Аксессуары и расходные материалы ГХ

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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.
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 noisy, 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 PFTBA (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

Ultra Inert gold plated seal and washer, 5190-6144

Liner O-rings, 5190-2269

Non-stick BTO septa, 5190-3157

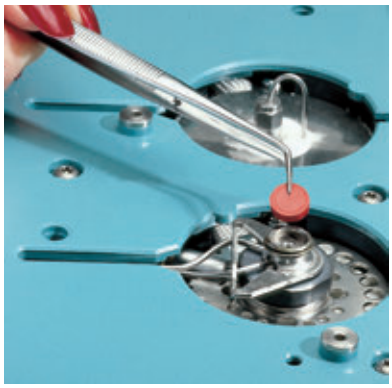
Ideal for high usage laboratories, our bulk supplies provide the quality and consistency of Agilent chromatography supplies in convenient and economical packaging. We currently offer Agilent inlet liners, septa, gold inlet seals, and liner O-rings in bulk packaging.

- 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 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			
Ultra Inert gold plated seal, includes washer		50/pk	5190-6149
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

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

Inlet 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

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

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.
Non-stick bleed and temperature optimized (BTO) septa, 11 mm	50/pk	5183-4757
Non-stick bleed and temperature optimized (BTO) septa, 11 mm	100/pk	5183-4757-100
Non-stick bleed and temperature optimized (BTO) septa, 11 mm	400/pk	5190-3157
5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4758

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
- Blister packaging for cleanliness and convenience

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

Advanced green septa, 5183-4759

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

Non-Stick Long-Life Septa

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

Long-life septa, 5183-4761

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.

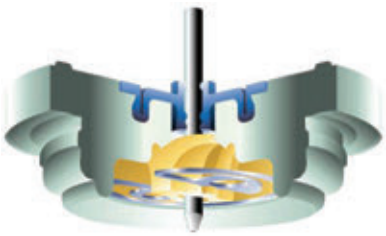
General purpose gray septa

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.
Merlin Microseal SPME replacement seal, 23-gauge, 1/pk	392609902
General Purpose Merlin Microseal (3-100 psi)	
Merlin Microseal starter kit, general purpose Includes Microseal septum and nut	5182-3442
Merlin Microseal general purpose replacement septum 3-100 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/pk	392609901
Merlin Microseal adapter kit for 1177 inlets Contains adapter, nut and general purpose Merlin Microseal septum	392609903
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

*Varian GC systems are now Bruker products

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.

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 and pesticides – 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.

Agilent Ultra Inert Liners

Ensure a reliably inert flow path – with or without glass wool

These Ultra Inert Inlet liners help ensure an inert GC flow path for higher sensitivity, accuracy, and reproducibility, especially at trace levels.

For samples that contain active or labile compounds, labs typically use liners without wool to prevent degradation or loss of active analytes. However, with Agilent Ultra Inert deactivation, liners with wool are recommended for no loss of sensitivity. The benefits provided by wool, such as homogeneous sample mixing and vaporation, non-volatile residue trapping, and column and detector protection, are gained without compromising detection of active analytes. Plus, Ultra Inert liners are more stable than liners with other deactivations, as shown on the following page. More samples can be analyzed before inlet or column maintenance is required when using Ultra Inert liners with wool.

Certified performance

Each deactivation lot is certified to ensure efficient, consistent coverage using both acidic and basic probes at trace (2 ng) levels on-column. In addition, every liner is packaged with a Performance Certificate that you can peel and stick into your lab notebook for quick compliance reference.

Easy traceability: The deactivation lot number is printed directly on the Performance Certificate; the liner lot number and part number are permanently etched on glass.

Unequalled manufacturing and quality control deliver best-in-class liner deactivation performance

Agilent's proprietary manufacturing process produces Ultra Inert liners that are rigorously tested and certified to ensure exceptional batch-to-batch uniformity, low (to no) bleed or background contamination, and good coverage – even with highly active compounds. This rigorous process includes:

- Lot testing to ensure reproducible deactivation coverage – and the stability of deactivation over time
- QC testing with probes specifically chosen to reveal activity
- A GC method that tests liner (not column or system) inertness
- The elimination of contamination – a common side effect of manufacturing and packaging

Touchless packaging – an Agilent exclusive – eliminates O-ring hassles

Ultra Inert Inlet liners are delivered in pharmaceutical-grade PTEG tubing approved by GC/MS extraction testing. But what really sets Agilent's packaging apart is a pre-installed O-ring that has been pre-cleaned, conditioned, and non-stick plasma treated. This touchless packaging allows you to quickly and easily install the new liner without searching for and installing the O-ring – saving time and improving productivity, without the risk of contamination from touching.

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
- Coverage allows for use even of glass wool 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		
Splitless, straight, Ultra Inert Liner	250	2	5190-6168			
Straight, Ultra Inert Liner	60	1	5190-4047			
Straight Ultra Inert Liner for SPME	35	0.75	5190-4048			

*The 100/pk is not in the Touchless packaging. O-rings must be purchased separately, p/n 5190-2269.

TIPS & TOOLS

Ultra Inert gold seals prevent active sites from ruining your analysis

Unlike traditional machined seals, Agilent Ultra Inert gold inlet seals are manufactured using metal injection molding, followed by gold plating to ensure a smooth, consistent surface. We then apply our Ultra Inert chemistry on the gold to produce a leak-free seal that reduces active analyte adsorption.

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

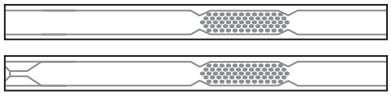
Agilent recommends part number 5190-2295 as the top split liner, and for splitless injection UI part number 5190-2293

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

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 Original Deactivation 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	

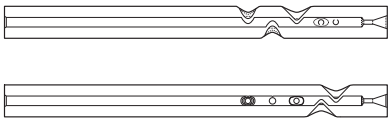
TIPS & TOOLS

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

Agilent Specialty Injection Liners

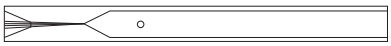
Agilent Specialty Injection Liners

Description	Volume (µL)	ID (mm)	1/pk	5/pk	25/pk
MultiMode Inlet Heavy Matrix					
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 split liner with cup, glass wool, and packing, 18740-60840	800	4	18740-60840	5183-4697	5183-4698
SPME					
SPME, deactivated	70	0.75	5188-6471		
SPME, Ultra Inert deactivation	70	0.75	5190-4048		
Volatiles					
Volatiles Organic Analysis liner	60	1	5190-4047		

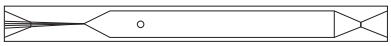


Single taper dimpled splitless liner, 5190-2296, 5190-2297

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



Single taper direct connect liner, G1544-80730



Dual taper direct connect liner, G1544-80700

Direct Connect

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

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

Liner O-Rings

Liner O-rings, 5188-5365

- 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

Non-stick fluorocarbon liner O-ring for Flip Top, 5188-5366

TIPS & TOOLS

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

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 (polyimide and polyimide/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

Use Self Tightening column nuts with graphite/polyimide ferrules to provide a leak-free column connection, without the risk of overtightening.

Self Tightening column nut

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
Polyimide/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
Polyimide (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
UltiMetal Plus Flexible Metal Ferrules	450 °C	• Designed for Capillary Flow Technology fittings • Compatible with Agilent inlet and detector fittings • Suitable with MS interface using the swaging nut G2855-20555	• Inert surface • Robust seal • Pre-swaged for precise height into fitting	Overtightening of stainless steel nut can damage fitting

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)

Polyimide/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/polyimide 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/polyimide ferrules

TIPS & TOOLS

Agilent's Self Tightening column nut eliminates the need for retightening once and for all

This self tightening stainless steel GC column nut delivers a tight connection – without expensive upgrades or adapters – and gives you the advantages of:

- Reliable performance
- Less wasted time
- Ease of use
- Faster maintenance

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

Column ID (mm)	Ferrule Nom ID	UltiMetal Plus Flexible Metal Ferrule Part No.	Graphite Short Ferrule Part No.	Polyimide Short Ferrule Part No.	85% Polyimide/ 15% Graphite Short Ferrule Part No.	Pre-Conditioned Long Ferrule 85% Polyimide/ 15% Graphite for MSD connection Part No.
0.025-0.05	0.4		500-2114	5062-3515	5062-3516	5062-3507
0.075	0.4		500-2114	5062-3515	5062-3516	5062-3507
0.1-0.25	0.4	G3188-27501	500-2114	5181-3322	5181-3323	5062-3508
0.1-0.25*	0.5		5080-8853	5062-3513	5062-3514	5062-3508
0.32	0.5	G3188-27502	5080-8853	5062-3513	5062-3514	5062-3506
0.45	0.8	G3188-27503	500-2118	5062-3511	5062-3512	5062-3538
0.53	0.8	G3188-27503	500-2118	5062-3511	5062-3512	5062-3538

*FactorFour, CP and VF brand columns made prior to 2013 have a larger od and require a 0.5 mm ferrule. The column test chromatogram confirms the ferrule size needed.

Specialty Application Capillary Column Ferrules

Column ID (mm)	Ferrule Nom ID	UltiMetal Plus Flexible Metal Ferrule Part No.	Graphite Short Ferrule Part No.	Polyimide Short Ferrule Part No.	85% Polyimide/ 15% Graphite Short Ferrule Part No.	Pre-Conditioned Long Ferrule 85% Polyimide/ 15% Graphite for MSD Part No.
0.32 CP-SilicaPLOT	0.8		500-2118	5062-3511	5062-3512	5062-3538
0.25 and 0.32 UltiMetal Plus column tubing		G3188-27505				
0.53 UltiMetal Plus column tubing		G3188-27506				
No hole					5190-4054	5181-3308

For additional capillary column ferrule selection, please refer to our CrossLab portfolio. **Turn to page 195.**

UltiMetal Plus Flexible Metal ferrules, G3188-27501

Polyimide ferrule, 5181-3322

Polyimide/graphite ferrules, 5181-3323

Graphite ferrules, 5080-8853

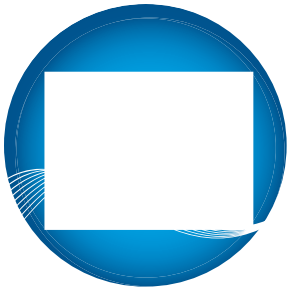
Polyimide/graphite ferrule, 5062-3514

Recommended MS Interface Connections

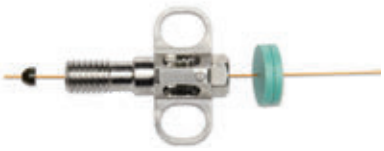
Description	Part No.
Recommended	
Nut	
Self Tightening column nut, for MS interface	5190-5233
Ferrule	
250 µm Polyimide/graphite ferrule, 10/pk	5181-3323
320 µm Polyimide/graphite ferrule, 10/pk	5062-3514
Tools	
MS interface column installation tool	G1099-20030
Column installation tool for 5975T	G3880-20030
Traditional	
Nut	
MS interface column nut, female	05988-20066
Ferrule	
0.4 mm Polyimide/graphite ferrule, 10/pk	5062-3508
0.5 mm Polyimide/graphite ferrule, 10/pk	5062-3506
Tools	
MS interface column installation tool	G1099-20030
Column installation tool for 5975T	G3880-20030
Alternative	
Nut	
Swaging nut, for MS interface with Flexible Metal ferrules	G2855-20555
Ferrule	
UltiMetal Plus Flexible Metal ferrule with 0.4 mm id, 10/pk	G3188-27501
UltiMetal Plus Flexible Metal ferrule with 0.5 mm id, 10/pk	G3188-27502
Tools	
Ferrule pre-swaging tool	G2855-60200

Recommended Inlet Connections

Description	Part No.
Recommended	
Nut	
Self Tightening column nut, for inlet/detector	5190-6194
Ferrule	
250 µm Polyimide/graphite ferrule, 10/pk	5181-3323
320 µm Polyimide/graphite ferrule, 10/pk	5062-3514
Tools	
Column installation pre-swaging tool, graphite ferrules	G3440-80217
Traditional	
Nut	
Universal column nut, 2/pk	5181-8830
Ferrule	
250 µm Polyimide/graphite ferrule, 10/pk	5181-3323
320 µm Polyimide/graphite ferrule, 10/pk	5062-3514
Tools	
Column installation pre-swaging tool, graphite ferrules	G3440-80217
Inert Flow Path	
Nut	
Column nut for long or long two-hole ferrules	05921-21170
Ferrule	
UltiMetal Plus Flexible Metal ferrule with 0.4 mm id, 10/pk	G3188-27501
UltiMetal Plus Flexible Metal ferrule with 0.5 mm id, 10/pk	G3188-27502
Tools	
Column installation pre-swaging tool, metal ferrules	G3440-80218



GC Column Connection Supplies



Self Tightening column nut

Self Tightening column nut, for MS interface, 5190-5233

Universal column nut, 5181-8830

MS interface column nut, 05988-20066

Column installation pre-swaging tool, metal ferrules, G3440-80218

Column installation pre-swaging tool, graphite ferrules, G3440-80217

The correct tools and supplies make proper GC column installation easier and ensure consistent, robust, leak-free connections and reliable results.

New Self Tightening column nuts have a stainless steel design that delivers a tight connection – without expensive upgrades or adapters. An innovative spring-driven piston continuously presses against the short graphite/polyimide ferrule – maintaining a leak-free seal even after hundreds of injections. It is especially well suited for oxygen sensitive detectors, such as mass spec and ECD.

Column Nuts

Description	Part No.
Short Nuts	
Self Tightening column nut, for MS interface	5190-5233
Self Tightening column nut, for inlet/detector	5190-6194
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	
Swaging nut, for MS interface with Flexible Metal ferrules	G2855-20555
Open end wrench, 1/4 and 5/16 in	8710-0510
Column installation pre-swaging tool, metal ferrules	G3440-80218
Column installation pre-swaging tool, graphite ferrules	G3440-80217

*For use with graphite ferrules only

Specialty Ferrules, 85% Polyimide/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, 0.20, 0.25	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% Polyimide/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 Polyimide/40% graphite	10/pk	0100-1379
1/4 in 85% Polyimide/15% graphite	10/pk	0100-1331

1/8 in 85% Polyimide/15% graphite, 0100-1332

Reducing Ferrules

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

Ferrules for LTM Rapid Heating/Cooling System

Description	Original Design (5/pk)	2010+ Ultimate Union (10/pk)
For use with 0.25-0.4 mm id LTM columns	5190-1437	G3188-27501
For use with 0.4-0.5 mm id LTM columns	5190-1438	G3188-27502
For use with 0.5-0.8 mm id LTM columns	5190-1439	G3188-27503

UltiMetal Plus Flexible Metal ferrules, G3188-27501

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 UltiMetal Plus deactivated, or non-deactivated)
- 1 Oven wall clip
- 2 Internal nuts, p/n G2855-20530
- 1 Swaging nut, p/n G2855-20555
- 1 5/pk of UltiMetal Plus Flexible Metal ferrules for 0.25 mm column

Ultimate Union Kits, Fittings and Ferrules

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

TIPS & TOOLS

UltiMetal Plus ferrules can be used to install columns in the Split/Splitless inlet using the long column nut, p/n 05921-21170

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, for MS interface with Flexible Metal ferrules		G2855-20555
Tee, inert		G3184-60065
Column storage fitting		G2855-20590
UltiMetal Plus Flexible Metal ferrule with 0.4 mm id	10/pk	G3188-27501
UltiMetal Plus Flexible Metal ferrule with 0.5 mm id	10/pk	G3188-27502
UltiMetal Plus Flexible Metal ferrule with 0.8 mm id	10/pk	G3188-27503
Ferrule pre-swaging tool		G2855-60200

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

Internal nut, G2855-20530

Swaging nut, G2855-20555

Tee, inert, G3184-60065

UltiMetal Plus Flexible Metal ferrules, G3188-27501

Ferrule pre-swaging tool, G2855-60200

Press-fit Capillary Column Connectors

Ultra Inert universal press fit connector, 5190-6979

Ultra Inert universal press fit Y-splitter, 5190-6980

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. Agilent's Press-fit capillary column connectors are treated with Agilent Ultra Inert deactivation to provide a robust and inert flow path.

Ultra Inert Press-fit Column Connectors

Description	Unit	Part No.
Ultra Inert universal press fit connector	10/pk	5190-6979
Ultra Inert universal press fit Y-splitter		5190-6980

Graphpak Capillary Connectors

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.

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

Graphpak connector for Agilent capillary detectors

Graphpak divider for simultaneous sampling

Capillary injection port connector, 5021-7170

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

Large Valve Oven

The Agilent Large Valve Oven (LVO) for GC is a versatile, high capacity external oven, which can be configured to support complex, multi-valve GC applications. The LVO supports several standard Agilent multi-valve Analyzers such as RGA and NGA, and is also available as a highly customizable option on the 7890B GC. Precisely engineered for thermal isolation from the GC oven, the LVO provides a homogeneous isothermal environment for up to six columns and/or valves, and convenient open-access for maintenance, adjustment or customization. Accessibility, capacity and thermal uniformity make the Agilent LVO a premium GC valving option, especially suited to support the rising trend of combining multiple complex analysis on a single GC platform.

Valves and Loops

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
4-port replacement valve WE series, 400 psi, 225 °C	0101-0946
4-port replacement valve WT series, 300 psi, 350 ºC	0101-0947
14-port replacement valve UWE series, Hastelloy C, 400 psi, 225 ° C	0101-1472
14-port replacement valve UWE series, 400 psi, 225 °C	0101-1473
4-port replacement valve WE series, Hastelloy C, 400 psi, 225 °C	5062-3519

General purpose gas sampling valves

Liquid Sampling General Purpose Valves

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

General purpose liquid sampling valves

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
4-port replacement rotor WE series, 400 psi, 225 °C	5190-6981
14-port replacement rotor UWE series, 400 psi, 225 °C	5190-6982

Front ferrules, stainless steel, 5181-1292

Valve Supplies

Description	Part No.
1/16 in stainless steel nut, 10/pk	5181-1291
1/16 in front ferrule, stainless steel, 10/pk	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, std temperature, Viton O-ring, 225 °C max, for flow balancing gas flows of 2-175 mL/min	0101-0633
Micrometering valve, Hastelloy C body, Viton O-ring, 225 °C max, for flow balancing gas flows of 2-175 mL/min	G3440-20003
Micrometering valve, high temperature, Kalrez O-ring, 350 °C max, for flow balancing gas flows of 2-175 mL/min	0101-0948
Micrometering valve, UltiMetal + treated body, Viton O-ring, 225 °C max, for flow balancing gas flows of 2-175 mL/min	G3480-60663
Air driven valve actuator for Small Valve Oven (box), short shaft	19325-60660
Air driven valve actuator for Large Valve Oven (box), long shaft	G3507-60660
10-port Actuator limiter	18900-21000
14-port Actuator limiter (for LVO only)	G3480-20002
Angle metering valve, 1/16 in, stainless steel	0101-0403
7 µm gas line filter, 7 µm (filtering element) 1/8 in x 1/8 in connectors Swagelok type gas line filter (stainless steel)	0101-0532
2 µm (filtering screen) 1/8 in x 1/16 in connectors Valco type reducing gas line filter (stainless steel)	0101-1001
2 µm (filtering frit) 1/8 in x 1/16 in connectors Valco type reducing gas line filter (Hastelloy C)	G3440-20008
2 µm replacement 1/8 in frits in Hastelloy C for Valco type reducing gas line filter G3440-20008	G3440-20007

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

Description	Stainless Steel Part No.	Nickel Part No.	Hastelloy Part No.	UltiMetal Plus Part No.
Sample loop, 0.25 cc	0101-0303	0101-0956		G1540-30024
Sample loop, 0.50 cc	0101-0282	0101-0957	G3440-20005	G1540-30025
Sample loop, 1.00 cc	0101-0299	0101-0954		G1540-30026
Sample loop, 2.00 cc	0101-0300	0101-0955		G1540-30027
Sample loop, 5.00 cc	0101-0301			G1540-30028
Sample loop, 10.00 cc	0101-0302			
Sample loop, 25 µL	0101-0304			
Sample loop, 50 µL	0101-0667			
Sample loop, 100 µL	0101-0666		G3440-20004	

Valve Tubing Assemblies

Description	Part No.	Stainless Steel Part No.	UltiMetal Plus Part No.	Nickel Part No.
A. Tube, 1/16 in, 0.010 in x 1000 mm		G3440-20033	G3440-60033	
B. Tube, 1/16 in, 0.031 in x 1000 mm		G3440-20035	G3440-60035	G3440-20037
C. Tube, 1/16 in, 0.010 in x 1000 mm w/adapter (Modified Detector Line)		G3440-60600	G3440-60610	G3440-60620
D. Tube, 1/16 in, 0.031 in x 1000 mm w/adapter (PPI Carrier Line)		G3440-60300	G3440-60310	
E. Tube, 1/16 in, 0.038 in x 975 mm, packed col line w/bulkhead		G3440-60336	G3440-60236	G3440-60136
F. Tube, 1/16 in, 0.010 in x 1000 mm, CPM		G3440-60333	G3440-60233	
Tube, 1/16 in, 0.020 in x 1000 mm, CPM		G3440-60334	G3440-60234	
Swaging nut (for CFT connections)	G2855-20555			
Internal nut (for CFT connections), 0.80 mm id for capillary column connections	G2855-20530			
Internal nut (for CFT connections), 1.65 mm id for 1/16 in tubing connections	G2855-20532			
Nut plate assembly for valve to column connection GC oven mounting (6 Pos.)	05890-80660			
Oven Right Side Nut Plate Assembly (8 Pos.)	G3440-81664			
Oven Left Side Nut Plate Assembly (8 Pos.)	G3440-81665			
UltiMetal Plus Flexible Metal ferrule with 0.4 mm id, for fused silica tubing 0.1-0.25 mm id, 10/pk			G3188-27501	
UltiMetal Plus Flexible Metal ferrule with 0.5 mm id, for fused silica tubing 0.32 mm id, 10/pk			G3188-27502	
UltiMetal Plus Flexible Metal ferrule with 0.8 mm id, for fused silica tubing 0.53 mm id, 10/pk			G3188-27503	
UltiMetal Plus Flexible Metal ferrule with no hole, 10/pk			G3188-27504	
UltiMetal Plus Flexible Metal ferrule with 0.5 mm id, for 0.25 and 0.32 mm id UltiMetal column tubing, 10/pk			G3188-27505	
UltiMetal Plus Flexible Metal ferrule with 0.8 mm id, for 0.25 mm and 0.32 mm UltiMetal column tubing, 10/pk			G3188-27506	

A.

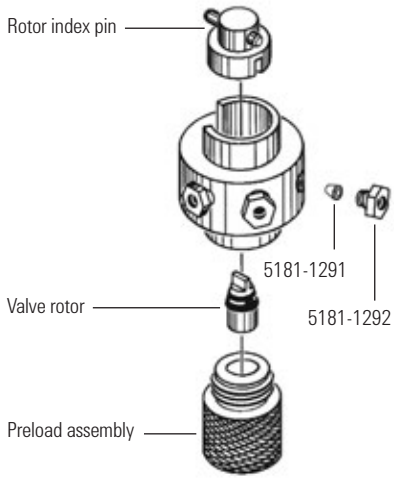
D.

B.

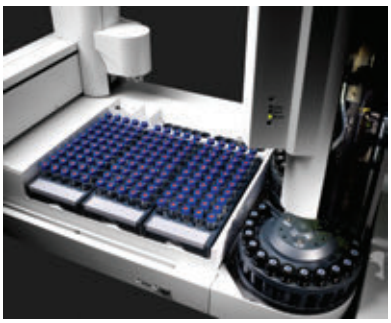
E.

C.

F.



Valve body, disassembled



7693A Automatic Liquid Sampler

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 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

Diffusion caps for 4 mL vials, 07673-40180

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 6 10 µL syringes, 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

7697A Headspace Sampler Supplies

The new 7697A Headspace Sampler from Agilent uses advanced designs based on our 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 extra 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 Replacement Parts and Supplies

Description	Part No.
Tray vial racks	G4556-60019
Vial rack label	G4556-90500
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
UltiMetal Plus Inert sample probe	G4556-60125
6-port valve, replacement rotor, WT series, 300 psi, 350 °C	1535-4952
Standards	
OQ/PV Headspace Sample Contains 2 g/L t-butyl disulfide, 1,2-dichlorobenzene, and nitrobenzene in ethanol	5182-9733

(Continued)

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 Replacement Parts and Supplies

Description	Part No.
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 ferrule, 5/pk, 0.50 mm, 0.80 mm	0100-2595
Polyimide, Valco 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	
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
Ultra Inert Straight 2.0 mm liner	5190-6168
Transfer line support bracket	G3504-60620

7697A Headspace Sampler

The 12-vial 7697A Headspace Sampler is compatible with Agilent 7820 Series GC systems, and will also work with Agilent 7890B Series GC systems

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	410105017
Tubing, probe to 6-port valve, deactivated	1300502506
Transfer line, 1.45 m	G1890-60000
Standards	
OQ/PV Headspace Sample Contains 2 g/L 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 with valves, transfer line and vent tube	G1888-60704

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, 2 mL, nickel	169-0013-HSP
Sample loop, 3 mL, deactivated	2321700004
Sample loop, 3 mL, nickel	321-056-HSP
Oven adapter 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 Contains 2 g/L t-butyl disulfide, 1,2-dichlorobenzene, and nitrobenzene in ethanol	5182-9733

Agilent Vials and Closures for GC, GC/MS and GC/HS

Headspace Vials and Closures

Beveled-neck headspace vials are available in both 10 mL and 20 mL capacities, flat or rounded bottom. The 20 mm crimp caps provide a consistently secure seal. Agilent also offers cost-saving convenience packs with vials, caps, and septa packaged together.

