Similar to OEM Part No.	Agilent CrossLab Part No.
Column nut, stainless steel, split/splitless injector	2/pk	35032423	8002-0311
Column nut, brass	2/pk	290BT239	8002-0312

Autosampler Syringes for Thermo GC Systems, 1/pk

Model	Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Similar to OEM Syringe Part No.	Agilent CrossLab Syringe Part No.	Similar to OEM Replacement Needle or Plunger Part No.	Agilent CrossLab Replacement Needle or Plunger Part No.
TriPlus, AS3000	0.5	Plunger-in-needle	23/50/cone tip	36504045	8010-0355		8010-0367*
TriPlus	5	Fixed needle	26/50/cone tip	36504047	8010-0353		
TriPlus, AS3000, AS2000, AS200, AS800	10	Fixed needle	23/50/cone tip	36520060	8010-0351		
		Fixed needle	26/50/cone tip	365D3711	8010-0352		
		Fixed needle	25/50/cone tip	36500525	8002-0003		
TriPlus, AS2000		Fixed needle	23/80/cone tip	36520061	8002-0002		
		Fixed needle	26/80/cone tip	36502019	8002-0001		
TriPlus, AS2000, AS200, AS800	100	Fixed needle, gas tight	23/50/cone tip		8010-0354		8010-0368**
TriPlus, AS2000		Removable needle, gas tight	23/50/side hole tip	36520050	8002-0004	36540040	8002-0005***

*Needle and plunger repair kit

**Replacement plunger

***Replacement needle

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Agilent CrossLab Supplies for Thermo Scientific GC Systems

Inlet Septa

Non-Stick Bleed and Temperature Optimized (BTO) Septa

Description	Similar to OEM Part No.	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	31303240	8010-0217		8010-0218
9.5 mm		8010-0219		8010-0220
10 mm		8010-0221		8010-0222
11 mm, CenterGuide		8010-0223		8010-0224
11.5 mm, CenterGuide	31303230	8010-0225		8010-0226
Description		**24/pk**		**48/pk**
12.7 mm, CenterGuide		8010-0227	31303228	8010-0228
17 mm, CenterGuide		8010-0229	31303211	8010-0230

Non-Stick Advanced Green Septa

Description	Similar to OEM Part No.	Agilent CrossLab Part No. 50/pk	Similar to OEM Part No.	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	313G3240	8010-0201		8010-0202
9.5 mm		8010-0203		8010-0204
10 mm		8010-0205		8010-0206
11 mm, CenterGuide	313G3230	8010-0207		8010-0208
11.5 mm, CenterGuide		8010-0209		8010-0210
Description		**24/pk**		**48/pk**
12.7 mm, CenterGuide		8010-0211	313G3228	8010-0212
17 mm, CenterGuide		8010-0213	313G3211	8010-0214

Non-stick advanced green septum, 11 mm, CenterGuide, 8010-0207

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Agilent CrossLab Supplies for Thermo Scientific GC Systems

Long-life septa, 8010-0239, 8010-0240

Non-Stick Long-Life Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm, CenterGuide	8010-0233	8010-0234
11 mm, CenterGuide	8010-0239	8010-0240
11.5 mm, CenterGuide	8010-0241	8010-0242
Description	**24/pk**	**48/pk**
12.7 mm, CenterGuide	8010-0243	8010-0244
17 mm, CenterGuide	8010-0245	8010-0246

General Purpose Septa

Description	Agilent CrossLab Part No. 50/pk	Agilent CrossLab Part No. 100/pk
9 mm	8010-0249	8010-0250
9.5 mm	8010-0251	8010-0252
10 mm	8010-0253	8010-0254
11 mm	8010-0255	8010-0256
11.5 mm	8010-0257	8010-0258
12.7 mm	8010-0259	8010-0260
17 mm	8010-0261	8010-0262

TIPS & TOOLS

For a comprehensive vial compatibility chart, identification guide, septum recommendations, and ordering information, see the complete CrossLab Vials and Closures section of our General Chromatography catalog, publication number 5991-1056EN.