- Certified for full warranted compatibility with Agilent autosamplers
- Choice of crimp or screw top vials
- Beveled top for maximum secure seal
- Two neck lengths available
- Choice of a pressure safety release cap at 45 psi
- Available in flat or rounded bottom designs

Clear headspace crimp top vials with graduation marks and write-on spot, 5190-2285

Amber headspace crimp top vials with graduation marks and write-on spot, 5190-2286

Certified Headspace Crimp Top Glass Vials

Description	Unit	Flat Bottom	Rounded Bottom
10 mL, 23 x 46 mm			
Clear	100/pk	5182-0838	5183-4475
Amber	100/pk	5067-0227	5190-2238
Clear, graduation marks and write-on spot	100/pk	5190-2285	
Amber, graduation marks and write-on spot	100/pk	5190-2287	
20 mL, 23 x 75 mm			
Clear	100/pk	5182-0837	5183-4474
Amber	100/pk	5067-0226	5190-2239
Amber, graduation marks and write-on spot	100/pk	5190-2286	
Clear, graduation marks and write-on spot	100/pk	5190-2288	

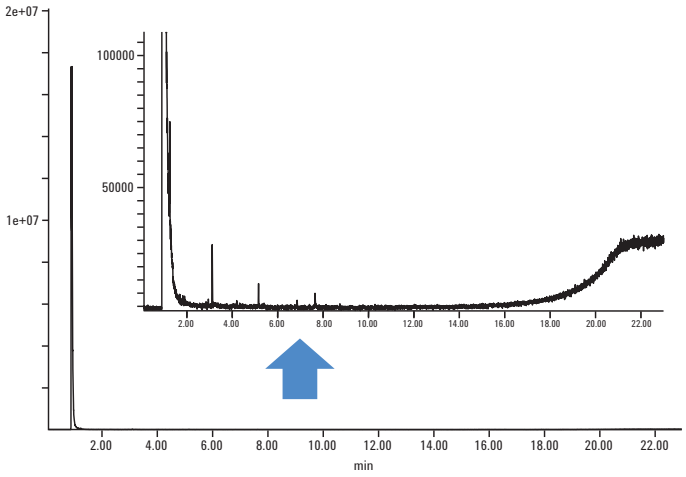
High Performance Septa

Agilent introduces the first septa that can withstand extreme temperatures and conditions for today's demanding headspace applications.

- Proven to withstand temperatures up to 300 °C with no degradation
- Leakproof
- Available in your choice of crimp or screw

Vial blank sample chromatogram at 300 °C with Agilent High Performance HS Septa

Agilent High Performance Septa provide significantly cleaner blank background at high temperature HS testing. Even with small abundance scale, the 300 °C vial blank chromatogram with High Performance Septa only shows few siloxane peaks with very small abundance.



Headspace conditions

Septa Type:	Agilent High Performance Septa, 5190-3986
Temperature:	Oven/loop & valve/transfer line: 300 °C/300 °C/300 °C
Times:	GC cycle time: 32 min, Vial equib time: 30 min
Vial:	Fill pressure: 15 psi, Fill flow: 50 mL/min, Loop fill ramp rate: 20 psi/min, Loop final pressure: 10 psi, Vial Size: 20 mL, Shaking: 1
Carrier:	GC controlled

High Performance Septa

Description	Unit	Agilent Certified Part No.	Compatible With
18 mm steel screw cap with High Performance Septa	100/pk	5190-3986	5188-2753, 5188-6537, 5188-5392, 5188-6538
20 mm steel crimp cap with High Performance Septa	100/pk	5190-3987	5182-0837, 5183-4474, 5067-0226, 5190-2239, 5182-0838, 5183-4475, 5067-0227, 5190-2238

20 mm Headspace Crimp Caps and Septa

Cap Color	Septa Type	Specifications	Certified	100/pk	10000/pk
Silver aluminum	PTFE/silicone septa	-60 °C to 180 °C	✓	5183-4477	5190-2257
Silver aluminum with safety feature	PTFE/silicone septa	-60 °C to 180 °C	✓	5183-4478	
Silver aluminum	Molded PTFE/butyl septa	-40 °C to 125 °C	✓	5183-4479	5190-2258
Silver aluminum with safety feature	Molded PTFE/butyl septa	-40 °C to 125 °C		5183-4480	
Silver aluminum	No septa			9301-0721	
Silver aluminum with safety feature	No septa			9301-0718	
Septa only	Gray PTFE/black butyl molded	-40 °C to 125 °C		9301-0976	
Septa only	Tan PTFE/white silicone	-60 °C to 180 °C		9301-0719	5067-0234

Aluminum crimp caps, 5183-4477

Headspace vial convenience kit

Certified Headspace Vial Convenience Packs

Septa Type	Vial Type	Cap Color	Specifications	Unit	Part No.
Molded PTFE/black butyl septa	Flat bottom	Silver aluminum with safety feature	<125 °C	100/pk	5182-0839
PTFE/silicone septa	Flat bottom	Silver aluminum with safety feature	<180 °C	100/pk	5182-0840

CombiPAL Headspace Vials and Closures

Screw top vials and caps are recommended for a tight seal and reproducible headspace results. CombiPAL headspace vials and caps are precision-threaded, making them an excellent choice for dependability and ease-of-use. They are ideal for applications in the environmental, food and beverage, industrial hygiene, drug analysis, and chemical industries.

CombiPAL Headspace Screw Top Vials

Description	100/pk
10 mL, 23 x 46 mm	
Clear	5188-5392
Amber	5188-6538
20 mL, 23 x 75 mm	
Clear	5188-2753
Amber	5188-6537

CombiPAL 18 mm Screw Top Caps with Septa

Cap Color	Septa Type	100/pk
Silver aluminum, magnetic	PTFE/silicone septa (top white, bottom blue)	5188-2759

Crimping and Decapping Tools

Electronic Crimpers and Decappers

Designed to replace awkward and bulky manual crimping pliers, the Agilent electronic handheld crimpers give tight, reproducible seals every time. Adjustable, slim steel jaws fit around closely spaced vials, enabling you to crimp vials directly in crowded autosampler trays. Using the same handheld design as the crimpers, Agilent's electronic decappers remove caps instantly and are designed for laboratories that recycle or reuse vials.

- More vials crimped per battery charge – new lithium ion battery lasts three times longer
- Increased crimping speed – new model is 50% more powerful (6.4 volt battery)
- Less hand strain – lighter weight means less effort
- Improved power signal – clearly shows when battery needs recharging
- Easily used in right or left hand – display on top for easier viewing
- More efficient charging – no overheating during recharging
- Extended productivity – significantly longer motor life

11 mm electronic crimper, 5190-3188

20 mm electronic crimper, 5190-3189

11 mm electronic decapper, 5190-3190

20 mm electronic decapper, 5190-3191

Electronic Crimpers and Decappers

Description	Part No.
11 mm electronic crimper with lithium battery	5190-3188
20 mm electronic crimper with lithium battery	5190-3189
11 mm electronic decapper with lithium battery	5190-3190
20 mm electronic decapper with lithium battery	5190-3191
Replacement lithium battery for crimper and decapper	5190-3192
High power electronic crimping tool with power supply	5190-4061
11 mm Crimper jaw set for HP electronic crimper	5190-4062
11 mm Decapper jaw set for HP electronic crimp tool	5190-4063
20 mm Crimper jaw set	5190-4064
20 mm Decapper jaw set	5190-4065
Base for electronic crimping tool	5190-4066
20 mm HP Crimping tool and jaw sets bundle	5190-4067

Manual Crimpers and Decappers

Agilent's ergonomic manual crimpers and decappers remove the pain and discomfort of wrist strain with a lightweight, tailored design. Weighing 25-30% less than predecessors and eliminating sore, pinched hands, the new design dramatically improves your experience. Extensively tested with Agilent vials for optimal fit, and color-coded for ease-of-use, this tool is a necessity for every lab. The new crimpers are built for lasting performance: the 11 mm crimper will cap at least 100,000 caps and the 20 mm at least 60,000 before wear starts to impact performance.

- Comfortable, lightweight, ergonomically designed handles fit smoothly in the hand and eliminate pinching
- Top-mounted adjustment knob shows directionality for tightening/loosening
- Adjustment knob doubles as an indicator that the crimp (or decap) is complete
- Crimpers are color-coded with blue knobs and labels, decappers with orange
- Narrow jaws provide better vertical clearance over vials
- Bottom handle motion allows for better control and enhanced stability of crimping jaw
- Sturdy construction of rugged, fiber-reinforced resin with steel reinforcement in the handles

Manual Crimpers and Decappers

Description	Part No.
Ergonomic manual crimper for 11 mm caps	5040-4667
Ergonomic manual decapper for 11 mm caps	5040-4668
Ergonomic manual crimper for 20 mm caps	5040-4669
Ergonomic manual decapper for 20 mm caps	5040-4671

Ergonomic manual crimper, 5040-4667

Stratum PTC Sample Concentrator

Teledyne Tekmar Purge and Trap Supplies

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

Tekmar AQUATek 70 and AQUATek 100 Purge and Trap Autosampler Supplies

Description	Part No.
Sample loop, 5 mL PEEK	5190-3151
Sample loop, 25 mL PEEK	5190-3152
Sample loop, 20 mL PEEK	5190-3153
Sample loop, 10 mL PEEK	5190-3154
Septa for 40 mL vials, pre-cleaned, 72/pk	14-3823-000
Screw caps for 40 mL vials, 24/pk	14-6855-000

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, #10	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, Stratum and Atomx P&T	5188-8820
Trap, Vocarb 4000	5188-8821
Trap, BTEX	5188-8822
Trap, Tenax, #1A	5188-1447
Trap, VPH, #11	5188-1448

Stratum and Atomx traps are U-shaped

U-trap for Stratum and Atomx,Trap, BTEX + MTBE, 5188-8813

Atomx Purge and Trap Concentrator

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

Traps for Teledyne Tekmar Velocity Purge and Trap Concentrator

Description	Part No.
Trap, Vocarb 3000, 7695 and 3100 P&T	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
Water reservoir 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, screw in mount	DY50573990
Sparge probe replacement kit, for S/N above 13160, square base	DY70007791
Sparge probe replacement kit, for S/N 995-13160, hexagonal base	DY50574190
Sparge probe replacement kit, for S/N below 995, hexagonal base	DY50549290
Standard reservoir	DY50548400
Water transfer line	DY50551400
I.S. pickup/waste lines	DY70001990
Soil transfer line	DY50574500
75 µm screen for water probe	DY50559800
Water probe, cleaned, for S/N 695-995, screw in mount	DY50549100
Sparge probe cleaned, for S/N above 13160	DY70007701
10 µm 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
Soil probe replacement kit, for SV S/N above 13160	DY70007691
Lower soil probe replacement kit, for SV units	DY50546390
Soil probe replacement kit, for SV S/N 995-13160	DY50574390

Markes Thermal Desorption

Markes Thermal Desorption system

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 Instrument 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
Quick fit connectors, Markes UNITY	10/pk	MKI-C-QSC10
O-ring insertion tool, Markes UNITY TDI		MKI-Z-0285
O-ring extraction tool, Markes UNITY TDI		MKI-Z-0351
O-rings, 010 Markes UNITY	10/pk	MKI-U-COV10

Cold Traps

Description	Unit	Part No.
Cold trap, universal, UNITY		MKI-U-T11GPC
Cold trap, universal, UNITY 2		MKI-U-T11GPC-2S
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, materials emissions, UNITY 2		MKI-U-T12ME-2S
Cold trap for DHS applications, UNITY		MKI-U-T13DHS
Cold trap for DHS applications, UNITY 2		MKI-U-T13DHS-2S
Cold trap, for EPA TO-15/TO-17 air toxics analysis methods, Markes UNITY 2		MKI-U-T15ATA-2S
Stainless steel Difflok cap, Markes UNITY		MKI-MTD-1169
Inert Difflok cap, Markes UNITY		MKI-MTD-1204
Cold trap, Tenax, UNITY		MKI-U-T9TNX
Cold trap, Tenax, UNITY 2		MKI-U-T9TNX-2S
Cold trap, high boilers, C_6-C_{40}, UNITY 2		MKI-U-T1HBL-2S
Cold trap, ozone precursor, UNITY 2		MKI-U-T17O3P-2S
Cold trap, sulfur, UNITY 2		MKI-U-T6SUL-2S
Cold trap, chemical weapons, C_6-C_{40}, UNITY 2		MKI-U-T10CW-2S
Cold trap, green house gases, UNITY 2		MKI-U-T16GHG-2S

Markes Thermal Desorption system

Standard TD Sorbent tube and related sampling accessories

Description	Unit	Part No.
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
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. For pumped sampling VOCs/SVOCs n-C_3 to n-C_{30}.	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
Cold trap alignment tool, Markes UNITY		MKI-UTD-5064
Split filter tube, stainless steel, 3 1/2 in, packed with charcoal		MKI-SERUTD-5065

Inlet Systems

Split/Splitless Inlet Seals

For samples with active analytes or sensitive compounds, only Agilent combines the best mechanical sealing with an inert surface. Our Ultra Inert chemistry is applied on top of the gold plating to produce a leak-free seal that also reduces active analyte adsorption. This is a critical component of the Agilent Inert Flow Path.

Split/Splitless Inlet Seals

Description	Unit	Part No.
Ultra Inert gold plated seal with washer		5190-6144
	10/pk	5190-6145
	50/pk	5190-6149
Gold plated inlet seal kit with washer		5188-5367
	10/pk	5190-2209
Gold plated seal with cross, split only		5182-9652
Inlet seal, stainless steel		18740-20880

Note: Due to the deactivation process, the surface of the UI gold plated seal may have spots or darker colored areas. These are normal side effects of the deactivation process, and do not affect the performance or inertness of the seal.

Ultra Inert gold plated seal with washer, 5190-6145

Certified gold plated seal kit, 5190-2209

Flip Top Inlet Sealing System

Agilent's Flip Top Inlet Sealing System is the faster, smarter way to change inlet liners on Agilent 7820, 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 installation kit, 5188-2717

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

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 (p/n 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	Less active than wool
	None	Least active
Injection volume	0.5-3 µL liquid	Split easily adjusted
	0.10-10 mL gas	Split adjusted accordingly
Injection technique	Fast autoinjection	Less needle discrimination
	Hot-needle fast manual injection	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

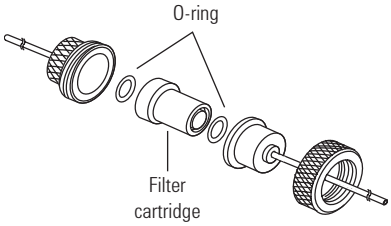
Parameter	Selection/Setting	Rationale
Inlet temperature	Just above highest boiling point of solutes (+20 °C)	Ensures flash vaporization Reduce if degradation occurs Use higher for dirty samples and higher-boiling solutes
Inlet liner	Large volume >0.8 mL	Use with autoinjector
	Small volume <0.2 mL	Use 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	Most reproducible Less needle discrimination
	Hot-needle slow manual	Inject 1-2 µL/s if narrow liner is used and >1 µL injection
	Hot-needle fast manual	Use for <1 µL injections
Split flow	20-50 mL/min	Higher for concentrated samples
Splitless time	20-80 s	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	Typical flow rates between 1 mL/min and 2 mL/min. Use of higher flow rates depends on separation conditions of compounds.	Change of flow rates can provide better chromatographic separation
Septum purge	2-3 mL/min	Reduces ghosting and septum contamination
Quantification	Internal standard	Maximizes reproducibility
	External standard addition	Use only with constant injection volume
Retention gap	1-3 m, deactivated (1-2 m per µL injected)	Promotes solvent and stationary phase focusing Protects analytical column from matrix contamination

Split/Splitless Inlet Maintenance

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.

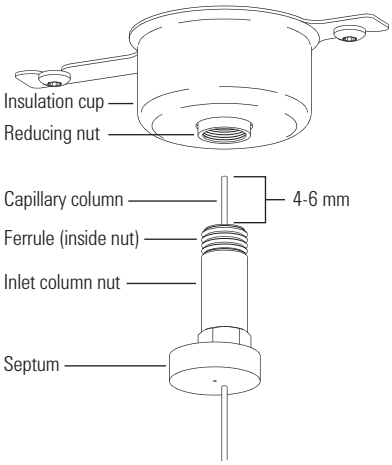
*Change every 6 months



Split vent trap, 5188-6495

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.



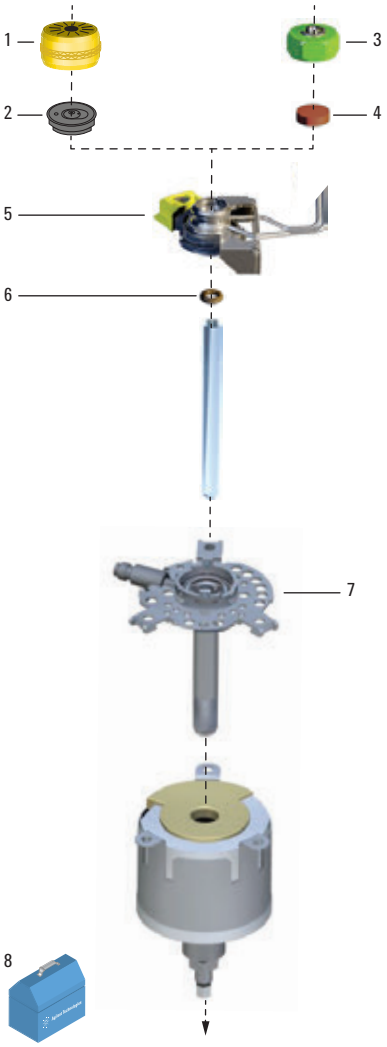
WARNINGS & CAUTION

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.

TIPS & TOOLS

Tools for capillary column installation

Make sure your lab always has the tools you need to install columns correctly. We recommend a column cutting tool such as a diamond-, carbide-, or sapphire-tipped pencil, or a ceramic cutter, a supply of an appropriate nonretained compound, a column test mixture, an electronic flowmeter, and an electronic leak detector.



Split/Splitless Inlet assembly (top)

7890/6890/6850 Split/Splitless Inlet Supplies (Top)

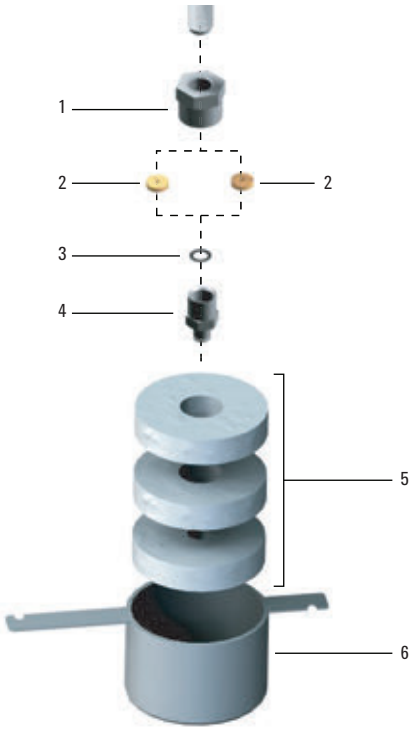
Item	Description	Unit	Part No.
1	Merlin Microseal kit, low pressure		5181-8816
	General purpose Merlin Microseal starter kit		5182-3442
	Merlin Microseal high pressure nut		5182-3445
2	Merlin Microseal low pressure replacement septum		5181-8815
	Merlin Microseal general purpose replacement septum 3-100 psi		5182-3444
3	Septum nut, purged inlets		18740-60835
	Headspace septum retainer nut		18740-60830
4	Non-stick bleed and temperature optimized (BTO) septa, 11 mm	50/pk	5183-4757
		100/pk	5183-4757-100
	Non-stick long-life septa, 11 mm	50/pk	5183-4761
		100/pk	5183-4761-100
5	7890 Top insert assembly, standard		G3452-60730
	7890 Top insert, AC gang fitting weldment		G3430-60011
	7890 Top insert assembly, valve		G3480-67585
	7890 Insert weldment, UltiMetal Plus treated		G3452-60586
	6890 Top insert assembly, standard		G1544-60585
6	Graphite O-ring for splitless liner	10/pk	5180-4173
	Graphite O-ring for split liner	10/pk	5180-4168
	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
7	Cap inlet shell weldment assembly		G3452-80570
	7890 Cap inlet shell weldment assembly, UltiMetal Plus treated		G3452-60570
8	QuickPick split inlet PM kit		5188-6493
	QuickPick splitless vent and inlet PM kit		5188-6497
	FID collector cleaning brush		8710-1346
	QuickPick split vent and inlet PM kit		5188-6496
	Column installation pre-swaging tool, metal ferrules		G3440-80218
	Column installation pre-swaging tool, graphite ferrules		G3440-80217

Column installation pre-swaging tool, metal ferrules, G3440-80218

Column installation pre-swaging tool, graphite ferrules, G3440-80217

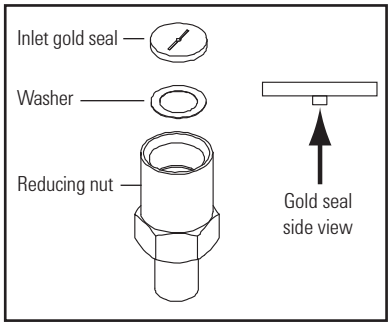
7890/6890/6850 Split/Splitless Inlet Supplies (Bottom)

Item	Description	Unit	Part No.
1	Inlet heater weldment retaining nut		G1544-20590
2	Gold plated inlet seal kit with washer		5188-5367
	Certified gold plated seal kit, includes washer	10/pk	5190-2209
	Ultra Inert gold plated seal with washer		5190-6144
	Ultra Inert gold plated seal with washer	10/pk	5190-6145
	Gold plated seal with cross, split only		5182-9652
3	Washers, 0.375 od		5061-5869
4	Reducing nut for split/splitless inlet		18740-20800
5	S/SL insulation kit, 3 pieces		5188-5241
6	Cover, lower insulation		19243-00070



Split/splitless inlet assembly (bottom)

Gold seal on the split/splitless inlet




Reducing nut, 18740-20800


Gold plated seal kit, 5188-5367

TIPS & TOOLS

Agilent's Self Tightening column nut eliminates the need for retightening once and for all

This self tightening stainless steel GC column nut delivers a tight connection – without expensive upgrades or adapters – and gives you the advantages of:

- Reliable performance
- Less wasted time
- Ease of use
- Faster maintenance

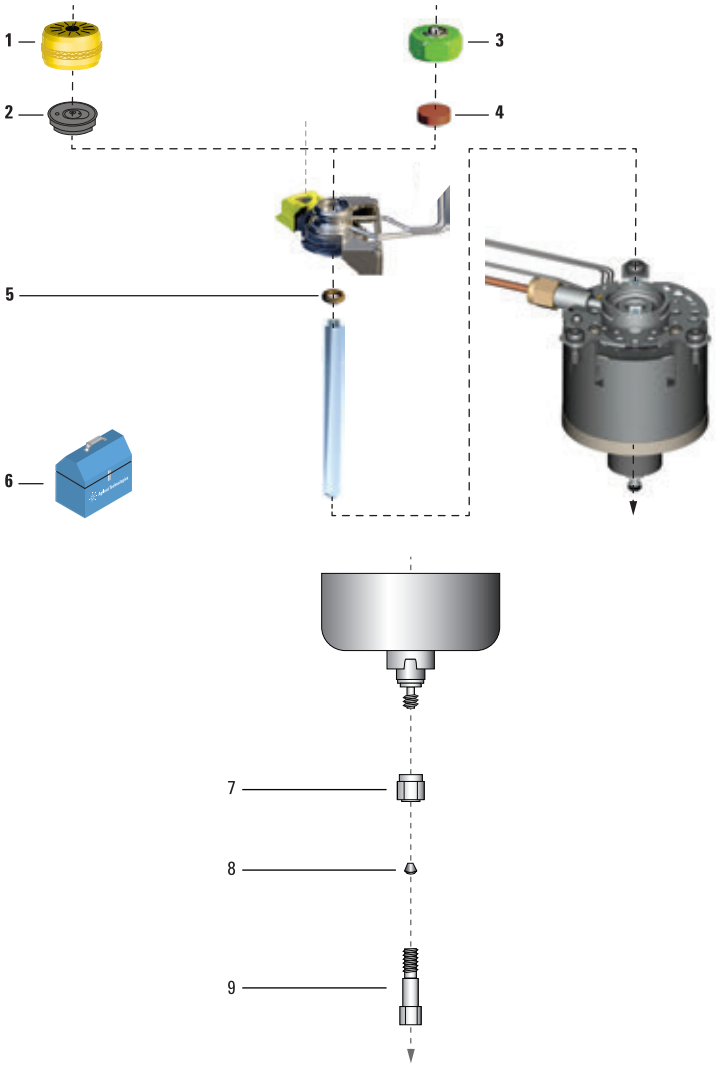
Multimode Inlet

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

The MMI combines the functionality of the split/splitless and PTV inlets. Perform standard injection techniques when SOPs require; use large volume or temperature programs as needed.

Multimode Inlet Body

Item	Description	Unit	Part No.
1	Merlin cap		5182-3445
	Merlin Microseal kit, low pressure		5181-8816
	General purpose Merlin Microseal starter kit		5182-3442
2	Merlin Microseal low pressure replacement septum		5181-8815
	Merlin Microseal general purpose replacement septum 3-100 psi		5182-3444
3	Septum nut, purged inlets		18740-60835
	Headspace septum retainer nut		18740-60830
4	Non-stick bleed and temperature optimized (BTO) septa, 11 mm	50/pk	5183-4757
		100/pk	5183-4757-100
	Non-stick long-life septa, 11 mm	50/pk	5183-4761
		100/pk	5183-4761-100
5	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
6	Wrench for multimode inlet		G3452-20512
	Column installation pre-swaging tool, metal ferrules		G3440-80218
	Column installation pre-swaging tool, graphite ferrules		G3440-80217
7	Column nut adapter		G3510-20018
8	For complete offering of column ferrules, **see page 37**.		
9	For complete offering of column nuts, **see page 40**.		

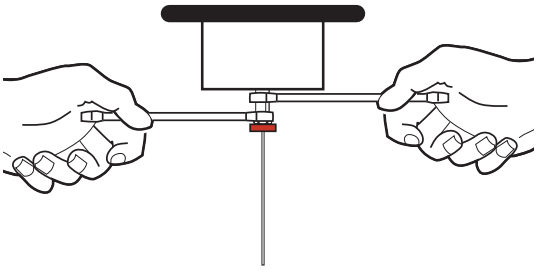


Exploded parts view of the Multimode Inlet

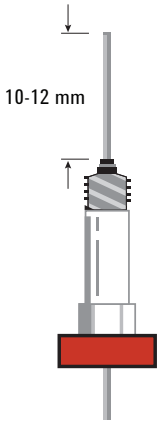
Installing a Capillary Column in a Multimode Inlet

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 10-12 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

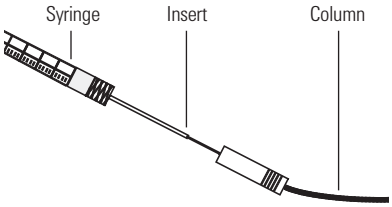
The inside of the wall of the inlet is only 0.005 in thick and can be damaged with hard scrubbing.

TIPS & TOOLS

Because of temperature programmability, graphite is the preferred ferrule for the MMI. However, graphite/polyimide ferrules can be used with Self Tightening column nuts to prevent leaks.

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

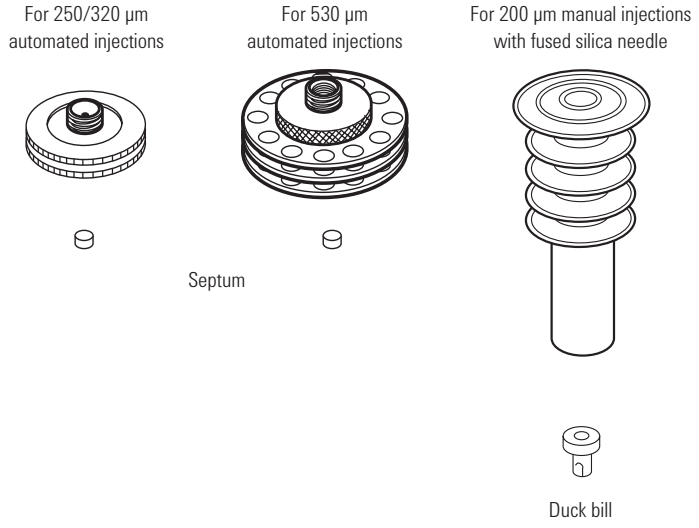
1. Check the needle-to-column size to make certain that the needle fits in the column.
2. Identify the correct insert for the column size. Use the insert that is the same size as the syringe needle to verify that the column you plan to use is the correct size.
3. Insert the column into one end of the 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.

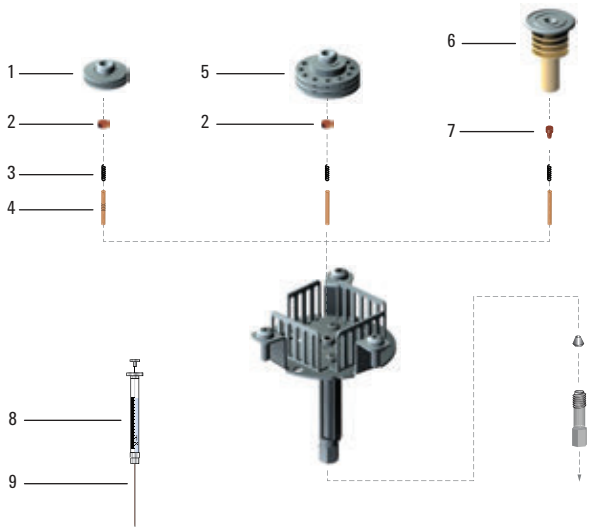
Changing the Septum on the Cool On-Column Inlet

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 Parts

7890/6890 Cool On-Column Inlet Supplies

Item	Description	Unit	Part No.
1	Septum nut for 320 µm columns		19245-80521
2	5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4760
	5 mm through-hole septa	25/pk	5181-1260
	5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4762
	5 mm septa through-hole for on-column, in glass jar	50/pk	5183-4758
3	Spring		19245-60760
4	Insert for 320 µm columns, 5 silver rings		19245-20525
	Insert for 530 µm columns, no rings		19245-20580
	Insert for 250 µm columns, 6 rings		19245-20515
	Insert, 530 µm aluminum clad, 4 rings		19245-20780
	Insert for 200 µm, 1 ring		19245-20510
5	Septum nut base for 530 µm assembly		G1545-80520
6	Cooling tower assembly		19320-80625
7	Duck bill	10/pk	19245-40050
8	On-column syringe, fused silica (barrel only)		9301-0658
	Removable needle, syringe only		5182-0836
	Syringe ferrule, PTFE		0100-1389
	On-column syringe, stainless steel		5182-9633
9	Needle, on-column syringe, 3/pk	3/pk	5182-9645
	Stainless steel needle for 0.25 mm column	3/pk	5182-0833
	Stainless steel needle for 0.32 mm column	3/pk	5182-0831
	Fused silica syringe needles	6/pk	19091-63000

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.

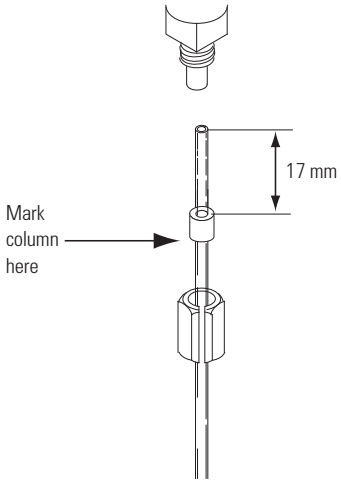
PTV Inlet Practices and Rationales (Cold Split/Splitless Modes)

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/s to 720 °C/s 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/s	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.
Merlin Microseal high pressure nut			5182-3445
Merlin Microseal			5182-3444
Septumless head			G2617-60507
Septum head			G2618-80500
Septum nut, purged inlets			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, 0.2 mm	0.20		5182-9754
	0.25-0.33		5182-9761
	0.53		5182-9762
Ferrules for Graphpak 2M inlet, 0.2 mm	0.20	10/pk	5182-9756
	0.25	10/pk	5182-9768
	0.32	10/pk	5182-9769
	0.53	10/pk	5182-9770

(Continued)

7890/6890 Septumless PTV Inlet Supplies

Description	Column ID (mm)	Unit	Part No.
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

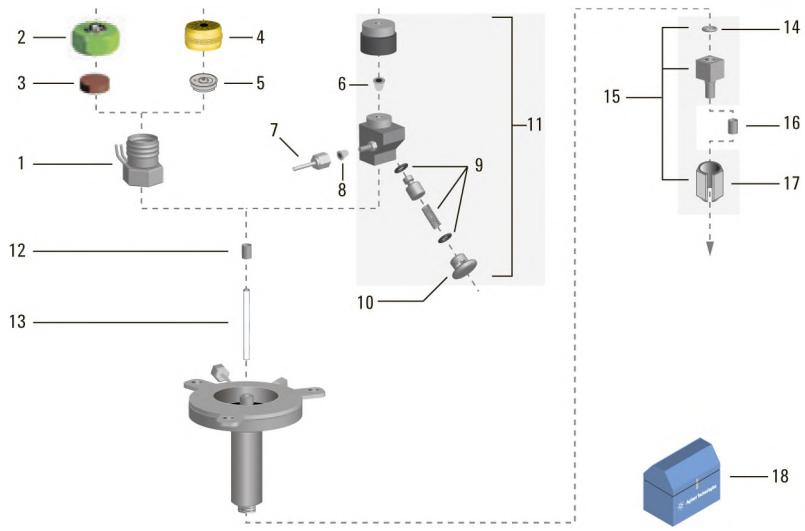
PTV Inlet Body

Item	Description	Unit	Part No.
1	Septum head		G2618-80500
2	Septum nut, purged inlets		18740-60835
3	11 mm septa	50/pk	5183-4759
		100/pk	5183-4759-100
	Non-stick long-life septa, 11 mm	50/pk	5183-4761
		100/pk	5183-4761-100
4	Merlin Microseal high pressure nut		5182-3445
5	Merlin Microseal general purpose replacement septum 3-100 psi		5182-3444
6	PTFE ferrule (needle seal)		5182-9748
7	PTV column adapter tube (includes 1/6 in nut and ferrule)		G2617-80550
8	Straight ferrule, 1/16 in	10/pk	0100-1375
9	Service kit for septumless head		5182-9747
10	Sealing element		5182-9760
11	Septumless head		G2617-60507
12	Graphpak 3D ferrules	5/pk	5182-9749
13	PTV liner, high temperature, borosilicate		5188-5356
	PTV liner, single baffle, deactivated		5183-2036
	PTV liner, sintered glass, deactivated		5190-1426
	PTV liner, high temperature, quartz		5188-5313

(Continued)

PTV Inlet Body

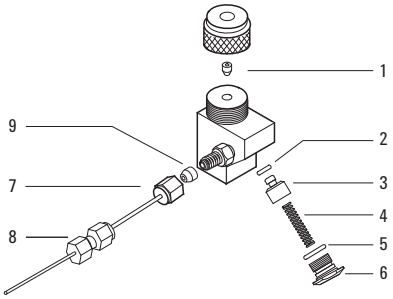
Item	Description	Unit	Part No.
14	Silver seal		5182-9763
15	Graphpak 2M inlet adapter, 0.53 mm		5182-9762
	Graphpak 2M inlet adapter, 0.32/0.25 mm		5182-9761
	Graphpak 2M inlet adapter, 0.2 mm		5182-9754
16	Ferrules for Graphpak 2M inlet, 0.32 mm	10/pk	5182-9769
	Ferrules for Graphpak 2M inlet, 0.2 mm	10/pk	5182-9756
	Ferrules for Graphpak 2M inlet, 0.25 mm	10/pk	5182-9768
	Ferrules for Graphpak 2M inlet, 0.53 mm	10/pk	5182-9770
17	Replacement Graphpak column nut	5/pk	5062-3525
18	Swabs for cleaning GC/MS	100/pk	5080-5400
	Injection port cleaning kit		480-0003
	Septum tool, knurled handle		450-1000
	Service kit for septumless head		5182-9747



PTV Inlet Body Parts

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 in 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	Ensures flash vaporization
	BP of major solute(s)	Use for neat samples
Insert type	1/8 in stainless steel	Use for stainless steel column only
	1/4 in stainless steel 530 µm	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	Will not break
	1/4 in packed glass 530 µm	Better for polar or labile compounds
Carrier gas flow	10-40 mL/min	Use with N_2 carrier gas
	10-60 mL/min	Use with He or H_2 carrier gas

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

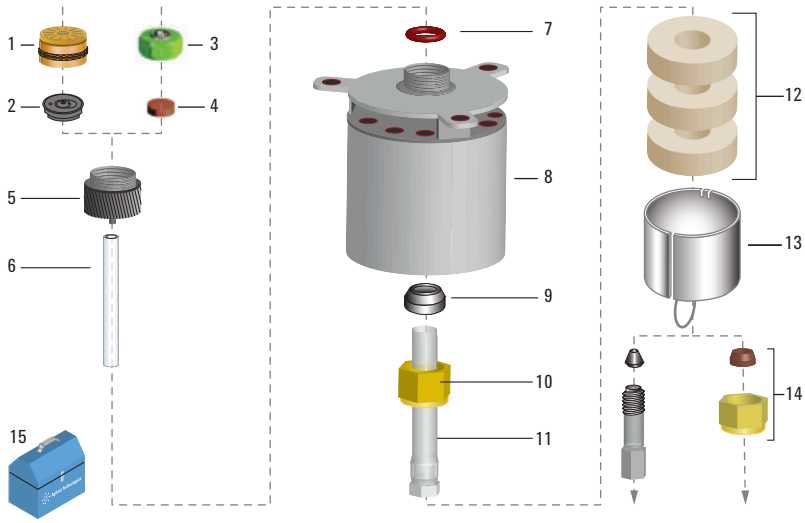
Leaks

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

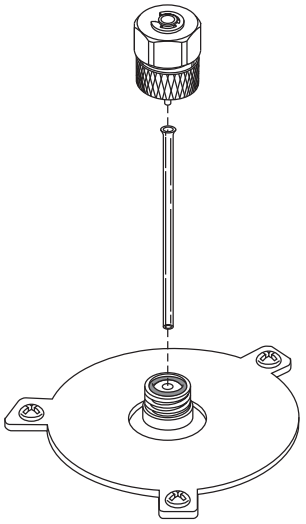
Item	Description	Unit	Part No.
1	Merlin Microseal high pressure nut		5182-3445
2	Merlin Microseal general purpose replacement septum 3 to 100 psi		5182-3444
	Merlin Microseal low pressure replacement septum		5181-8815
3	Septum nut, purged inlets		18740-60835
4	Non-stick advanced green septa, 11 mm	50/pk	5183-4759
	Non-stick long-life septa, 11 mm	50/pk	5183-4761
	General purpose gray septa 11 mm	50/pk	5080-8896-50
	Non-stick bleed and temperature optimized (BTO) septa, 11 mm	50/pk	5183-4757
5	Packed port insert weldment		19243-80570
6	Disposable glass insert, deactivated, 170 µL internal volume		5181-3382
	Disposable glass liner, 170 µL internal volume		5080-8732
7	O-ring, Viton	12/pk	5080-8898
8	Inlet weldment		G3451-80501
9	Polyimide ferrule, 1/4 in	10/pk	5080-8774
10	1/4 in nut, brass	10/pk	5180-4105
11	Packed column adapter		G1540-80013
	1/4 in column adapter		19243-80540
	1/8 in column adapter		19243-80530
	530 µm column adapter for use with glass liners		19244-80540
12	Nut warmer insulation		19234-60715
13	Nut warmer cup assembly		19234-60700
14	For complete offering of column nuts, **see page 40**.		
15	QuickPick purged packed inlet PM kit		5188-6498
	Swabs for cleaning GC/MS	100/pk	5080-5400
	Injection port cleaning kit		480-0003
	Septum tool, knurled handle		450-1000



Purged packed inlet assembly

7890/6890/6850 Purged Packed Inlet Supplies

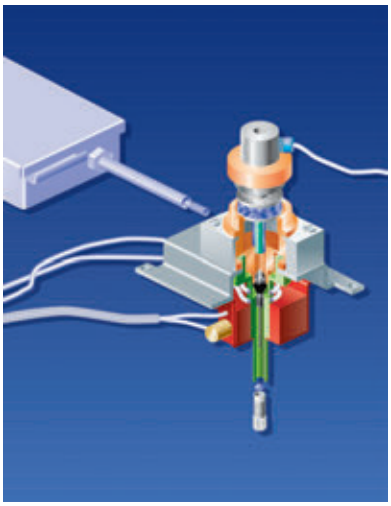
Description	Unit	Part No.
QuickPick purged packed inlet PM kit Includes 5 non-stick BTO septa, 1 O-ring, 1 ferrule, and 1 disposable glass liner		5188-6498
Merlin Microseal		5182-3444
Merlin Microseal high pressure nut		5182-3445
Septum nut, purged inlets		18740-60835
Non-stick bleed and temperature optimized (BTO) septa, 11 mm	50/pk	5183-4757
Packed port insert weldment		19243-80570
O-ring, Viton	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
Polyimide 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
Nut warmer cup with insulation		19234-60720
Universal column nut	2/pk	5181-8830
Self Tightening column nut, for inlet/detector		5190-6194



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
Polyimide/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.

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.

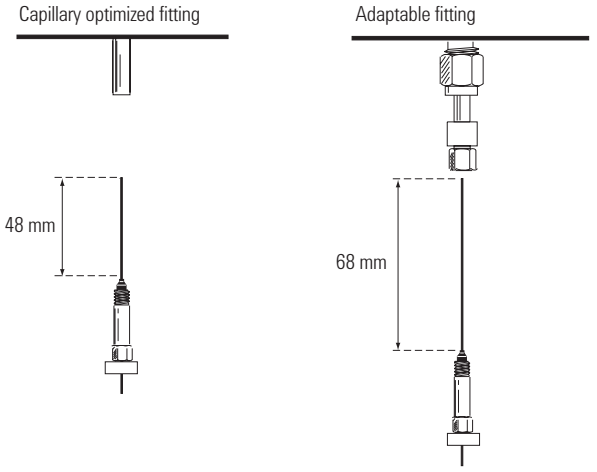
   b. Finger tighten the column nut, then withdraw the column about 1 mm. Tighten the nut an additional 1/4 turn with a wrench.

   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

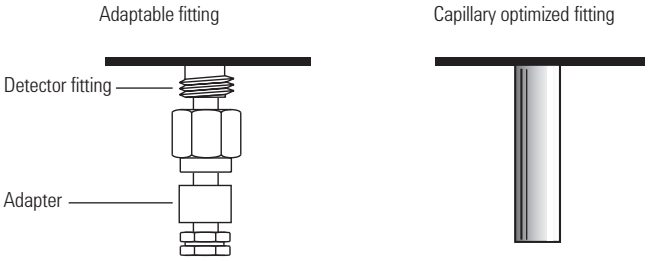
Adaptable FID Jet, 19244-80560

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

Item	Description	Part No.
1	Jet, 0.011 in/0.29 mm id tip, capillary dedicated	G1531-80560
2	Jet, 0.018 in/0.47 mm id tip, capillary optimized	G1531-80620
3	Jet, capillary adaptable, 0.011 in id tip	19244-80560
4	Jet, packed, high temperature, 0.018 in id tip	19244-80620
5	Jet, packed standard, 0.018 in id tip	18710-20119
6	Jet, packed wide-bore, 0.030 in id tip (for high-bleed applications)	18789-80070

Jet Cleaning Procedure

Use Agilent FID Cleaning Kit, p/n 9301-0985

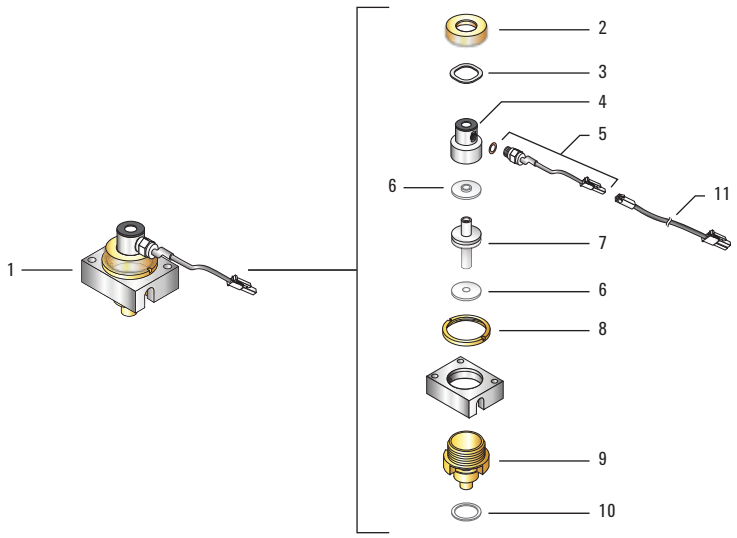
1. Run a cleaning wire through the top of the jet. Run it back and forth a few times until it runs smoothly. Be careful not to scratch the jet. (Do not force too large a wire or probe into the jet opening or the opening will become distorted. A loss of sensitivity, poor peak shape, and/or lighting difficulties 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 min.

   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.

FID cleaning kit, 9301-0985

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

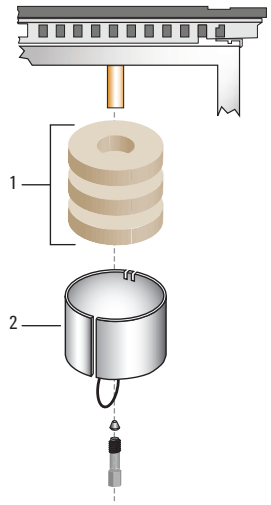
Item	Description	Unit	Part No.
1	FID collector assembly		G1531-60690
2	Collector nut		19231-20940
3	Washer, spring, wavey, 19.0 to 19.81 mm id, 24.5 mm od		3050-1246
4	Hastelloy ignitor castle (optional)		19231-21060
	Ignitor castle		19231-20910
5	Ignitor glow plug assembly		19231-60680
6	Collector insulator		G1531-20700
7	Hastelloy collector body		G1531-21090
	Collector body		G1531-20690
8	Nut, collector spanner		19231-20980
9	Collector housing		G1531-20740
10	Silicone gaskets, 0.890 in od/0.709 in id	12/pk	5180-4165
11	FID ignitor cable, 7890A only		G3431-60680



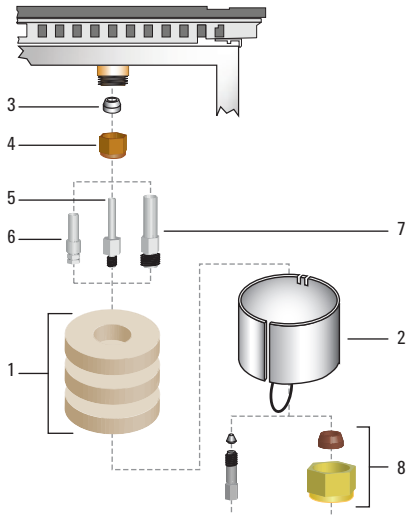
Flame Ionization Detector (FID) assembly

FID base assembly

Item	Description	Unit	Part No.
1	Nut warmer insulation		19234-60715
2	Nut warmer cup assembly		19234-60700
3	Polyimide ferrule, 1/4 in	10/pk	5080-8774
4	1/4 in nut, brass	10/pk	5180-4105
5	FID/NPD 1/8 in packed column		19231-80520
6	FID/NPD adapter for capillary column		19244-80610
7	FID/NPD 1/4 in packed column		19231-80530
8	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
	Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
	1/8 in nut, brass	10/pk	5180-4103
	Universal column nut	2/pk	5181-8830
	For complete offering of column ferrules, **see page 37**.		