For more information, please visit
www.agilent.com/chem/CrossLabGC

Agilent CrossLab Supplies for CTC GC Autosamplers

Autosampler Syringes for CTC CombiPAL and GC PAL, 1/pk

Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Agilent CrossLab Syringe Part No.	Agilent CrossLab Replacement Needle or Plunger Part No.
0.5	Plunger-in-needle	23/50/cone tip	8010-0355	8010-0367*
5	Fixed needle	23/50/cone tip	8010-0356	
	Fixed needle	26/50/cone tip	8010-0353	
10	Fixed needle	23/50/cone tip	8010-0351	
	Fixed needle	25/50/cone tip	8002-0003	
	Fixed needle	26/50/cone tip	8010-0352	
	Fixed needle, gas tight	26/50/cone tip	8010-0357	8010-0359**
	Fixed needle	26/50/bevel tip	8010-0358	
25	Fixed needle	26/50/cone tip	8010-0360	
100	Fixed needle, gas tight	23/50/cone tip	8010-0354	
	Removable needle, gas tight	23/50/side hole tip	8002-0004	8002-0005***
	Fixed needle	26/50/cone tip	8010-0361	
250	Fixed needle, gas tight	26/50/cone tip	8010-0362	

Volume (mL)	Description	Needle Gauge/ Length (mm)/Tip	Agilent CrossLab Syringe Part No.	Agilent CrossLab Replacement Needle or Plunger Part No.
1	Fixed needle, gas tight, headspace	23/56/side hole tip	8010-0363	8010-0365
2.5	Fixed needle, gas tight, headspace	23/56/side hole tip	8010-0364	8010-0366

*Needle and plunger repair kit

**Replacement plunger

***Replacement needle

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Ordering Information

Easy Ordering Terms and Conditions

Discounts and Delivery

Agilent Technologies specializes in fast delivery. In the US, if you call before 2 PM EST, we will ship your order that day. You may also request overnight express delivery before 6 PM EST and you will have your order the next day. Volume discounts on a variety of individual products are offered when the entire quantity is shipped to one address at one time.

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- If a shipment is visibly damaged upon arrival, do not accept it until the person making the delivery has endorsed the bill of lading with statement for the extent of the damage.
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- Phone: **1-800-227-9770** (option 1, 1) in the US and Canada – Mon-Fri, 8AM to 8PM EST
- Fax: **1-302-633-8901** in the US
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- Online: **www.agilent.com/chem** in the US and Canada

Payment Options

- In the US, Visa, MasterCard, Discover and American Express are accepted with a minimum order of $20 (not applicable in all countries).
- Email ePay@agilent.com to make an electronic payment using the ACH/EFT (Automated Clearing House/Electronic Funds Transfer) method.
- Establish a charge account through your Agilent Customer Service Representative or Your Local Agilent sales office. An account number will be assigned to you for charging your purchases. Payment terms are net 30 days from the invoice date. All orders are subject to credit approval.

We will be happy to supply a price quote via, phone, email or fax if you need it in writing.

Warranties

All Agilent Technologies products in this catalog are designed and manufactured to stringent standards under the Agilent quality system registered to ISO 9001. At Agilent, we back every product with a 90-day warranty and a money-back guarantee. If Agilent receives notice of defects during the warranty period. Agilent shall, at its option, either repair or replace products which prove to be defective. If Agilent is unable, within a reasonable time, to repair or replace any product to a condition as warranted, the buyer shall be entitled to a refund of the purchase price upon return of the product to Agilent. The warranty period for each product begins on the day of shipment.

This warranty shall not apply to any defect, failure, or damage caused by improper use or improper or inadequate maintenance or care. This warranty is exclusive and no other warranty, whether written or oral, is expressed or implied. Agilent specifically disclaims the implied warranties of merchantability and fitness for particular purposes. The remedies provided herein are the buyer's sole and exclusive remedies. In no event shall Agilent be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) whether based on contract, tort, or any other legal theory.