Capillary-optimized FID parts



Adaptable FID parts

FID base assembly

Electron Capture Detector (ECD)

The Agilent micro ECD is sensitive and has a low detection zone volume. 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, polyimide coating
- Mixing Liner (p/n G2397-20540): for µECD, clear glass with indent

Makeup Gas Adapter Maintenance/Installation Procedure

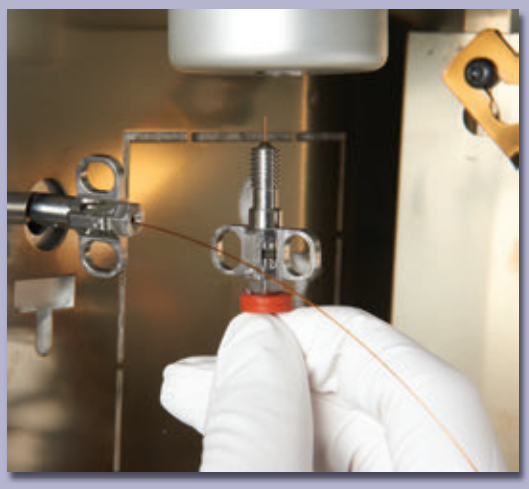
1. Remove the Makeup Gas Adapter from the ECD fitting with a 9/16 in wrench. Be careful not to stress the 1/16 in stainless steel gas supply tube.
2. Unscrew the end cap of the Makeup Gas Adapter and ultrasonically clean in solvent.
3. Remove the old liner.
4. Clean the Makeup Gas Adapter body with solvent 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.

TIPS & TOOLS

Agilent's Self Tightening column nut eliminates the need for retightening once and for all

The self tightening stainless steel GC column nut delivers a tight connection – without expensive upgrades or adapters – and gives you the advantages of:

- Reliable performance
- Less wasted time
- Ease of use
- Faster maintenance



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 (bake out) of the detector. Bake out 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.

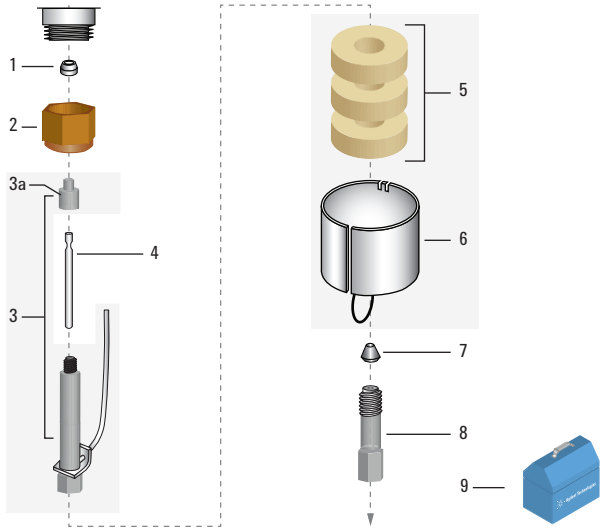
ECD Wipe Test

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) Supplies

Item	Description	Unit	Part No.
1	Polyimide ferrule, 1/4 in	10/pk	5080-8774
2	1/4 in nut, brass	10/pk	5180-4105
3	Micro ECD makeup gas adapter, 7890		G3433-63000
	Micro ECD makeup gas adapter, 6890		G2397-80520
3a	ECD adapter end cap		19233-20755*
4	Fused silica liner for micro ECD makeup gas adapter		G2397-20540*
5	Nut warmer insulation		19234-60715
6	Nut warmer cup assembly		19234-60700
7	For complete offering of column ferrules, **see page 37**.		
8	For complete offering of column nuts, **see page 40**.		
9	GC electron capture detector standard in isooctane	3 x 0.5 mL ampoules	18713-60040
	Micro ECD wipe test kit		18713-60050

*Items 3a and 4 are supplied with item 3



Electron Capture Detector (ECD) assembly

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 min 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.

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.

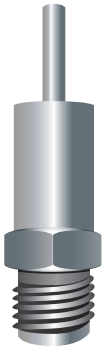
Watch out for decreased sensitivity caused by samples that react with the filament, originating from oxygen-contaminated carrier gas, leaks in plumbing, or column bleeding. Samples with active components, such as acids and halogenated compounds can chemically attack the filament as well. Also, sample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

Some types of contaminants can be removed by temperature bake out.

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

Description	Unit	Part No.
For 1/8 in SS Packed Column Installation		
Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
1/8 in nut, brass	10/pk	5180-4103
For 1/4 in SS Packed Column Installation		
Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
1/8 in nut, brass	10/pk	5180-4103
1/4 in packed column adapter		G1532-20710
Polyimide ferrule, 1/4 in	10/pk	5080-8774
1/4 in nut, brass	10/pk	5180-4105
For Capillary Column Installation (Standard)		
TCD capillary column adapter		G1532-80540
Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
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 Solution of 0.33% C_{14}, C_{15}, and C_{16} normal alkanes in hexane (w/w).	3 x 0.5 mL ampoules	18711-60060
FID and TCD sample This sample is used for the HP 5880, 5890 and 6890 with a FID or TCD. Solution of 0.033% C_{14}, C_{15}, and C_{16} normal alkanes in hexane.	3 x 0.5 mL ampoules	18710-60170

1/8 in stainless steel packed column



1/4 in packed column adapter, G1532-20710

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

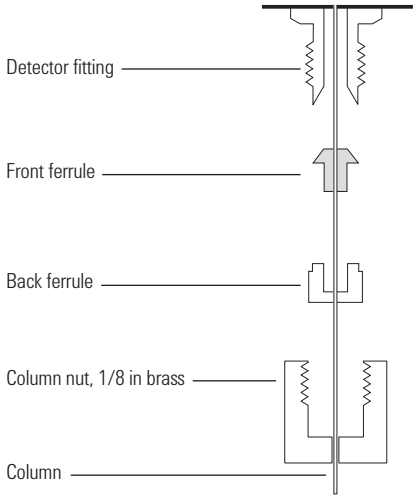
1. Gather the required supplies and tools.
2. Assemble the ferrules and 1/8 in brass Swagelok nut on the column.
3. Score the column using a glass scribing tool. The score must be square to ensure a clean break.
4. Break off the column end by supporting it against the column cutter opposite the scribe. 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, 10/pk	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	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, turn to page 164.

Contamination

The FPD is susceptible to buildup 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-polyimide 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 polyimide 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:

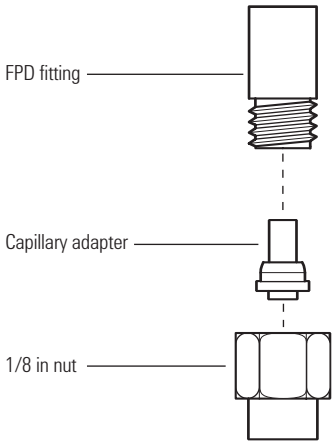
- Large air leaks at the inlet or detector can reduce the percentage of the hydrogen-air mixture at the detector and cause ignition problems.
- Large injections of certain samples can cause flameouts or quenching that cause the detector to attempt to relight, interrupting your analysis.
- Condensation 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 in 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.

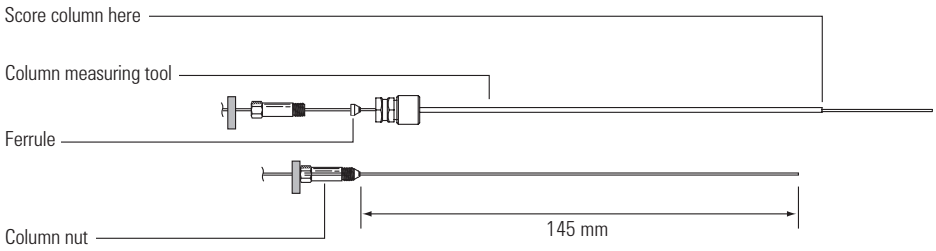
WHAT YOU NEED:

- 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

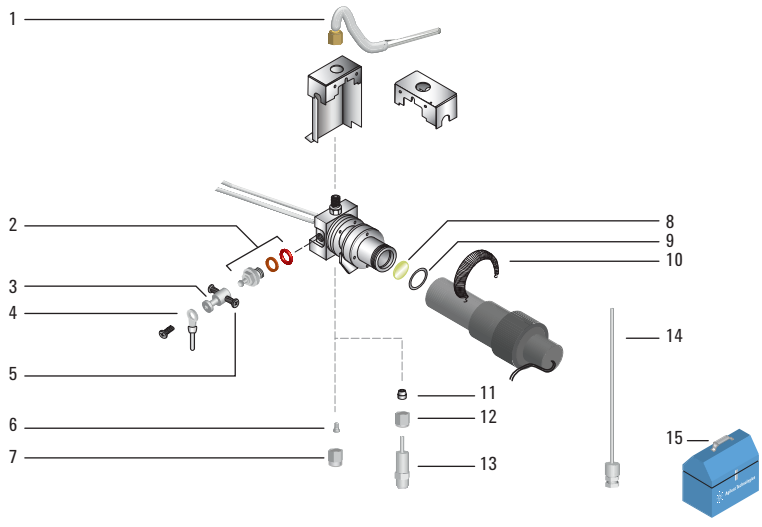
1. Gather the required supplies and tools.
2. Load the GC maintenance method and wait for the GC to become ready.
3. Assemble a septum, column nut, and ferrule on the end of the column.
4. Insert the end of the column through the column measuring tool so that the end protrudes beyond the tool.
5. Tighten 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, p/n 19256-80640.



7890/6890/6850 FPD Ignitor and Heat Shield Assembly

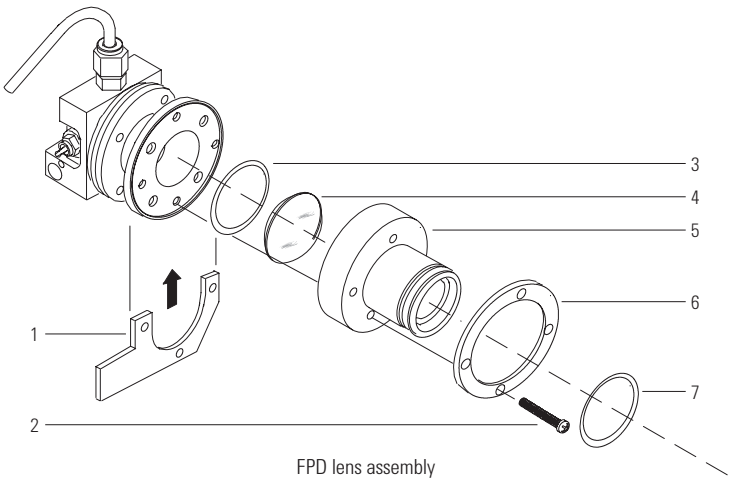
Item	Description	Unit	Part No.
1	FPD exit tube assembly, aluminum		19256-60700
	FPD exit tube assembly, stainless steel		19256-20705
2	FPD ignitor replacement kit		19256-60800
3	Collet for glow plug		19256-20690
4	Ignitor cable assembly		G1535-60600
5	Screw, M3 x 66 mm, T10		0515-0680
6	Capillary adapter seat, FPD		19256-21140
7	Capillary adapter nut		19256-21150
8	Sulfur filter		1000-1437
	Phosphorus filter		19256-80010
9	Filter spacer, use only with sulfur filter for flame photometric detector (p/n 1000-1437)		19256-20910
10	Spring, compression, for flame photometric detector		1460-1160
11	Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
12	Nut, 1/8 in, stainless steel		0100-0057
13	1/4 in packed column adapter		G1532-20710
14	Column tool brazement		19256-80640
15	FPD check out sample		5188-5953
	FPD sample		5188-5245
	PM kit for single FPD		G2647-60501
	PM kit for dual FPD		G2648-60501



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



FPD lens assembly

TIPS & TOOLS

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

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	19256-80010
Filter spacer, use only with sulfur filter for flame photometric detector (p/n 1000-1437)	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.

FPD+ Supplies for 7890B

Description	Part No.
Single FPD+ heat shield	G3435-81330
Dual FPD+ heat shield	G3435-81360
Ignitor for FPD, cleaned	19256-60750
Collet for glow plug	19256-20690
Screw, M3 x 66 mm, T10	0515-0680
Ignitor cable assembly	G1535-60600
Sulfur filter	1000-1437
Phosphorus filter	19256-80010
Filter spacer, use only with sulfur filter for flame photometric detector (p/n 1000-1437)	19256-20910
Spring, compression, for flame photometric detector	1460-1160
Packed-capillary adapter assembly	G3435-60350
Polyimide ferrule	5062-3538
Column tool brazement	19256-80640
FPD check out sample	5188-5953
FPD sample	5188-5245

FPD+

Nitrogen Phosphorus Detector (NPD)

NPD Beads

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

- Blos bead
- White ceramic bead
- Black ceramic bead

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

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

The white ceramic bead exhibits some tailing for phosphorus 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.

Blos NPD bead assembly, G3434-60806

NPD Beads

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

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.

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

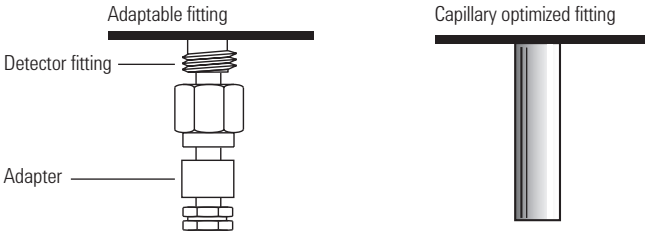
Hint: Adaptable jets are longer than dedicated capillary jets.

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

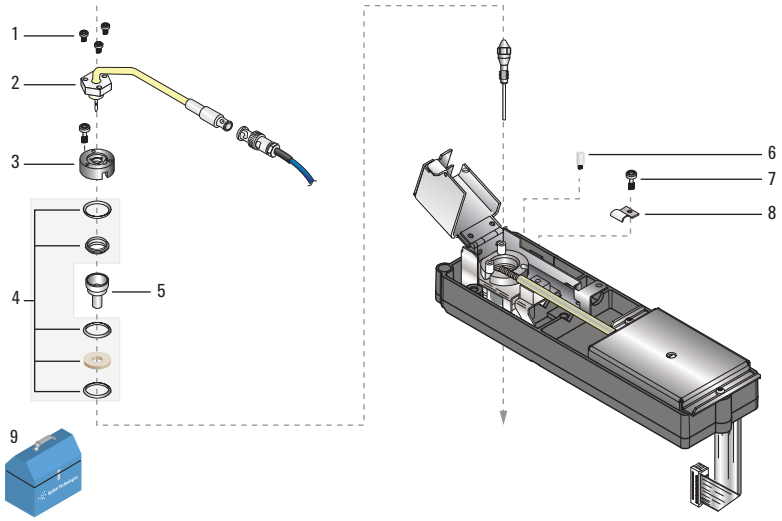
Capillary with extended jet, for capillary-optimized fittings, G1534-80580

Capillary with extended jet, for adaptable fittings, G1534-80590



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

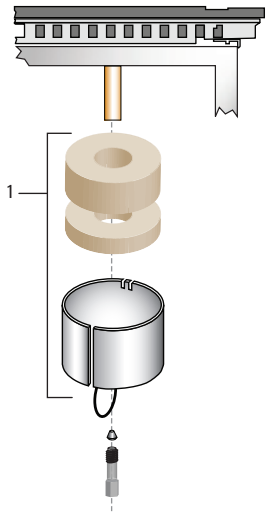
Item	Description	Part No.
1	Screw, T-10, M3 x 8 mm	0515-2726
2	NPD white bead assembly	G1534-60570
	Blos NPD bead assembly	G3434-60806
	NPD black ceramic bead assembly	5183-2007
3	NPD lid weldment	G1534-80510
4	NPD ceramic insulator kit Includes 2 metal C-rings (top and bottom), 2 alumina insulators (upper and lower)	5182-9722
5	NPD collector funnel	G1534-20530
6	NPD lid standoff	G1534-20590
7	Screw, M4 x 0.7, 10 mm	0515-2495
8	J-Clamp	1400-0015
9	Nitrogen phosphorus detector sample	18789-60060
	1/4 in nut driver for FID jet, drilled shaft	8710-1561
	NPD flow adapter	G1534-60640



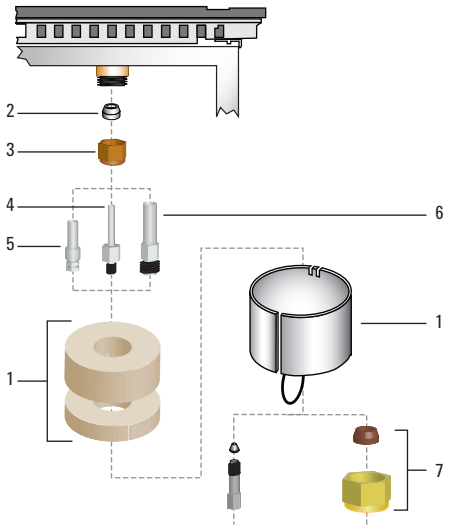
Nitrogen Phosphorus Detector (NPD) assembly (top)

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

Item	Description	Unit	Part No.
1	Nut warmer cup with insulation		19234-60720
2	Polyimide ferrule, 1/4 in	10/pk	5080-8774
3	1/4 in nut, brass	10/pk	5180-4105
4	FID/NPD 1/8 in packed column		19231-80520
5	FID/NPD adapter for capillary column		19244-80610
6	FID/NPD 1/4 in packed column		19231-80530
	1/4 in packed column adapter		G1532-20710
7	1/4 in stainless steel nut and ferrule set	20/pk	5080-8753
	1/4 in brass nut and ferrule set	20/pk	5080-8752
	1/4 in nut, brass	10/pk	5180-4105
	Polyimide ferrule, 1/4 in	10/pk	5080-8774
	Universal column nut	2/pk	5181-8830
	For complete offering of column ferrules, **see page 37**.		



Capillary-Optimized NPD Parts



Adaptable NPD Parts

Nitrogen Phosphorus Detector (NPD) assembly (bottom)

Nitrogen Chemiluminescence Detector (NCD)

Nitrogen and Sulfur Chemiluminescence Detectors

The Agilent 355 Sulfur Chemiluminescence Detector (SCD) is a sensitive and selective chromatographic sulfur detector 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.

Quartz tube kit for NCD DP burner, 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.
Quartz tube kit for NCD DP burner Includes ferrules, fittings and quartz tube	G6600-60038
PM Kit, DP RV5 oil pump Includes 4 chemical traps for ozone destruction, 4 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
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
Column nut, 1/32 in	G6600-80072
Ferrule, column, 1/32 in x 0.5 mm fused silica, Valco	0100-2138
Ferrule, column, 1/32 in x 9 mm, polyimide/graphite	0100-2430

Sulfur Chemiluminescence Detector (SCD) Supplies

Description	Part No.
PM Kit, DP RV5 oil pump Includes 4 chemical traps for ozone destruction, 4 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
Ceramic tube kit for SCD DP burner Includes ferrules, 3 upper ceramic tubes, and 1 lower ceramic tube	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
Column nut, 1/32 in	G6600-80072
Ferrule, column, 1/32 in x 0.5 mm fused silica, Valco	0100-2138
Ferrule, column, 1/32 in x 9 mm, polyimide/graphite	0100-2430

Sulfur Chemiluminescence Detector (SCD)

PM kit, G6600-67008

Miscellaneous Instrument Parts and Supplies

Description	Part No.
Oven exhaust deflector for 6890/7890	G1530-80650
Oven exhaust deflector for 6850	G2630-60710
GC oven insert for 6890/7890	G2646-60500

Ceramic tube kit for SCD DP burner, 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

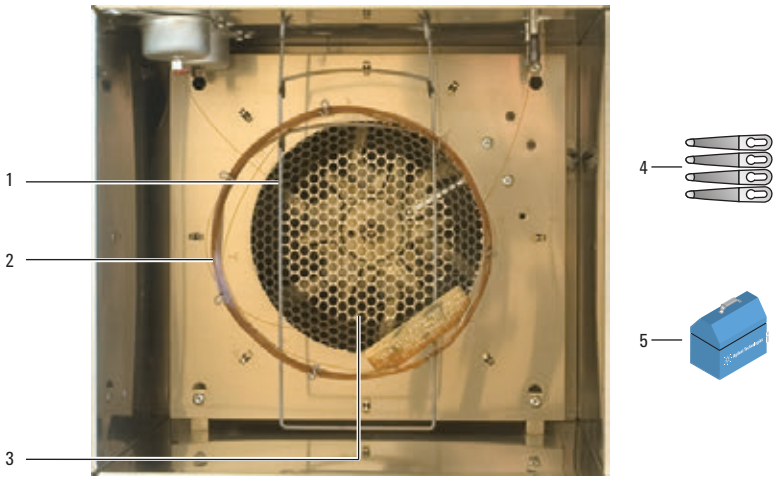
7820A GC System

Reliability and value

7820A GC System

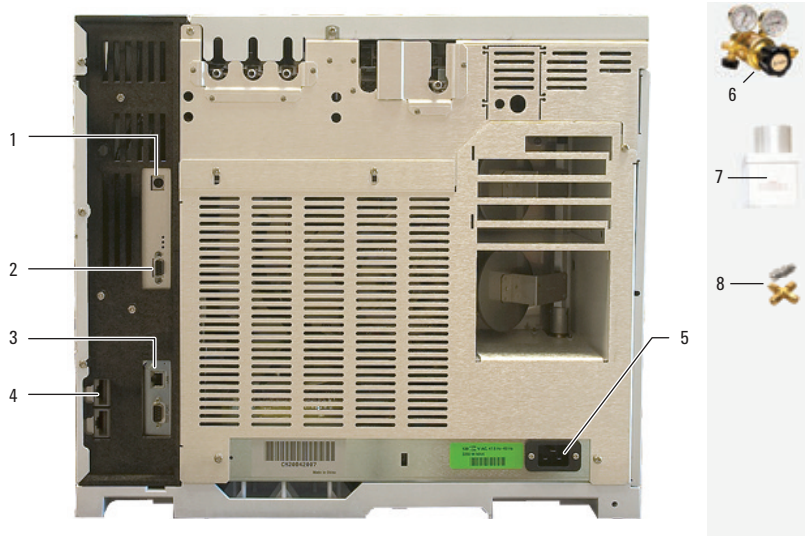
The Agilent 7820A GC is an affordable, high-quality solution for small- to medium-sized labs that are mainly concerned with routine analyses using standard GC methods – including those that must comply with regulatory requirements. The 7820A GC was designed to maximize uptime, minimize maintenance and complexity, and provide a high return on your investment. The system uses Agilent's proven electronic pneumatics control and digital electronics so you will get the results you can count on.

- With an intuitive user interface and 'minimalist' five-button keypad, the 7820A GC is very easy to operate, even for inexperienced or infrequent users. Because there are no gauges or manual gas knobs, errors are minimized. And with convenient, real-world design features and built-in self-diagnostics, the 7820A GC is also easy to maintain.
- The simplified front panel keys and display provide sequence information, instrument conditions, and run status, while minimizing operating errors. The complementary software keyboard and display lets you control the system when it connects with an integrator or third-party software.
- You'll find a wide choice of inlets, including split/splitless for megabore and all capillary columns, packed for wide-bore capillary and packed columns.
- There's a wide choice of detectors, too, from flame ionization to thermal conductivity, micro-electron capture to nitrogen-phosphorus, not forgetting single wavelength flame photometric.
- With an Agilent 7650A or 7693A Injection Tower, you can eliminate the variables of manual injection, and increase your lab's throughput, too. With a capacity of up to sixteen 2 mL samples, this optional accessory offers unprecedented sample handling flexibility, and allows fully unattended operation – from injection all the way through final reporting.



7820A Column Oven Parts

Item	Description	Unit	Part No.
1	Column hanger for 6890, 5890, 5880A		1460-1914
2	HP-88, 30 m, 0.25 mm, 0.20 µm, 7 in cage		112-8837
	DB-5ms, 20 m, 0.18 mm, 0.18 µm, 7 in cage		121-5522
	DB-1ms, 30 m, 0.25 mm, 0.25 µm, 7 in cage		122-0132
	DB-1701, 30 m, 0.25 mm, 0.25 µm, 7 in cage		122-0732
3	Oven shroud, 120 V, US		G1530-61610
	Oven shroud, 220 V/10 A, China		G1530-61230
	Oven shroud, 240 V, Australia		G1530-61640
4	Column hanger clip kit for 7 in basket		G1530-61580
5	Ceramic wafer column cutter	4/pk	5181-8836
	Magnifier, 20x		430-1020
	MS interface column installation tool		G1099-20030
	Column ferrule installation tool		19251-80680

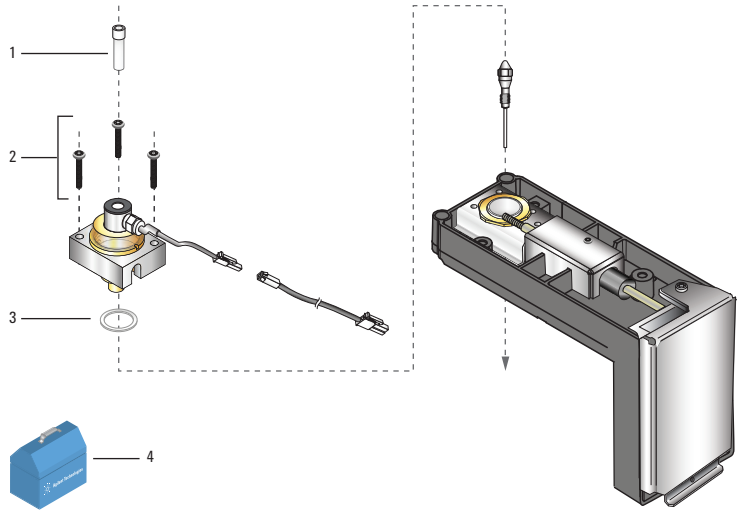


7820A Back View

Item	Description	Unit	Part No.
1	Signal cable, general purpose analog output cable assembly, spade lugs/6 pins		G1530-60560
2	Remote start cable for general use with lug		35900-60670
	Cable assembly, 6890A to 3396		G1530-60570
	Remote Start/Stop Cable 3590B/C/D/E		35900-60920
	Remote cable to 6890		03396-61010
	Remote cable APG 9M/9M to 6890		G1530-60930
	Remote control APG h-cable		35900-60800
3	Cable, w/conn, 80-1000V, telecom		8121-0940
4	ALS main cable assembly		G4514-60610
5	Power cord, Korea, C19, 16 amp		8121-1222
	Power cord, India/S.Africa, C19, 15 amp		8121-0710
	Power cord, GB/HK/SG/MY, C19, 13 amp		8120-8620
	Power cord, Europe, 16 amp		8120-8621
	Power cord, Japan, C15, 15 amp		8120-5342
	Power cord, US 120V, C19, 20 amp		8120-6894
	Power cord, Japan, C19, 20 amp		8120-6903
	Power cord, Australia, 16 amp		8120-8619
	Power cord, China, C19, 15 amp, Fast		8121-0070
	Power cord, Israel, C19, 16 amp		8121-0161
	Power cord, Argentina, C19, 20 amp		8121-0675
	Power cord, Thai 220V, 15 amp, 1.8M, C19		8121-1301
	Power cord, Swiss/DK, C19, 16 amp		8120-8622
	Power cord, China, C13, 10 amp		8121-0723
	Power cord, Brazil, C19, 250V max		8121-1787
	Power cord, Taiwan/S America, C19, 20 amp		8120-6360

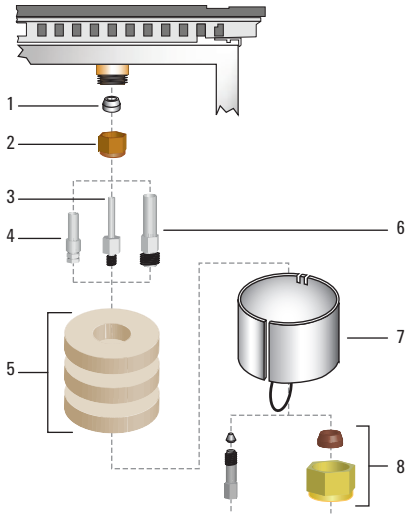
Item	Description	Unit	Part No.
6	Regulator, 2-stage, brass body, stainless steel diaphragms, 125 psi max, CGA590, industrial air, with 1/8 in fitting, for 1/4 in tubing purchase a 1/4 in adapter		5183-4645*
	Regulator, 2-stage, brass body, stainless steel diaphragms, 125 psi max, CGA350, hydrogen, argon/methane, with 1/8 in fitting, for 1/4 in tubing purchase a 1/4 in adapter		5183-4642*
	Regulator, 2-stage, brass body, stainless steel diaphragms, 125 psi max, CGA346, air, with 1/8 in fitting, for 1/4 in tubing purchase a 1/4 in adapter		5183-4641*
	Regulator, 2-stage, brass body, stainless steel diaphragms, 125 psi max, CGA580, helium, argon, nitrogen, 1/8 in fitting, for 1/4 in tubing purchase a 1/4 in adapter		5183-4644*
7	Oven exhaust deflector for 6890/7890		G1530-80650
8	1/8 in brass nut and ferrule set	20/pk	5080-8750
	Copper tubing, 1/8 in	12 ft	5021-7107
	Copper tubing, 1/8 in	50 ft	5180-4196
	1/8 in cross, brass		0100-0161

*Designed for US thread type CGA.



7820A FID Parts Top

Item	Description	Unit	Part No.
1	Chimney insert, PTFE		19231-21050
2	Screw, M4 x 25 mm, Torx T-20		0515-2712
3	Silicone gaskets, 0.890 in od/0.709 in id	12/pk	5180-4165
4	Cleaning wires for 0.016 in id jet	5/pk	5180-4150
	Cleaning wire for 0.018 in id/530 µm jet	5/pk	5180-4152
	GC flame ionization detector MDL standard Agilent 7890 GC		5188-5372
	FID flow measuring insert		19301-60660

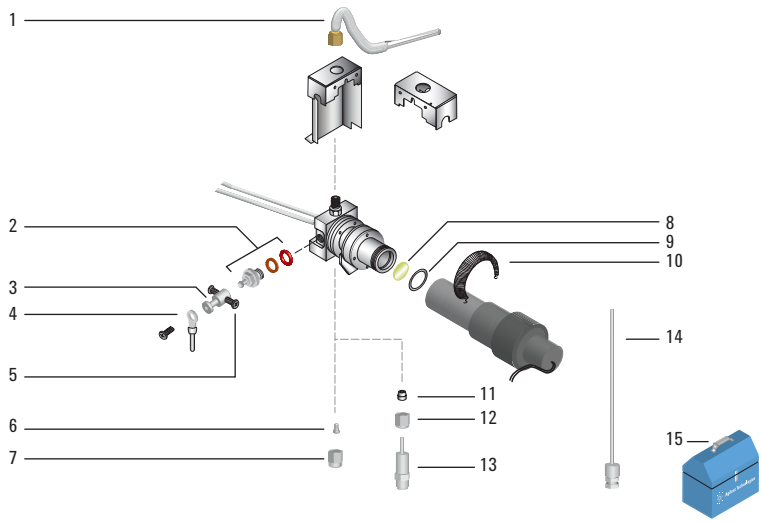


7820A FID Parts Bottom

Item	Description	Unit	Part No.
1	1/4 in nut, brass	10/pk	5180-4105
2	Polyimide ferrule, 1/4 in	10/pk	5080-8774
3	FID/NPD 1/8 in packed column		19231-80520
4	FID/NPD adapter for capillary column		19244-80610
5	Nut warmer insulation		19234-60715
6	FID/NPD 1/4 in packed column		19231-80530
7	Nut warmer cup assembly		19234-60700
8	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
	Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
	1/8 in nut, brass	10/pk	5180-4103
	Universal column nut	2/pk	5181-8830
	For complete offering of column ferrules, **see page 37**.		

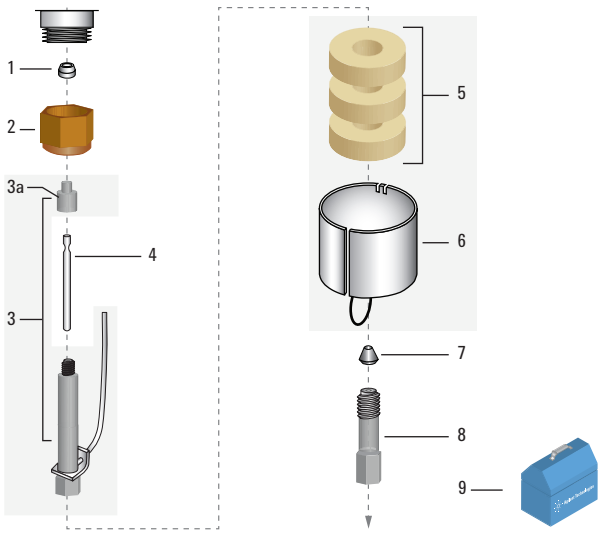
7820A FID Jets

Item	Description	Part No.
1	Jet, capillary adaptable, 0.011 in id tip	19244-80560
2	Jet, packed, high temperature, 0.018 in id tip	19244-80620
3	Jet, packed standard, 0.018 in id tip	18710-20119
4	Jet, packed wide-bore, 0.030 in id tip (for high-bleed applications)	18789-80070



7820A FPD Parts

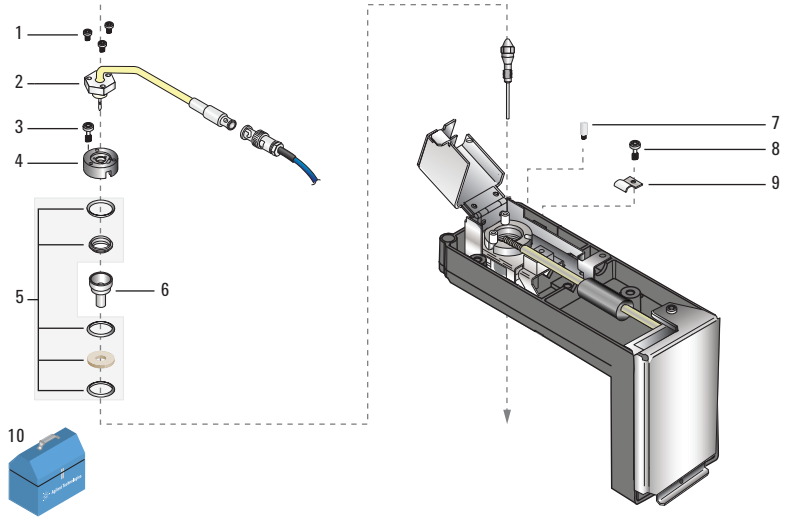
Item	Description	Unit	Part No.
1	FPD exit tube assembly		19256-60700
	FPD vent tube assembly		19256-20705
2	FPD ignitor replacement kit		19256-60800
3	Collet for glow plug		19256-20690
4	Ignitor cable assembly		G1535-60600
5	Screw, M3 x 66 mm, T10		0515-0680
6	Capillary adapter seat, FPD		19256-21140
7	Capillary adapter nut		19256-21150
8	Sulfur filter		1000-1437
	Phosphorus filter		19256-80010
9	Filter spacer, use only with sulfur filter for flame photometric detector (p/n 1000-1437)		19256-20910
10	Spring, compression, for flame photometric detector		1460-1160
11	Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
12	Nut, 1/8 in, stainless steel		0100-0057
13	1/4 in packed column adapter		G1532-20710
14	Column tool brazement		19256-80640
15	FPD check out sample		5188-5953
	FPD sample		5188-5245
	PM kit for single FPD		G2647-60501
	PM kit for dual FPD		G2648-60501



7820A Micro ECD Parts

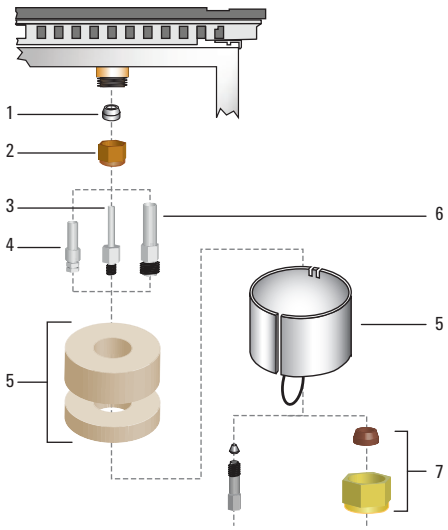
Item	Description	Unit	Part No.
1	Polyimide ferrule, 1/4 in	10/pk	5080-8774
2	1/4 in nut, brass	10/pk	5180-4105
3	Micro ECD makeup gas adapter, 7890 Micro ECD makeup gas adapter weldment assembly for new version detector, connected to EPC with tubing blocks		G3433-63000
	Old Micro ECD mug adapter Micro ECD makeup gas adapter weldment assembly for old version detector, connected to EPC with thumb nuts		G4333-63000
3a	Stainless steel cap for ECD makeup gas adapter, ECD adapter end cap		19233-20755*
4	Fused silica liner for micro ECD makeup gas adapter		G2397-20540*
5	Nut warmer insulation		19234-60715
6	Nut warmer cup assembly		19234-60700
7	For complete offering of column ferrules, **see page 37**.		
8	Universal column nut	2/pk	5181-8830
9	GC electron capture detector standard in isooctane	3 x 0.5 mL ampoules	18713-60040
	Micro ECD wipe test kit		18713-60050

*Items 3a and 4 are supplied with item 3



7820A NPD Parts – Top

Item	Description	Unit	Part No.
1	Screw, T-10, M3 x 8 mm		0515-2726
2	NPD white bead assembly		G1534-60570
	NPD black ceramic bead assembly		5183-2007
3	Screw, M4 x 0.7, 10 mm		0515-2495
4	NPD lid weldment		G1534-80510
5	NPD ceramic insulator kit		5182-9722
6	NPD collector funnel		G1534-20530
7	NPD lid standoff		G1534-20590
8	Screw, M4 x 0.7, 10 mm		0515-2495
9	J-Clamp		1400-0015
10	Nitrogen phosphorus detector sample	3 x 0.5 mL ampoules	18789-60060
	1/4 in nut driver for FID jet, drilled shaft		8710-1561
	NPD flow adapter		G1534-60640

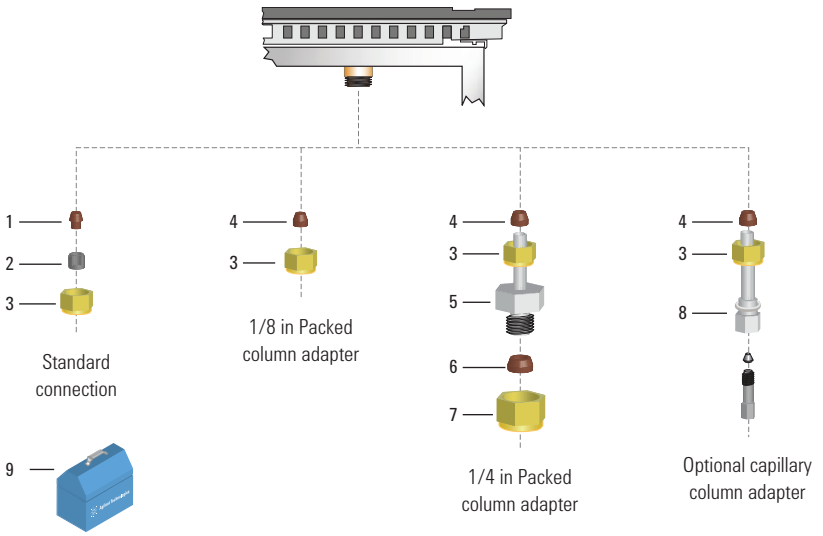


7820A NPD Parts – Bottom

Item	Description	Unit	Part No.
1	Polyimide ferrule, 1/4 in	10/pk	5080-8774
2	1/4 in nut, brass	10/pk	5180-4105
3	FID/NPD 1/8 in packed column		19231-80520
4	FID/NPD adapter for capillary column		19244-80610
5	Nut warmer cup with insulation		19234-60720
6	FID/NPD 1/4 in packed column		19231-80530
	1/4 in packed column adapter		G1532-20710
7	1/4 in nut, brass		5180-4105
	1/8 in stainless steel nut and ferrule set	20/pk	5080-8751
	1/4 in stainless steel nut and ferrule set	20/pk	5080-8753
	1/4 in brass nut and ferrule set	20/pk	5080-8752
	Universal column nut	2/pk	5181-8830
	For complete offering of column ferrules, **see page 37**.		

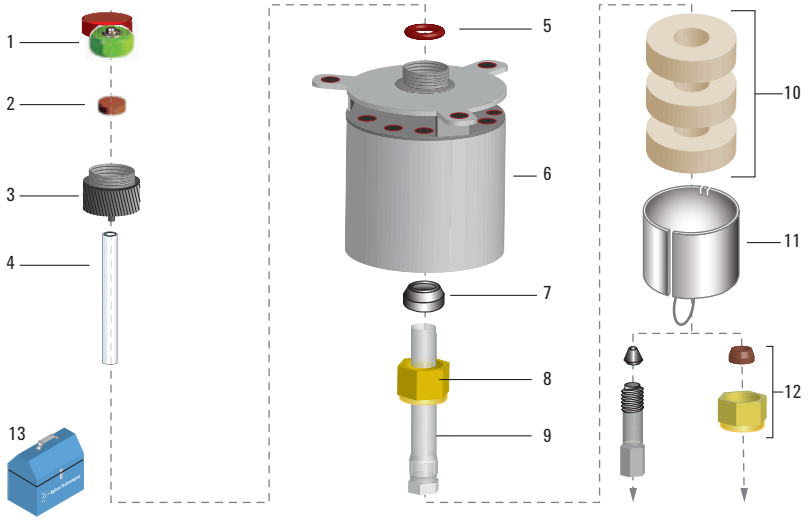
7820A NPD Jets

Item	Description	Part No.
1	Capillary with extended jet, 0.011 in/ 0.29 mm id tip, 70.5 mm length for adaptable fittings	G1534-80590
2	Jet, capillary adaptable, 0.011 in id tip	19244-80560
3	Jet, packed, high temperature, 0.018 in id tip	19244-80620
4	Jet, packed standard, 0.018 in id tip	18710-20119



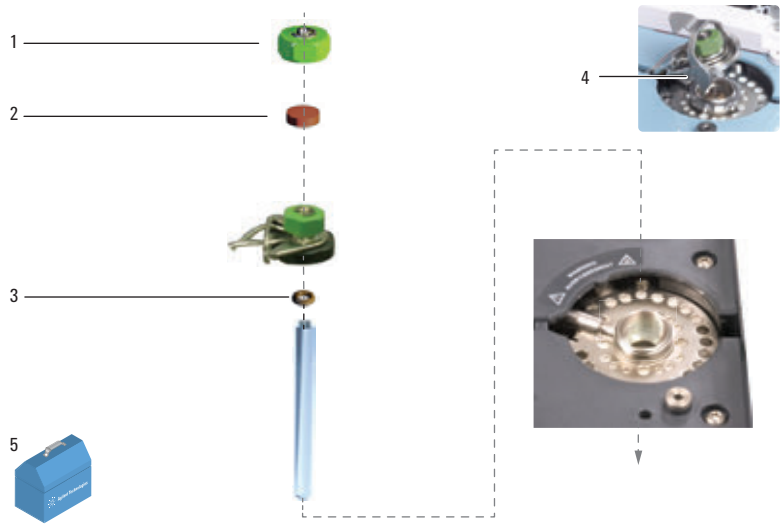
7820A TCD Parts

Item	Description	Unit	Part No.
1	TCD Front ferrule for 0.8 mm od columns	10/pk	5182-9673
	TCD Front ferrule for 0.53 mm od columns	10/pk	5182-9676
	TCD Front ferrule for 0.45 mm od columns	10/pk	5182-9677
	TCD Front ferrule, no hole	10/pk	5182-9679
2	TCD Back ferrule for 1/8 in detector fitting	10/pk	5182-3477
3	1/8 in nut, brass	10/pk	5180-4103
	1/8 in plug, brass	6/pk	5180-4124
4	Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
5	1/4 in packed column adapter		G1532-20710
6	Polyimide ferrule, 1/4 in	10/pk	5080-8774
7	1/4 in nut, brass	10/pk	5180-4105
8	TCD capillary column adapter		G1532-80540
9	FID and TCD sample	3 x 0.5 mL ampoules	18710-60170
	TCD sample	3 x 0.5 mL ampoules	18711-60060



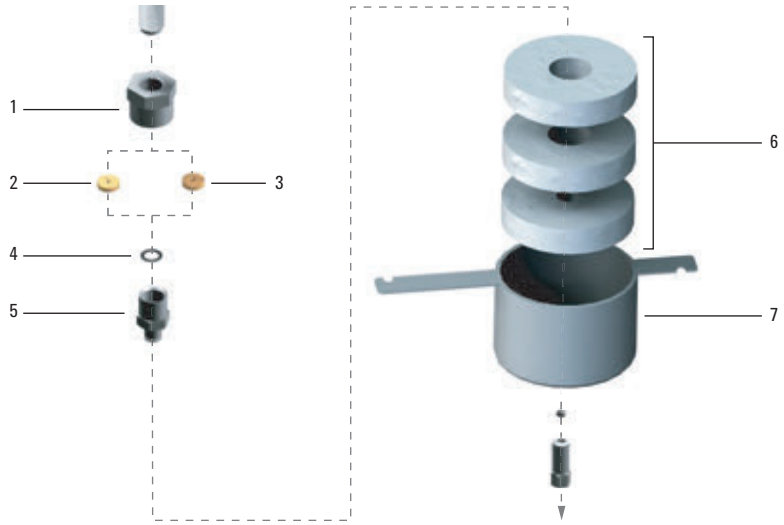
7820A Purged Packed Inlet Parts

Item	Description	Unit	Part No.
1	Septum nut, purged inlets		18740-60835
2	11 mm septa	50/pk	5183-4759
	Non-stick long-life septa, 11 mm	50/pk	5183-4761
	Non-stick bleed and temperature optimized (BTO) septa, 11 mm	50/pk	5183-4757
3	Packed port insert weldment		19243-80570
4	Disposable glass insert, deactivated, 170 µL internal volume	5/pk	5181-3382
	Disposable glass liner, 170 µL internal volume	25/pk	5080-8732
5	O-ring, Viton	12/pk	5080-8898
6	Inlet weldment		G3451-80501
7	Polyimide ferrule, 1/4 in	10/pk	5080-8774
8	1/4 in nut, brass	10/pk	5180-4105
9	1/4 in column adapter		19243-80540
	1/8 in column adapter		19243-80530
	530 µm column adapter for use with glass liners		19244-80540
10	Nut warmer insulation		19234-60715
11	Nut warmer cup assembly		19234-60700
12	1/8 in nut, brass	10/pk	5180-4103
	Polyimide/graphite ferrule, 1/8 in	10/pk	0100-1332
	1/8 in brass nut and ferrule set	20/pk	5080-8750
	Polyimide ferrule, 1/4 in	10/pk	5080-8774
	Universal column nut	2/pk	5181-8830
	For complete offering of column ferrules, **see page 37**.		
13	QuickPick purged packed inlet PM kit		5188-6498
	Swabs for cleaning GC/MS	100/pk	5080-5400
	Injection port cleaning kit		480-0003
	Septum tool, knurled handle		450-1000



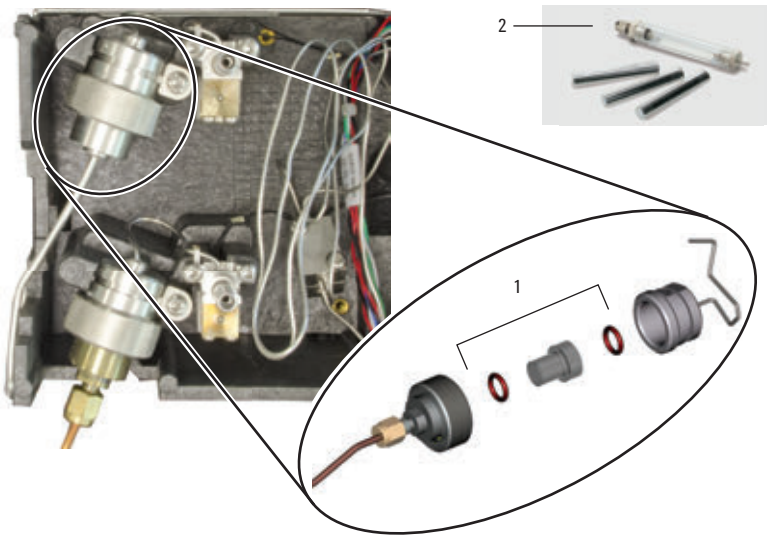
7820A Split/Splitless Inlet Parts (Top)

Item	Description	Unit	Part No.
1	Headspace septum retainer nut		18740-60830
	Septum nut, purged inlets		18740-60835
2	Non-stick bleed and temperature optimized (BTO) septa, 11 mm	50/pk	5183-4757
	Non-stick bleed and temperature optimized (BTO) septa, 11 mm	100/pk	5183-4757-100
	Non-stick long-life septa, 11 mm	50/pk	5183-4761
	Non-stick long-life septa, 11 mm	100/pk	5183-4761-100
3	Graphite O-ring for splitless liner	10/pk	5180-4173
	Graphite O-ring for split liner	10/pk	5180-4168
	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
4	Non-stick fluorocarbon O-ring for Flip Top	100/pk	5190-2268
	Non-stick fluorocarbon liner O-ring for Flip Top	10/pk	5188-5366
	Flip Top inlet sealing system		5188-2717
5	QuickPick split inlet PM kit		5188-6493
	QuickPick splitless vent and inlet PM kit		5188-6497
	FID collector cleaning brush	2/pk	8710-1346
	QuickPick split vent and inlet PM kit		5188-6496



7820A Split/Splitless Inlet Parts (Bottom)

Item	Description	Unit	Part No.
1	Inlet heater weldment retaining nut		G1544-20590
2	Gold plated inlet seal kit with washer		5188-5367
	Certified gold plated seal kit, includes washer	10/pk	5190-2209
	Inlet seal, stainless steel		18740-20880
3	Gold plated seal with cross, split only		5182-9652
4	Washers, 0.375 od	12/pk	5061-5869
5	Reducing nut for split/splitless inlet		18740-20800
6	S/SL insulation kit, 3 pieces		5188-5241
7	Cover, lower insulation		19243-00070



7820A Split Vent Traps

Item	Description	Unit	Part No.
1	Split vent trap preventive maintenance kit, single cartridge		5188-6495
2	Split vent trap with 3 cartridges		RDT-1020
	Cartridges, split vent trap	3/pk	RDT-1023

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 tip seals (IDP3)			✓	
Replace the traps and filters			✓	
Clean the ion source				✓
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

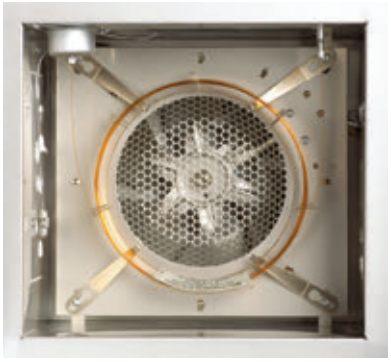
- Higher than normal vacuum manifold pressure or foreline pressure
- Higher than normal background
- Peaks characteristic of air (m/z 18, 28, 32, and 44 or m/z 14 and 16)
- Poor sensitivity
- Low relative abundance of m/z 502 (this varies with the tune program and MSD used)

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
- 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
- Polyimide/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 abundance of these peaks decrease as peak mass increases. Fingerprint contamination is usually caused by the failure to wear clean, nylon gloves during ion source handling or 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 Polyimide 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.

5977A Series GC/MSD system

Cloths, lint-free, 05980-60051

Cotton swabs, 5080-5400

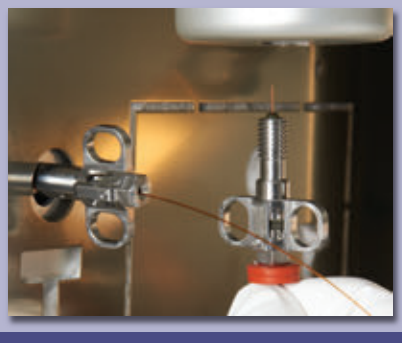
Cleaning and Maintenance Supplies

Description	Part No.
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
Swabs for cleaning GC/MS, 100/pk	5080-5400
Abrasive sheets, aluminum oxide green lapping paper, 600 mesh, 5/pk	5061-5896
Alumina powder, abrasive, 100 g	393706201
PFTBA sample, certified, 10 g	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 Includes source hold tool, lint-free cloth, cotton swabs, lint-free nylon gloves, abrasive sheets, wrenches and driving tools	G1099-60566

(Continued)

TIPS & TOOLS

Self Tightening column nuts at the transfer line and inlet fitting, using short graphite/polyimide-blend ferrules, provide a leak-free seal at both column connections, without the need to retighten the fitting after hundreds of heat cycles.



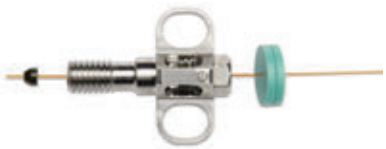
Cleaning and Maintenance Supplies

Description	Part No.
MS Interface Supplies	
MS interface column installation tool for the 5973 series, 5975 A/B/C/C TAD/E, 5977 series, and 7000 series Not for the 5975T	G1099-20030
Column installation tool for 5975T	G3880-20030
Column insertion tool for the 7200 series	G3850-60014
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
Gas Filters	
Replacement Agilent Gas Clean carrier gas filter	CP17973
Gas Clean carrier gas starter kit for 7890 Includes carrier gas filter, 1/8 in single connecting unit with bracket that installs directly on the 7890	CP17988
GC/MS filter kit Includes 1 connecting unit 1/4 in and 2 carrier gas filters	CP17977
Chemical ionization gas purifier	G1999-80410

Column installation tool, G1099-20030

Replacement Agilent Gas Clean carrier gas filter, CP17973

By using tools, supplies and best practices that provide a leak-free GC or GC/MS, analysts can improve performance and productivity of their system. The Agilent innovative Self Tightening column nuts using standard short polyimide/graphite ferrules eliminate the need to retighten GC column fitting at the mass spec transfer line, even after repeated heat cycling. Agilent UltiMetal Plus Flexible Metal ferrules provide robust leak-free column connections, along with an inert surface for fittings in the sample flow path.



Self Tightening column nut, for MS interface, 5190-5233

MS interface column nut, 05988-20066

UltiMetal Plus Flexible Metal ferrules, G3188-27501

Recommended MS Interface Connections

Description	Part No.
Recommended	
Nut	
Self Tightening column nut, for MS interface	5190-5233
Ferrule	
250 µm Polyimide/graphite ferrule, 10/pk	5181-3323
320 µm Polyimide/graphite ferrule, 10/pk	5062-3514
Tools	
MS interface column installation tool	G1099-20030
Column installation tool for 5975T	G3880-20030
Traditional	
Nut	
MS interface column nut, female	05988-20066
Ferrule	
0.4 mm Polyimide/graphite ferrule, 10/pk	5062-3508
0.5 mm Polyimide/graphite ferrule, 10/pk	5062-3506
Tools	
MS interface column installation tool	G1099-20030
Column installation tool for 5975T	G3880-20030
Alternative	
Nut	
Swaging nut, for MS interface with Flexible Metal ferrules	G2855-20555
Ferrule	
UltiMetal Plus Flexible Metal ferrule with 0.4 mm id, 10/pk	G3188-27501
UltiMetal Plus Flexible Metal ferrule with 0.5 mm id, 10/pk	G3188-27502
Tools	
Ferrule pre-swaging tool	G2855-60200

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.

Electron Impact (EI) Ion Source

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
- Shape of lens ramps and the chosen voltages
- 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 (if applicable)
- The turbo pump is off and not spinning (if applicable)
- 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
5977	0.1	2.0	4.0	2.0
5975	0.1	2.0	4.0	2.0
5973	0.1	2.0	4.0	2.0

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.

EI Source Selection Guide

Inert Ion Source

To ensure accurate quantification and high sensitivity, the entire GC/MSD flow path must be highly insert, including the detector surfaces. The inert ion source is made of the same inert material used in the Extractor EI Source and is programmable to 350 °C, enabling trace level detection and SVOC and VOC analyses (see Source Selection for Various Applications).

Aperture Diameters Availabe for the Agilent 5977A Series Ion Sources

Aperture Diameter	3 mm	6 mm	9 mm
Stainless Steel Source	05971-20134	G3136-20530	--
Inert Source	G2589-20100	G2589-20045	--
Extractor EI Source	G3870-20444	G3870-20448	G3870-20449

Source and Tune Selection Guidance

Choosing the most appropriate source configuration and tune can have a significant effect on the success of an application (see, Source Configurations and Supported Tunes). The guidelines outlined here are meant to be general suggestions as starting points. Application-specific method development should be performed to ensure the best operating conditions. EI Tune Options gives a description of the various tune modes and their use.

Stainless Steel Ion Source

The most cost-effective source for picogram to high nanogram sensitivity and for obtaining spectra most similar to legacy instruments is the stainless steel ion source, which is progrmmable up to 350 °C.

Source Selection for Various Applications

Application	Source(s)	Drawout/ Extractor Lens (mm)	Tune
Ultra-trace level (low fg-low ng)	Extractor EI	3	Etune
Trace level (fg-ng)	Extractor EI, Inert	3	Etune, Atune
Mid to high-level (pg-high ng)	Extractor, Inert, Stainless Steel	6, 9	Atune
Obtain spectra closest to older instruments	Stainless Steel	3	Stune
VOC P&T - (BFB)	Extractor EI, Inert	6	BFB Autotune
SVOC (DFTPP)	Extractor EI, Inert	6	DFTPP

Source Configurations and Supported Tunes

Source	Etune	Atune	BFB Autotune	Ion Mass	Stune	DFTPP	BFB
Stainless Steel	--*	✓	--	✓	✓	✓	✓***
Inert	--*	✓	✓**	✓	✓	✓	✓***
Extractor EI	✓	✓	✓**	✓	✓	✓	✓***

*Etune can be executed from the tune menu with a non-extractor source but will produce only an atune

**BFB Autotune requires the use of the 6 mm drawout plate/extraction lens

***BFB Autotune is the preferred tune.

EI Tune Options

In the Tune menu, and in the Tune and Vacuum Control view there are several options for tune selection. The top two options are mechanisms to run part or the entire active tune. The remaining menu options are tunes for specific purposes and are described below.

Description of the Tune Options for the Agilent 5977A Series Ion Source

Tune menu items (default tune filenames as *.U)	Description
Tune MSD	Performs the type of tune that is embedded in the active tune.
QuickTune	Provides a fine tuning to ensure acceptable response, resolution and accurate mass assignment.
Autotun (Atune.U)	The standard repeller-based tune of the Agilent 5973 inert MSD and Agilent 5975 Series.
Extraction source tune (Etune.U)	Used with the Extractor EI Source to provide the highest sensitivity. Equivalent to Atune when used with inert or stainless sources.
BFB Autotune (BFB_Atune.U)	Used in conjunction with Atune to meet US EPA BFB tuning criteria. Requires the use of 6 mm drawout/extraction lens and operates in standard repeller-based tuning mode.
Low Mass Autotune (Lomass.U)	Identical to Autotune, except it tunes on masses 69, 131, and 219 instead of 69, 219, and 502. Intended for low molecular weight applications and natural gases under 250 daltons.
Standard Spectra Tune (Stune.U)	Ensures standard response over the full mass range. Specifically, PFTBA mass 69 is the base peak, mass 219 is between 35 and 99%, and mass 502 is >1%. This is a lower sensitivity tune used to better match legacy libraries created using the Agilent 5971 or 5972 MSDs.
DFTPP	A specific target tune used for US EPA semivolatile analyis (8270 methods).
BFB	A specific legacy target tune used for VOC analysis. It does not provide the same sensitivity and stability as BFB Autotune. Provides continuity for established SOPs and for users with a preference for target tuning.

Available EI Sources for the Agilent 5977A Series GC/MS

Source	Benefit	Part No. (spare parts)
Stainless	Inexpensive	G2591D
Inert	Reduced activity	G2591B
Extractor EI Source	Reduced activity	G2591C
	Highest sensitivity	

Electron Impact (EI) Ion Source

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.

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.

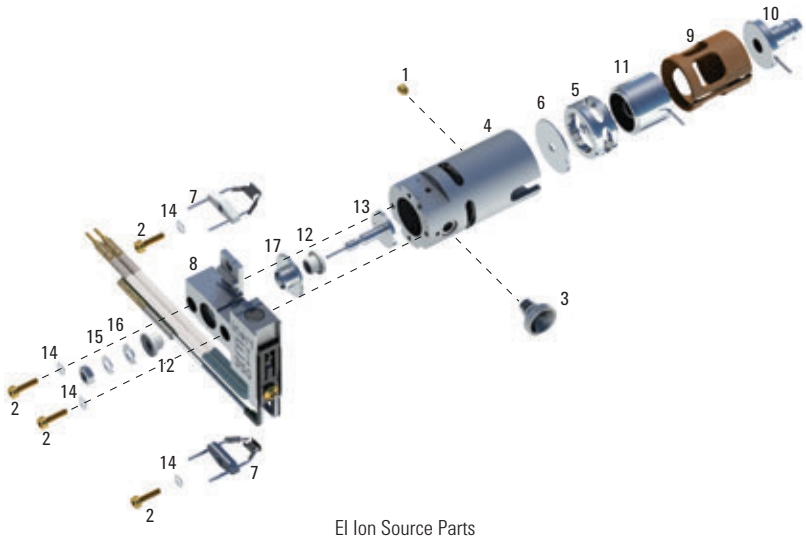
Take care to avoid contaminating cleaned and dried parts. Put on new, clean gloves before handling the parts. Do not put the cleaned parts on a dirty surface. Place them only on clean, lint-free cloths.

5977/5975/5973 MSD Electron Impact Ion Source Parts (EI)

Item	Description	Part No.
1	Set screw for lens stack	G1999-20022
2	Cap screw, gold plated	G1999-20021
3	Transfer line socket	G1099-20136
4	Ion source body	G1099-20130
5	Drawout cylinder	G1072-20008
6	Drawout plate, 3 mm	05971-20134
	Drawout plate, 6 mm	G3163-20530
7	Filament assembly, high temperature (EI)	G7005-60061
8	Repeller assembly, Agilent 5977 MSD, stainless steel EI 350 ion source	G3870-67172
9	Lens insulator	G3170-20530
10	Entrance lens assembly	G3170-20126
11	Ion focus lens	05971-20143
12	Repeller insulator	G1099-20133
13	Repeller	G1099-20132
14	Washer, SPR CRVD, 1.6 to 1.8 mm id, 4 mm od, SS	3050-1375
15	Washer, SPR BLVL 4 .125 in id .25 in od	3050-1301
16	Washer, for Repeller M3	3050-0891
17	Repeller block insert	G3870-20135

Lens insulator, G3170-20530

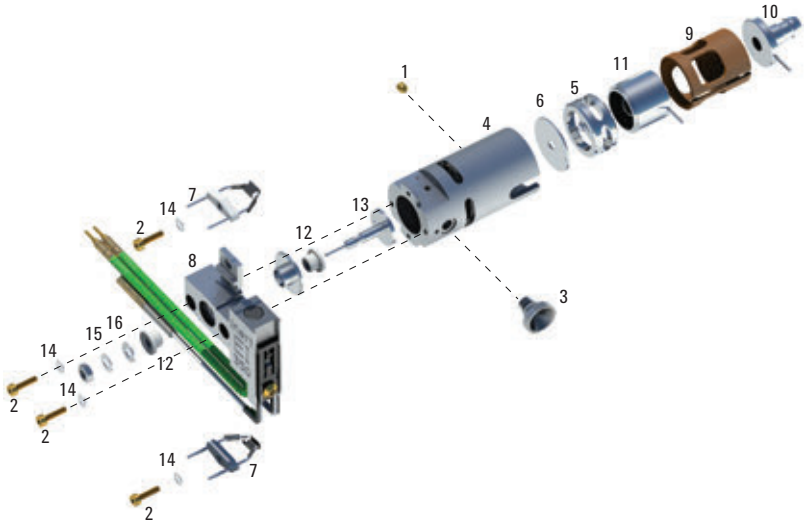
Repeller insulator, G1099-20133



EI Ion Source Parts

5977/5975/5973 MSD Electron Impact Inert Ion Source Parts (EI)

Item	Description	Part No.
1	Set screw for lens stack	G1999-20022
2	Cap screw, gold plated	G1999-20021
3	Transfer line socket	G1099-20136
4	Inert ion source body	G2589-20043
5	Drawout cylinder	G1072-20008
6	Drawout plate, 3 mm	G2589-20100
	Drawout plate, 6 mm	G2589-20045
7	Filament assembly, high temperature (EI)	G7005-60061
8	5977 Inert EI 350 repeller block	G3870-67173
9	Lens insulator	G3170-20530
10	Entrance lens assembly	G3170-20126
11	Ion focus lens	05971-20143
12	Repeller insulator	G1099-20133
13	Inert repeller	G2589-20044
14	Washer, SPR CRVD, 1.6 to 1.8 mm id, 4 mm od, SS	3050-1375
15	Washer, SPR BLVL 4 .125 in id .25 in od	3050-1301
16	Washer, for Repeller M3	3050-0891



5977/5975/5973 Inert Ion source parts (EI)

Extractor EI Source

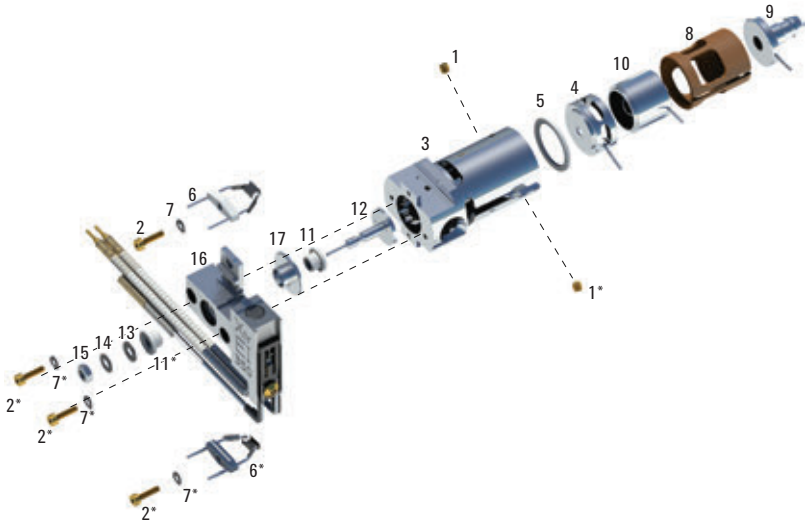
Extractor EI Source

This innovative ion source has an extractor lens in place of the drawout plate used in the other EI sources and it is made of an inert material. It is programmable up to 350 °C to deliver enhanced response for active compounds and late eluters. These features provide maximum, ultratrace level sensitivity for a wide variety of compounds. The extractor lens provides additional focus to the ion beam into the mass analyzer.
A potential is applied to the extractor lens which pulls the ions out of the ionization chamber, adding to the push provided by the repeller voltage. The result is a significant increase in the number of ions analyzed, improving the true sensitivity of the instrument. There are three available aperture sizes for the Extractor EI Source, as well as the two other sources: 3, 6, and 9 mm. Generally, the 3 mm aperture provides the best sensitivity. Selecting one of the larger aperture sizes enables analysis of higher concentrations of target compounds. Increasing aperture diameters also reduces the residence or interaction time and provides higher effective inertness for fragile compounds.

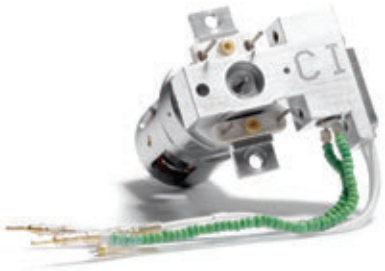
The Extractor EI Source can be operated in the higher sensitivity mode of extraction tuning or in standard mode in which it behaves in the same way as the standard stainless and inert sources. The ability to change between extractor and repeller-only mode is controlled by the software and does not require any physical changes.

5977/7000C Extractor Ion Source Parts

Item	Description	Part No.
1	Set screws	G3870-20446
2	Screws	G3870-20021
3	Extraction source body	G3870-20440
4	Extractor lens	G3870-20444
5	Extractor lens insulator	G3870-20445
6	Filaments, 4-turn	G3170-60053
7	Spring washer	3050-1374
8	Lens insulator	G3870-20530
9	Entrance lens assembly	G3170-20126
10	Ion focus lens	05971-20143
11	Repeller insulator	G1099-20133
12	Inert repeller	G2589-20044
13	Washer, for Repeller M3	3050-0891
14	Washer, SPR BLVL 4 .125 in id .25 in od	3050-1301
15	Nut, 5.5 mm	0535-0071
16	5977 Extraction 350 repeller block assembly	G3870-67171
17	Repeller block insert	G3870-20135



Extractor Ion Source Parts



5977/5975/5973/7000 Ion Source

Chemical Ionization (CI) 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:

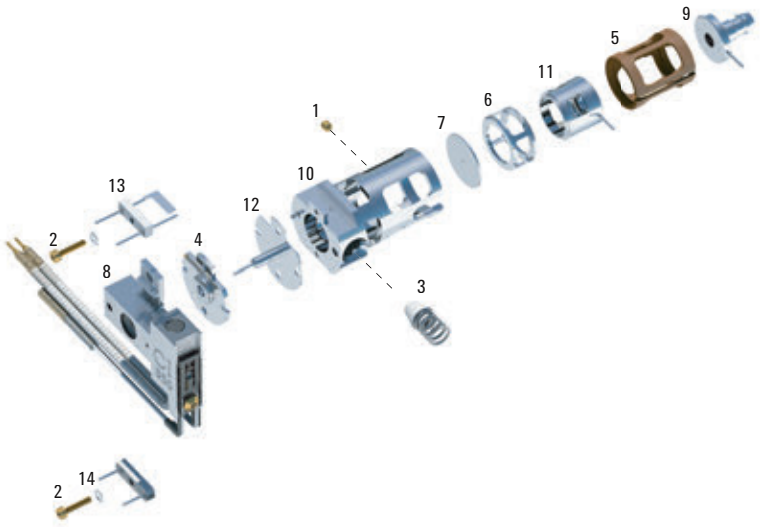
- The CI ion source may not look dirty, but deposits left by chemical ionization are very difficult to remove. Clean the CI ion source thoroughly.
- Use a round wooden toothpick to gently clean out the electron entrance hole in the source body and the ion exit hole in the drawout plate.
- Do not use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

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.

5977/5975/5973/7000 MSD Chemical Ionization Ion Source Parts (CI)

Item	Description	Part No.
1	Set screw for lens stack	G1999-20022
2	Cap screw, gold plated	G1999-20021
3	Interface tip seal/spring	G1999-60412
4	Repeller insulator	G1999-20433
5	Lens insulator	G3170-20540
6	Drawout cylinder	G1999-20444
7	Drawout plate	G1999-20446
8	5977 CI 350 repeller assembly	G3170-60416
9	Entrance lens assembly	G3170-20126
10	Source body	G1999-20430
11	Ion focus lens	G1999-20443
12	Repeller	G1999-20432
13	Filament assembly (CI), 2/pk	G7005-60072
14	Washer, SPR CRVD, 1.6 to 1.8 mm id, 4 mm od, SS	3050-1375



5977/5975/5973/7000 MSD Chemical Ionization (CI) Ion Source Assembly

Installing a Capillary Column in the GC/MSD Interface

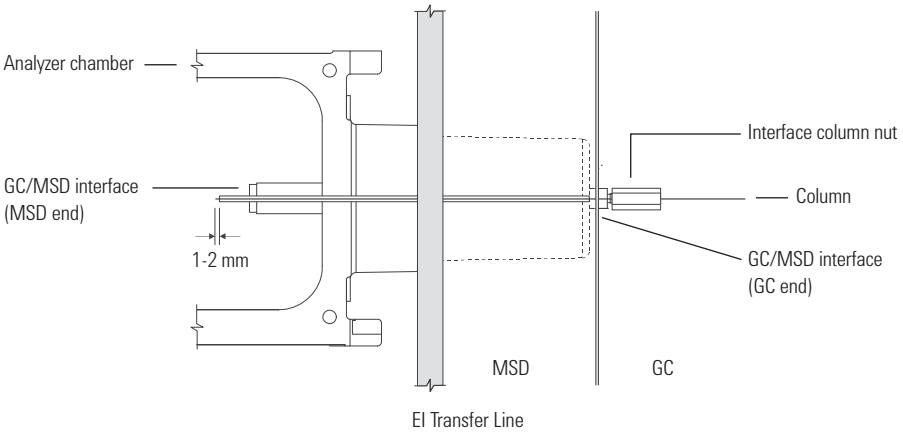
1. Condition the column.
2. Vent the MSD and open the analyzer chamber. Be sure you can see the end of the GC/MSD interface.
3. If the CI interface is installed, remove the spring-loaded tip seal from the MSD end of the interface.
4. Slide an interface nut and conditioned ferrule onto the free end of the GC column. The tapered end of the ferrule must point towards the nut.
5. 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.
   - 5977/5975 – 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.

TIPS & TOOLS

View recommended MS interface connections.

Installing a capillary column in the GC/MSD interface



TIPS & TOOLS

The column installation procedure for 5977 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.

MSD Filaments

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	7200 Series	7000 Series	5977 Series	5975 Series	5975T Series	5973 Series
Filament assembly, high temperature (EI)	G7005-60061	G7005-60061	G7005-60061	G7005-60061	G7005-60061	G7005-60061
Filament assembly (CI), 2/pk	G7005-60072	G7005-60072	G7005-60072	G7005-60072		G7005-60072
Micro ion vacuum gauge	G3170-80001	G3170-80001	G3170-80001	G3170-80001		
Triode gauge tube for measuring vacuum						0960-0897
Ion gauge controller			G3397B	G3397A	G3880-80010	
Ion gauge tube					G3880-80011	

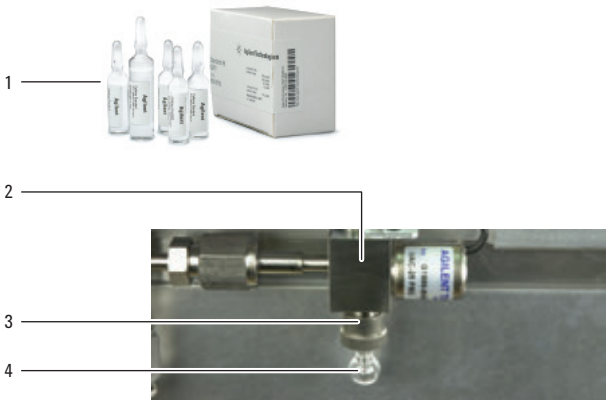
Filament assembly, high temperature (EI), G7005-60061

Filament assembly (CI), G7005-60072

TIPS & TOOLS

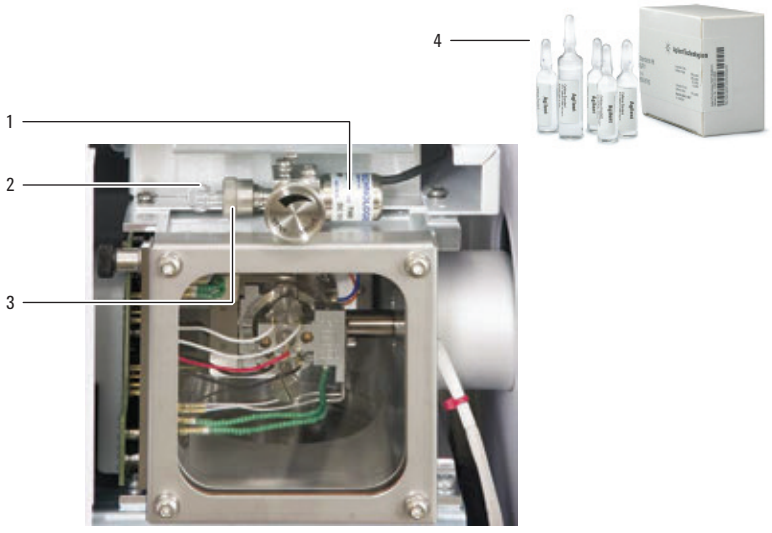
It is very useful to switch from one filament to the other every three months so that when a filament fails, you know the other will fail soon. This will allow you to change both filaments at the same time. Since the GC/MS system is already vented, it's a good idea to replace other supplies in the flowpath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

Vent Valve Supplies



CI Valve Supplies

Item	Description	Unit	Part No.
1	PFDTD calibrant, for GC/MS, perfluoro-5,8-dimethyl-3, 6,9-trioxidodecane	1 mL	8500-8510
2	CI Cal valve assembly		G1999-60452
3	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
4	5975 Calibrant bulb		G3170-80002



Vent Valve Supplies

Item	Description	Unit	Part No.
1	5975 EI CalVal turbo		G3170-60204
2	5975 Calibrant bulb		G3170-80002
3	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
4	PFTBA MS sample kit	0.5 mL	05971-60571

Replacement Agilent Gas Clean carrier gas filter, CP17973

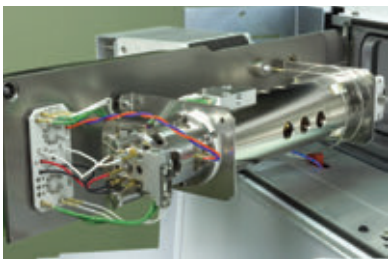
Gas Clean Filters

The Agilent Gas Clean Filter System delivers clean gases, reducing the risk of column damage, sensitivity loss and instrument downtime. Inserting a Gas Clean Filter System in the gas line immediately before the instrument inlet greatly reduces the level of impurities, thus improving trace analysis. Contaminants entering your GC column will also be reduced, which is critical for high temperature analysis and essential for longer column lifetime.

- Deliver clean gases for accurate analyses
- Fast, leak-free filter replacement reduces downtime
- Economical, with immediate payback
- Highly sensitive filter indicators provide maximum instrument protection

Gas Filters

Description	Part No.
Chemical ionization gas purifier	G1999-80410
Gas Clean carrier gas starter kit for 7890	CP17988
Replacement Agilent Gas Clean carrier gas filter	CP17973
Big universal trap, 1/8 in fittings, nitrogen, for 7000 and 7200 Series	RMSN-2

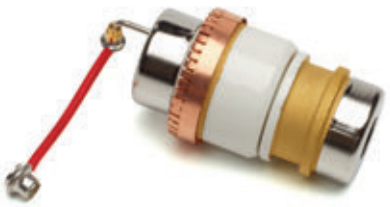


Quadrupole Mass Filter

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



Triple axis electron multiplier, G3170-80103

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 2600 V

MSD Electron Multipliers and Replacement Horn

Description	7000A Series	7000B/C Series	5975 Series	5973 Series	5977 Series
Electron multiplier replacement horn Use with electron multipliers with "straight" horns			05971-80103	05971-80103	
Triple axis detector assembly*	G3170-80100		G3170-80100		G3170-80100
Triple axis electron multiplier	G3170-80103	G3170-80103	G3170-80103		G3170-80103
EM signal wire, low noise detector			G3170-80008		G3170-80008

*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 mTorr. 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 mTorr. • 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 mTorr.	• 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 5977/5975/5973). Therefore, the best time to check the fluid is when the instrument is already vented for other maintenance.

How to Check the Fluid Level

5977/5975/5973 Series

- Use the sight glass to determine the depth of the fluid. The recommended total fluid charge is approximately 37 mL. Two charges are used for the 5977/5975/5973.

5977A Series GC/MSD system

Quiet Cover

Agilent has a solution to the annoying, frequent maintenance of GC/MS rough pumps (visual check of oil levels, oil changes, oil additions, cleanup of oil leaks, etc.), as well as the inherent noise produced by the pumps.

The Quiet Cover GC/MS was designed for easy movement, maintenance, and with rough pumps used with Agilent and other GC/MS systems.

The Quiet Cover GC/MS is compatible with rough pump models used in many laboratories, including the Agilent DS42, Agilent DS42i, Pfeiffer Duo 2.5, and Edwards E2M1.5. This quiet cover model is compatible with Agilent 5977 GC/MS, 5975 GC/MS and 5973 GC/MS systems.

Quiet Cover GC/MS

Quiet Cover GC/MS, with open-access cover

Quiet Cover

Quiet Cover GC/MS	G6014A

The G6012A Quiet Cover DS is used with the 7200 GC-QTOF and requires an extra filter extension and seal.

Quiet Cover DS

Quiet Cover DS	G6012A
Filter extender tube, NW 25 x 100 mm*	5188-1181
Clamping ring, NW 20/25, stainless steel*	0100-0549
Co-seal, NW 20/25, filter extender tube*	0100-1597

*Parts required for use with Quiet Cover DS and a 7200 GC-QTOF

Quiet Cover DS, G6012A

Foreline Pump

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.

Pump Oils

Description	Part No.
Foreline pump (rotary pump) oil, Inland 45, 1 L	6040-0834
Diffusion pump fluid, 18.5 mL	6040-0809*
Oil mist exhaust filter	G1099-80039
Inland 45 pump oil, 1 gallon	6040-0798
Foreline (roughing) pump oil, 1 L	8829951700
Oil for vacuum pumps, 1 L, petroleum-based, used on 7000 Series	6040-1361
Oil, Edwards Ultragrade for RV3 and RV5 pumps	G6600-85002

*2 required for 5977, 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. Reinstall the drain plug and pour pump oil into the fill hole.
6. Reinstall the fill cap.
7. Reconnect the MSD power cord.
8. Start up and pump down the MSD according to the Instrument Manual procedure.

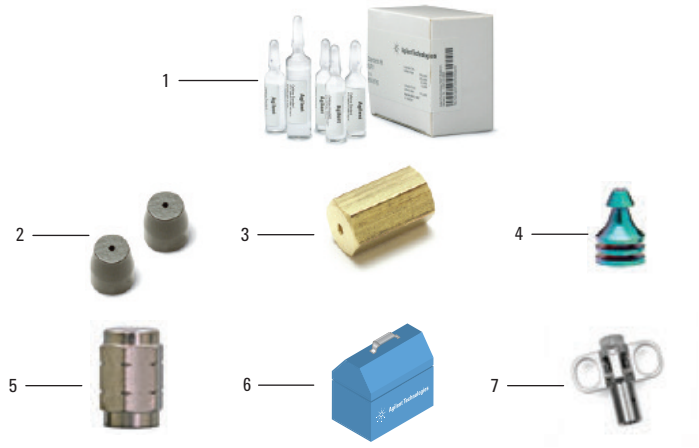
7000 Triple Quadrupole GC/MS

Precision, reliability and the lowest detection limits

The 7000C Triple Quadrupole GC/MS was designed to deliver accurate quantitative results and confident identification even in the most complex matrixes. Coupled with the 7890B GC, the 7000C MS works in perfect harmony to enhance productivity, save resources and alert you when maintenance is pending. Agilent MassHunter software has enhanced MRM optimization tools, giving you complete control from tune to report generation while streamlining your workflow.

- Second-generation extractor ion source: the high sensitivity EI extractor ion source with improved thermal characteristics delivers confident trace analysis even in complex matrixes. We demonstrate the instruments' detection limit of ≤4 fg octafluoronaphthalene at installation.
- Hyperbolic quadrupoles enhance performance up to 1050 u. The stability of the proprietary Gold Quadrupole allows the analyzer to be heated to 200 °C, to eliminate contamination commonly seen with metal quadrupoles operated at lower temperatures.
- The triple-axis HED-EM detector reduces neutral noise by the doubly off-axis position of the HED-EM.
- The MRM optimization tool allows for automated, efficient method development, yet is easily customizable.
- Capillary Flow Technology (CFT) adds functionality to the GC with backflush, Dean switching, or splitters for multiple detectors. CFT also enables reliable, leak-free in-oven connections.
- The programmable helium conservation module reduces helium consumption for GC and GC/MS systems by changing an alternate carrier during system stand-by. You program carrier gas changeover and flows during sleep and wake states. Programmable helium conservation eliminates the revalidation of methods required when converting to other carrier gases.
- The Pesticides and Environmental Pollutants Database provides comprehensive information to help you with simple yet flexible MS/MS method development.
- Retention Time Locking software reproduces retention times from one Agilent GC to another to help transfer methods anywhere, worldwide.
- Early maintenance feedback (EMF) monitors GC and MS resources, with injection counter, operation times, and electronic logs to help you plan maintenance more efficiently.

7000C Triple Quadrupole GC/MS

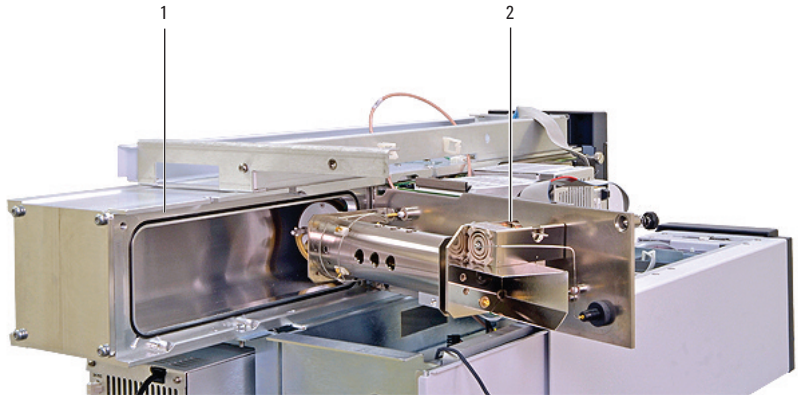


7000 Triple Quad GC/MS Interface Parts and Standards

Item	Description	Unit	Part No.
1	OFN, 100 fg/µL	3 x 1 mL ampoules	5188-5347
	OFN, 10 fg/µL	3 x 1 mL ampoules	5190-0585
	OFN, 1 pg/µL	3 x 1 mL ampoules	5188-5348
	Benzophenone, 100 pg/µL	5 ampoules	8500-5440
	PFHT-high mass checkout sample, 10 µg/mL PFHT (Tris(perfluoro- heptyl)-s-triazine) in Hexane	3 x 1 mL ampoules	5188-5357
2	Capillary column long ferrule	10/pk	5181-3308
	250 µm Polyimide/graphite ferrule	10/pk	5181-3323
	0.5 mm Polyimide/graphite ferrule	10/pk	5062-3506
	0.3 mm, 100 µm Polyimide ferrule	10/pk	5062-3507
3	MS interface column nut, female		05988-20066
4	UltiMetal Plus Flexible Metal ferrule with 0.4 mm id	10/pk	G3188-27501
	UltiMetal Plus Flexible Metal ferrule with 0.5 mm id	10/pk	G3188-27502
	UltiMetal Plus Flexible Metal ferrule with 0.8 mm id	10/pk	G3188-27503
	UltiMetal Plus Flexible Metal ferrule with no hole	10/pk	G3188-27504
5	Swaging nut, for MS interface with Flexible Metal ferrules		G2855-20555
6	MS interface column installation tool		G1099-20030
	Ferrule pre-swaging tool		G2855-60200
	Open end wrench, 1/4 and 5/16 in		8710-0510
	Nylon gloves, lint-free, large	1 pair	8650-0030
7	Self Tightening column nut, for MS interface		5190-5233

TIPS & TOOLS

View MS interface connection options including the recommended Self Tightening column nut.



7000 Triple Quad Rear Analyzer Chamber

Item	Description	Unit	Part No.
1	High vacuum grease	25 g	6040-0289
2	Electron multiplier horn		G7000-80103
	Low noise EM horn		G3170-80103

7000A Triple Quadrupole GC/MS

7000 Triple Quadrupole GC/MS Parts and Supplies

Engineered from the ground up for ease-of-use and routine high performance operation, the 7000 Triple Quadrupole 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.

Low noise EM horn, G3170-80103

Cotton swabs, 5080-5400

Maintenance Supplies

Description	Part No.
Abrasive sheets	5061-5896
Alumina powder, abrasive, 100 g	393706201
Cloths, lint-free	05980-60051
Lint-free industrial wipes, 100% cotton	9310-4828
Swabs for cleaning GC/MS	5080-5400
Nylon gloves, lint-free, large	8650-0030
Nylon gloves, lint-free, small	8650-0029
High vacuum grease, 25 g	6040-0289
Low noise EM horn	G3170-80103
Filament assembly, high temperature (EI)	G7005-60061
Filament assembly (CI), 2/pk	G7005-60072
Manifold vacuum gauge	G1960-80303
Replacement glass bulb for PFTBA and PFDTD test sample	G3170-80002

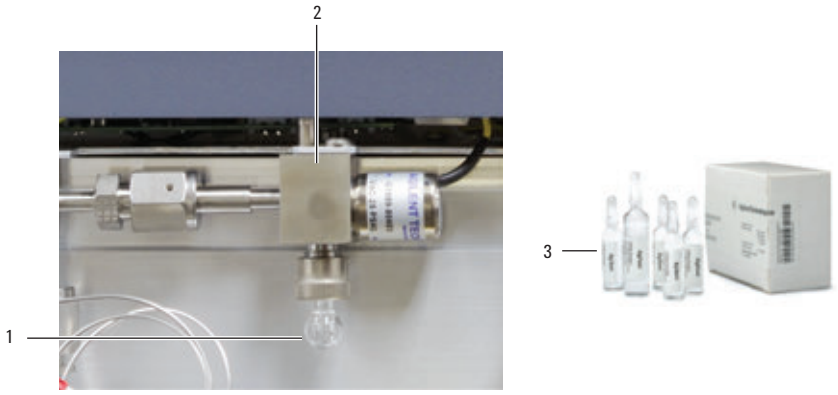
7200 Q-TOF for GC/MS

Detection and selectivity of targets and unknowns with complete confidence

7200 Q-TOF for GC/MS

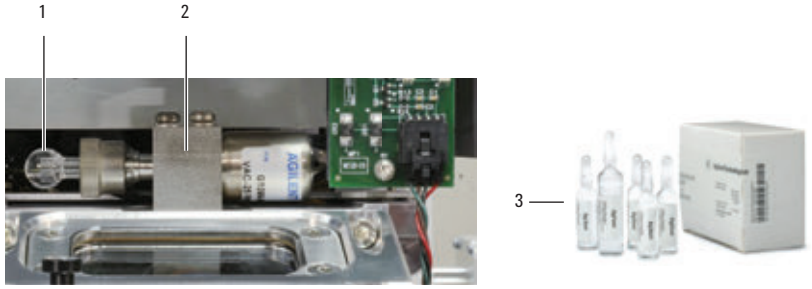
Complex matrix analyses demand your best qualitative GC data. That's why we designed the Agilent 7200 Q-TOF for GC/MS, a Q-TOF purpose built specifically for gas chromatography. The 7200 Q-TOF redraws the boundaries of GC/MS technology by combining the separation power of Agilent's 7890 Series GC with application-tested MS components from our 7000 Triple Quadrupole GC/MS and 6500 LC/Q-TOF systems. You get robust GC/MS operation, outstanding selectivity, full-spectrum acquisition with high sensitivity, fast data rates, and accurate mass information to simplify molecular characterization and structural confirmation.

- Highly accurate mass assignments: low-ppm mass accuracy – combined with 15x to 50x greater resolution than a single quadrupole MS – gives you the power to analyze target, non-target, and unknown compounds with much greater reliability. In addition, the 7200 GC/Q-TOF uses dual gain amplifiers with dual analog-to-digital (ADC) detection to record multiple events over a wide mass range and concentration range.
- High sampling rate (32 Gbit/s): the 4 GHz ADC electronics improve resolution, mass accuracy, and sensitivity for low-abundance samples.
- 24/7 mass accuracy: our proprietary invar flight tube, sealed in a vacuum-insulated shell, stabilizes mass calibration against thermal change.
- Fast, high-quality MS/MS spectra: ions are accelerated in Agilent's hexapole collision cell.
- Fast routine maintenance: the removable ion source permits rapid changing of the entire ion source, lens, and filaments, without venting the high vacuum mass analyzer.
- Low detection limits and excellent linearity: a full spectrum with sensitivity better than quadrupole MS lets you capture accurate mass spectra at low pg on-column for most compounds. The dual-gain mode expands this range to 105.
- Unparalleled MS/MS selectivity: the detection selectivity of high-resolution MS/MS dramatically surpasses other MS/MS analyzers. Moreover, accurate mass product-ion spectra help confirm targets and non-targets, as well as elucidate unknown compounds.
- Agilent MassHunter software provides valuable tools for identification, quantitation, and confirmation: you can find compounds in complex samples by applying deconvolution optimized for EI or CI data, simplify compound identification by combining library search results and calculated formulas for molecular and fragment ions, and perform multivariate statistical analysis on several data files using Mass Profiler Professional – a mass spectrometry-centric program.



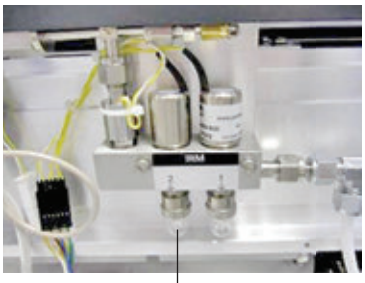
7200A Q-TOF CI Calibration Valves

Item	Description	Unit	Part No.
1	Replacement glass vial for PFTBA and PFDTD test sample		05980-20018
	PFDTD calibrant, for GC/MS, perfluoro-5,8-dimethyl-3, 6,9-trioxidodecane	1 mL	8500-8510
	5975 Calibrant bulb		G3170-80002
2	CI Cal valve assembly		G1999-60452
	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
3	PFDTD calibrant, for GC/MS, perfluoro-5,8-dimethyl-3, 6,9-trioxidodecane	1 mL	8500-8510



7200A Q-TOF EI Calibration Vials

Item	Description	Unit	Part No.
1	5975 Calibrant bulb		G3170-80002
2	Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
3	PFTBA MS Sample Kit	0.5 mL	05971-60571



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7200A Q-TOF IRM Vials

Item	Description	Unit	Part No.
1	Replacement glass vial for PFTBA and PFDTD test sample		05980-20018
	5975 Calibrant bulb		G3170-80002
	IRM calibrant for GC/TOF	1 x 0.5 mL	5190-0531
2	PFTBA sample, certified	10 g	8500-0656

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

TIPS & TOOLS

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

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
GC/MS Standards	
Evaluation standard (Internal EI & CI) 2 pg/µL OFN, 5 pg/µL benzophenone	393112601
Test standard for external EI (5 pg/µL OFN)	393112702
Benzophenone CI sensitivity standard 50 pg/µL	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
Quiet Cover GC/MS	G6014A
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	
Benzophenone CI sensitivity standard 50 pg/µL	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
Solvents plus checkout mix for 3 in 1 environmental analyzer	G3440-05012
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, 5 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 2A, 1 x 1 mL	5190-0492
Residual solvent revised method 467, class 2B low	5190-0513
Residual solvent revised method 467, class 2B, 1 x 1 mL	5190-0491
Residual solvent revised method 467, class 2C, 1 x 1 mL	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
Glycerol calibration standards kit, 5 x 1 mL	G3440-85028
Standard glycerides stock solution in THF, 1 x 2 mL	G3440-85018
FAME retention time standard in toluene, 5 x 2 mL	G3440-85027
Methyl nonadeconate in toluene, 5 x 10 mL	G3440-85026
Solvents-plus checkout mix, 3 x 2 mL	G3440-85012
Transformer Oil Gas Analyzer checkout mix, 17 L SCOTTY cylinder	G3440-85007
PAH Analyzer checkout standard, 5 x 2 mL	G3440-85009
C6 to C12 normal hydrocarbon mix, 3 x 2 mL	G3440-85013
Natural gas analyzer checkout mix, 14 L SCOTTY cylinder	G3440-85017
Methylheptadecanoate-d33 in dodecane, 3 x 2 mL	G3440-85029
Ethanol calibration kit for blood alcohol analyzer	G3440-85035
Multicomponent alcohol kit for blood alcohol analyzer	G3440-85036

MS Test and Performance Samples

	Description	Part No.	5977/ 5975 Series	5973 Series	5972 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			✓			
	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 Syringes

With a broad selection of syringes for manual and auto injectors, Agilent has what you need for accurate and effective sampling.

Whether you need an autosampler or manual syringe, there are two keys to choosing the right syringe – identifying your sample type and establishing the smallest volume to be dispensed or injected. Agilent offers two varieties of syringes.

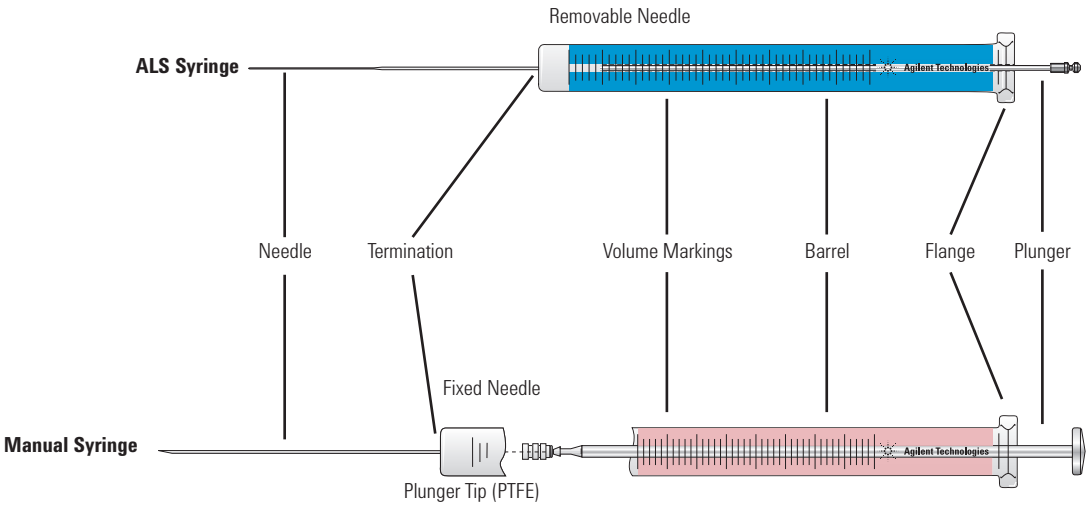
PTFE-Tipped Syringes for Gases and Liquids

PTFE-tipped syringes have a precision-machined plunger tip that forms a tight seal and enables the tip to wipe the barrel's interior free of sample during operation. This feature is particularly useful for viscous or heterogeneous samples, because it reduces deposits that can cause the plunger to freeze. Replacement plunger assemblies are available for most PTFE-tipped syringes.

Fitted Plunger Syringes for Liquids

Fitted plunger syringes feature a stainless steel plunger that is meticulously hand-fitted to its matching glass barrel, creating a liquid-tight seal. These syringes are ideal for homogenous samples that are not prone to precipitation or bonding with glass. **Note:** plungers cannot be interchanged or replaced if damaged.

Syringe Features



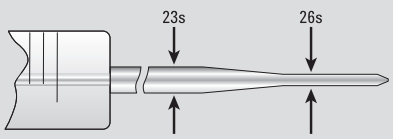
Reference drawing (not to scale)

Needle Gauge

Needle gauge is the thickness of the needle. The gauge depends on the injector. When selecting a needle gauge, it is important to keep in mind the volume of the syringe and the dead volume of the needle. Refer to the chart below to choose a needle gauge with an appropriate dimension before selecting a needle.

Typical Needle Gauge Dimensions

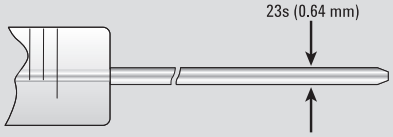
	OD		ID	
Gauge	**mm**	**in**	**mm**	**in**
22	0.71	0.028	0.41	0.016
23s	0.635	0.025	0.11	0.0045
25	0.50	0.020	0.20	0.008
26s	0.47	0.0184	0.11	0.0045



Tapered Dual Gauge 23-26 or 23s-26s (0.64-0.47 mm)

Durability of a 23-gauge

Versatility of a 26-gauge for split/splitless and on-column injection

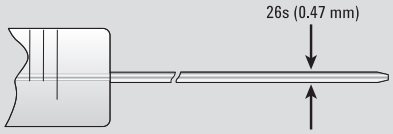


Single Gauge 23 or 23s (0.64 mm)

Merlin Microseal septa

Packed column injector ports

Split/splitless injector ports



Single Gauge 26 or 26s (0.47 mm)

Packed column injector ports

Split/splitless injector ports

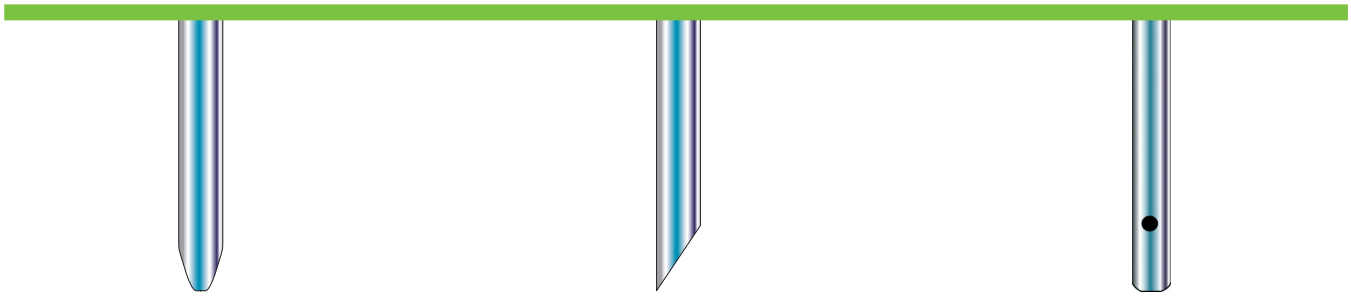
Note: Needles with an 'S' following the gauge are more durable, with a thicker needle wall and smaller id bore.

Needle Termination

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

- **Fixed (cemented)** – Economical, reproducible injections for autosamplers
- **Removable needle** – One syringe fixed – many methods, simplicity of fixed needle, but needle can be replaced if damaged or clogged
- **Luer tip** – Easy, fast needle replacement, syringe filter or pump priming, Luer tip is ground glass suitable for mounting chromatographic or PTFE needles, syringes can be autoclaved (without plunger or needle)
- **Luer Lok** – Security of a locked needle, syringe filter or pump priming, PTFE, male Luer taper with nickel-plated brass locking hub for use with KEL-F or metal hub needles and universal connectors

Needle Tip Design



HP Tip (also referred to as Cone or Point Style AS)

Proprietary design required for Agilent autosamplers for optimal performance and reliability by reducing septum coring.

Bevel Tip (Point Style 2, BV)

General purpose; excellent choice for transferring liquids from ampoules or vials. For manual GC injections, a beveled tip is preferred for optimum septum penetration and to prevent septum coring.

Side Hole (Point Style 5)

Recommended for thin gauged septa or large volume injections.

Blue line autosampler syringe shown in 7693A ALS, G4513-80204

Autosampler Syringes

Premium autosampler syringes optimize system productivity and ensure precise sample handling

Agilent Blue Line Autosampler Syringes for 7693A ALS

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. Backed by over 40 years of chromatography experience, these meticulously crafted syringes offer:

- Wider range of volumes including exclusive 250 and 500 µL syringes for sample enhancement with the new 7693A
- Precise match with your autosampler's stroking mechanism, resulting in more accurate volume delivered
- Smooth needle that reduces septum coring and keeps your system working at its full potential
- Choice of PTFE-tipped or metal fitted plunger to meet application needs
- Easy-open, environmentally friendly packaging
- Certified compliance with strict Agilent specifications

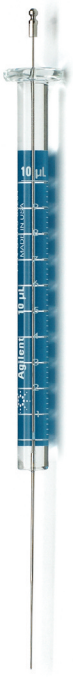
Blue Line Autosampler Syringes with Fitted Plungers

Fitted plunger syringes are recommended for homogeneous liquid samples. Each fitted syringe is individually matched with the plunger for precision injection. Plungers are not interchangeable or replaceable.

Blue line autosampler syringe, G4513-80205

Blue Line Autosampler Syringes with Fitted Plungers

Volume (µL)	Description	Unit	Needle Gauge/ Length (mm)/Tip	Part No.
0.5	Plunger in needle		23/42/cone tipped	G4513-80229
	Replacement needle/plunger			G4513-80240
1	Plunger in needle		23/42/cone tipped	G4513-80215
	Replacement needle/plunger			G4513-80239
5	Straight, fixed		23/42/HP	G4513-80213
	Straight, fixed	6/pk	23/42/HP	G4513-80205
	Straight, fixed		26s/42/HP	G4513-80226
	Straight, fixed	6/pk	26s/42/HP	G4513-80212
	Tapered, fixed		23-26s/42/HP	G4513-80206
	Tapered, fixed	6/pk	23-26s/42/HP	G4513-80201
	Straight, removable		23/42/HP	G4513-80234
	Replacement needle	3/pk	23/42/HP	G4513-80236
	Tapered, removable		23-26s/42/HP	G4513-80224
	Replacement needle	3/pk	23-26/42/HP	G4513-80225
10	Straight, fixed		23/42/HP	G4513-80209
	Straight, fixed	6/pk	23/42/HP	G4513-80202
	Straight, fixed		26s/42/HP	G4513-80216
	Straight, fixed	6/pk	26s/42/HP	G4513-80211
	Tapered, fixed	1/ea	23-26s/42/HP	G4513-80204
	Tapered, fixed	6/pk	23-26s/42/HP	G4513-80200
	Straight, removable		23/42/HP	G4513-80235
	Replacement needle	3/pk	23/42/HP	G4513-80236
	Removable		23-26s/42/HP	G4513-80218
	Replacement needle	3/pk	23-26/42/HP	G4513-80225
25	Tapered, fixed		23-26/42/HP	G4513-80242
50	Tapered, fixed	1/ea	23-26/42/HP	G4513-80244
100	Tapered, fixed	1/ea	23-26/42/HP	G4513-80243



Blue line autosampler syringe, G4513-80204

Blue Line Autosampler Syringes with PTFE-Tipped Plungers

Suitable for gas and liquid samples, the PTFE tip of the plunger creates a tight seal between the plunger and glass, helping to reduce carry-over and increase syringe lifetime. Replacement plungers are available.

Needles, replacement, G4513-80236

Blue Line Autosampler Syringes with PTFE-Tipped Plungers

Volume (µL)	Description	Unit	Needle Gauge/ Length (mm)/Tip	Part No.
10	Straight, fixed		23/42/HP	G4513-80220
	Straight, fixed	6/pk	23/42/HP	G4513-80210
	Tapered, fixed		23-26/42/HP	G4513-80203*
	Replacement plunger for fixed needle			G4513-80227
	Tapered, fixed	6/pk	23-26s/42/HP	G4513-80208
	Straight, removable		23/42/HP	G4513-80219
	Replacement needle	3/pk	23/42/HP	G4513-80236
	Tapered, removable		23-26/42/HP	G4513-80233
	Replacement needle	3/pk	23-26/42/HP	G4513-80225
25	Straight, fixed		23/42/HP	G4513-80228
	Tapered, fixed		23-26/42/HP	G4513-80241
50	Straight, fixed		23/42/HP	G4513-80221
	Tapered, fixed		23-26/42/HP	G4513-80223
100	Tapered, fixed		23-26s/42/HP	G4513-80222

*Included in 7693A shipments

Blue line autosampler syringe, G4513-60560

Advanced Sample Enhancement Autosampler Syringes with PTFE-Tipped Plungers

Used with the 7693A optional Enhanced Sample Handling Syringe Carriage, these syringes can eliminate analyst-to-analyst variability and reduce re-work in sample preparation, such as dilution and internal standard addition.

Advanced Sample Enhancement Autosampler Syringes with PTFE-Tipped Plungers

Volume (µL)	Description	Needle Gauge/ Length (mm)/Tip	Part No.
250	Fixed, advanced sample enhancement	23/42/HP	G4513-60560
500	Fixed, advanced sample enhancement	23/42/HP	G4513-60561

Gold Standard Autosampler Syringes

Use one needle and get the benefits of two. The upper portion of the tapered needle offers the strength of a 23-gauge needle, while the lower portion at 26s-gauge allows use with split/splitless or on-column injections with 0.53 mm id columns. All standard plungers are stainless steel.

Tapered Needle, 23-26s Gauge Autosampler Syringes

Volume (µL)	Description	Unit	Needle Gauge/ Length (mm)/ Tip	Part No.
5	Tapered, fixed		23-26s/42/HP	5181-1273
	Tapered, fixed	6/pk	23-26s/42/HP	5181-8810
	Tapered, removable		23-26s/42/HP	5182-0835
	Replacement needle for 5 µL syringe	3/pk		5182-0832
10	Tapered, fixed		23-26s/42/HP	5181-1267
	Tapered, fixed	6/pk	23-26s/42/HP	5181-3360
	Tapered, removable		23-26s/42/HP	5181-3321
	Replacement needle for 10 µL syringe	3/pk		5181-3319
	Tapered, fixed, PTFE-tipped plunger		23-26s/42/HP	5181-3354
	Tapered, fixed, PTFE-tipped plunger	6/pk	23-26s/42/HP	5181-3361
	Replacement plunger with PTFE tip for fixed needle 10 µL syringe			5181-3365
	Tapered, removable		23-26s/42/HP	5181-3356
	Replacement plunger with PTFE tip for removable needle 10 µL syringe			5181-3358
50	Tapered, fixed, PTFE-tipped plunger		23-26s/42/HP	5183-0314
100	Tapered, fixed, PTFE-tipped plunger		23-26s/42/HP	5183-2042

Autosampler Syringes

Straight Needle, 23 and 26s Gauge Autosampler Syringes

Volume (µL)	Description	Unit	Needle Gauge/ Length (mm)/Tip	Part No.
1	Cone-tipped		23/42/HP	5188-5246
1	Replacement needle/plunger for 1.0 µL syringe		23/42/HP	5188-5370
0.5	Replacement needle/plunger for 0.5 µL syringe	1/ea	23-26/42/HP	5190-3193
2	Cone-tipped		23/42/HP	5188-5247
	Replacement needle/plunger for 2.0 µL syringe		23/42/HP	5188-5371
5	Straight, fixed		26s/42/HP	9301-0891
	Straight, fixed	6/pk	26s/42/HP	5183-4728
	Straight, fixed		23/42/HP	9301-0892
	Straight, fixed	6/pk	23/42/HP	5182-0875
	Straight, removable		23/42/HP	5182-0834
	Replacement needle for 5 µL syringe	3/pk		5182-0830
10	Straight, fixed		26s/42/HP	9301-0714
	Straight, fixed	6/pk	26s/42/HP	5183-4729
	Straight, fixed		23/42/HP	9301-0713
	Straight, fixed	6/pk	23/42/HP	9301-0725
	Straight, fixed, PTFE-tipped plunger		23/42/HP	5181-8809
	Straight, fixed, PTFE-tipped plunger	6/pk	23/42/HP	5183-4730
	Replacement plunger for 10 µL fixed needle syringe			5181-8808
	Straight, removable		23/42/HP	5181-8806
	Straight, removable, PTFE-tipped plunger		23/42/HP	5181-8813
	Replacement needle for 10 µL syringe	3/pk		5181-8811
	Replacement plunger with PTFE tip for removable needle 10 µL syringe			5181-3358
25	Straight, fixed, PTFE-tipped plunger		23/42/HP	5183-0316
50	Straight, fixed, PTFE-tipped plunger		23/42/HP	5183-0318
100	Straight, fixed, PTFE-tipped plunger		23/42/HP	5183-2058

7673/7683 On-Column Autosampler Syringes

Agilent 7673/7683 on-column syringes with needle diameter for columns ranging from 0.25 mm to 0.53 mm are specifically designed for the 7673/7683 Autosampler.

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

HP 7670/71/72 Autosampler Syringes

This syringe has a long needle and regular plunger button for compatibility with HP 7670/71/72 autosamplers. Available with a fixed or removable needle.

HP 7670/71/72 Autosampler Syringes

Volume (µL)	Description	Needle	Part No.
1	Straight, removable	23/56/2	5182-9622
10	Straight, fixed	23/50/HP	5182-9734
	Straight, removable	23/50/HP	5182-9626
	Straight, fixed, PTFE-tipped plunger	23/50/HP	5182-9799

Autosampler syringe, 10 µL, straight, RN, 5182-9626

Agilent CrossLab

Supplies for major brand GC Systems

Agilent CrossLab is a growing portfolio of supplies critical to instrument performance and productivity. CrossLab GC supplies are designed and manufactured to perform seamlessly with a variety of other major brands of GCs in your lab.

We currently support:

- Bruker/Varian
- CTC
- PerkinElmer
- Shimadzu
- Thermo Scientific

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

Agilent CrossLab is more than supplies:

- Over 40 years of chromatography expertise and ongoing innovation
- Technical and application support
- Optimal performance for both routine and challenging applications
- Dependable worldwide product availability and delivery
- Convenience of consolidated purchasing
- 90-day risk-free money-back guarantee

Agilent CrossLab works with BRUKER/VARIAN | CTC | PERKINELMER | SHIMADZU | THERMO | 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.

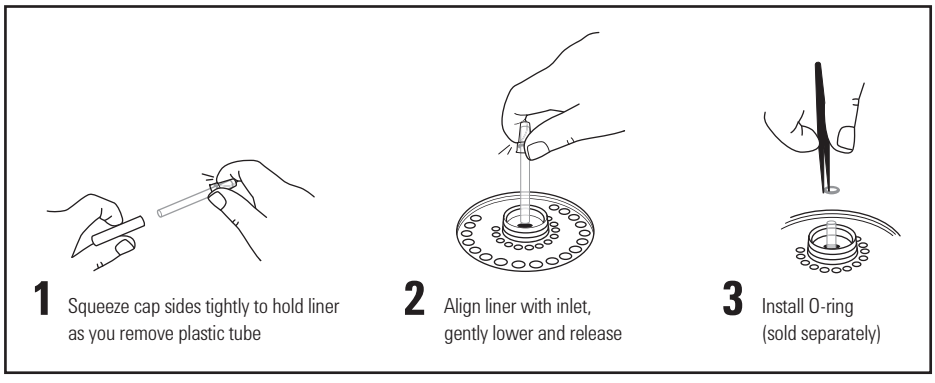
Choose from split, splitless, PTV, and other inlet liner designs in either the new, innovative Ultra Inert deactivation or Agilent's popular proprietary deactivation, now referred to as Agilent Original deactivation. With part number and lot number silk screened on CrossLab liners, identification and 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.



Agilent 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

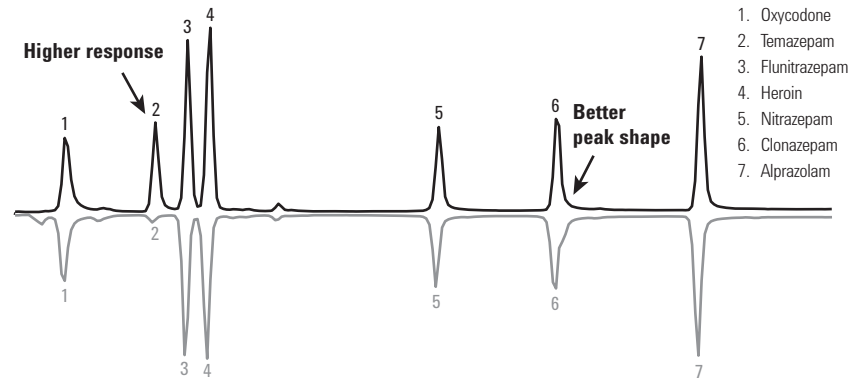
✓ Active analyte response loss or decomposition

For Forensic Use

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 at 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 at 300 °C, Quad temp at 150 °C, Transfer line at 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% polyimide, and polyimide/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 (polyimide and polyimide/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
Polyimide/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
Polyimide (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% Polyimide ferrules should only be used for isothermal applications.

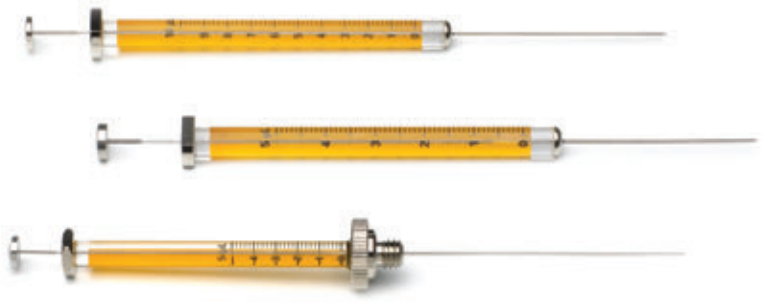
Agilent CrossLab Autosampler Syringes

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:

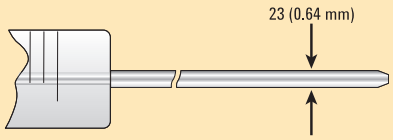
- Lot number printed directly on the barrel with a corresponding Certificate of Conformance
- Illuminating backing strip, for effortless viewing of the volume scale
- Environmentally friendly packaging and improved design that reduces waste
- Individually packaged for contaminant-free use right out of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

Typical Needle Gauge Dimensions

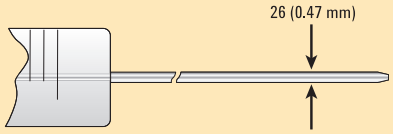
	OD		ID	
Gauge	**mm**	**in**	**mm**	**in**
23	0.64	0.0248	0.11	0.0043
25	0.50	0.0197	0.20	0.0079
26	0.47	0.0184	0.11	0.0043



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:

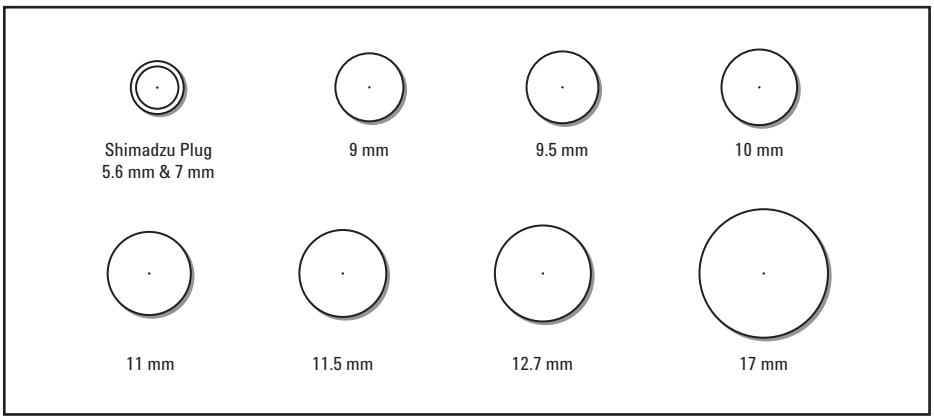
- Use within the recommended temperature range
- Change regularly
- Use septum purge when available
- Use autoinjectors
- Regularly inspect needle tips for wear

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 systems, now Bruker products

Septa Diameters



Premium Non-Stick Septa

Agilent 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

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
- Blister packaging for cleanliness and convenience

Advanced green septa, 8010-0207, 8010-0208

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

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 systems, now Bruker products**

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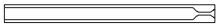
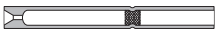
Agilent CrossLab Supplies for Bruker, Varian* GC Systems

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

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

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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 liner 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

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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% Polyimide/40% Graphite Capillary Column Ferrules							
1177, 1079	1/16	0.3	0.18 or smaller	1	10/pk	CR213103	8004-0211
	1/16	0.425	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
Polyimide 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

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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% Polyimide/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

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	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	8004-0007

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

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

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

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

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. 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

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

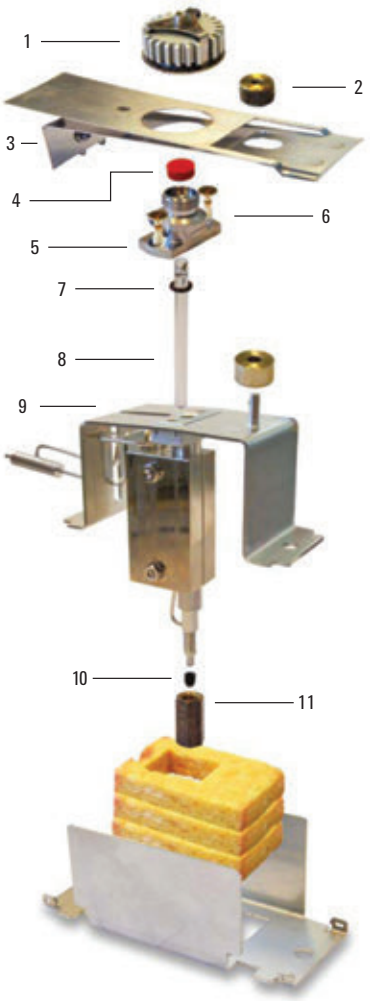
The cross references to the original equipment manufacturer (OEM) part numbers listed here serve as a recommendation that the Agilent CrossLab products are viable alternatives to OEM products. CrossLab products are compatible with the corresponding OEM instruments, although in some cases, the CrossLab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

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

Injector Replacement Parts and Supplies

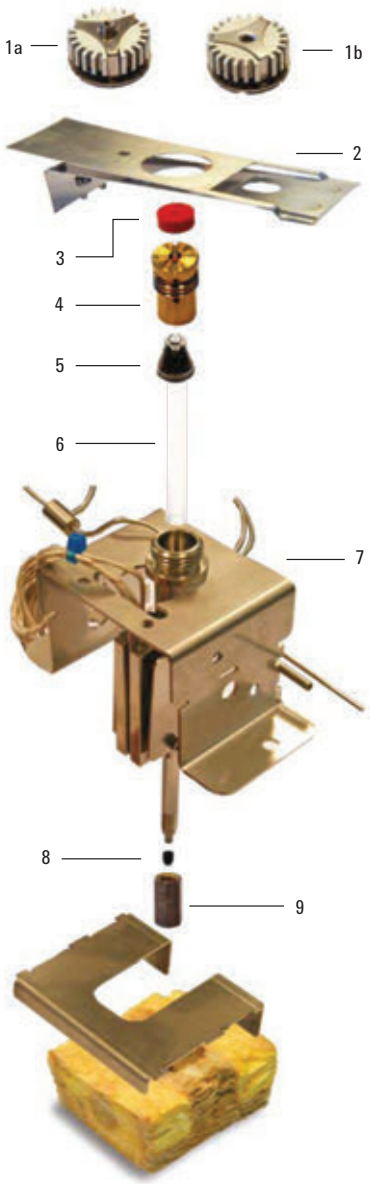
1177 Split/Splitless Injector

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 209**.	
11	Bottom nut	8004-0311



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

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 209**.	
9	Bottom nut	8004-0311

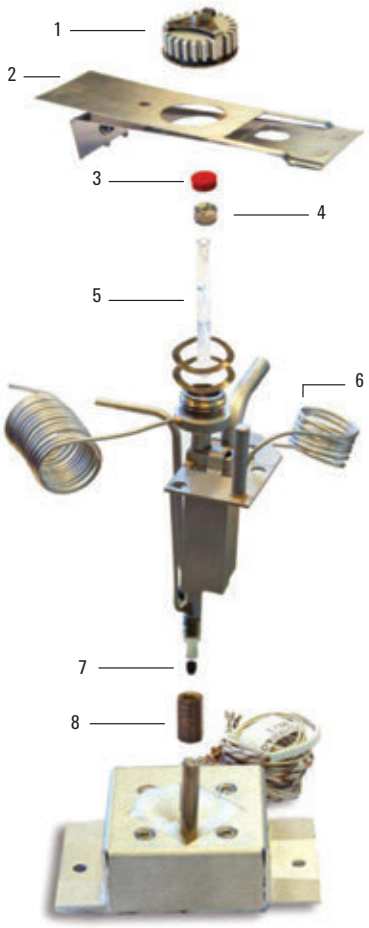
***Formerly Varian systems, now Bruker products**

Agilent CrossLab Supplies for Bruker, Varian* GC Systems

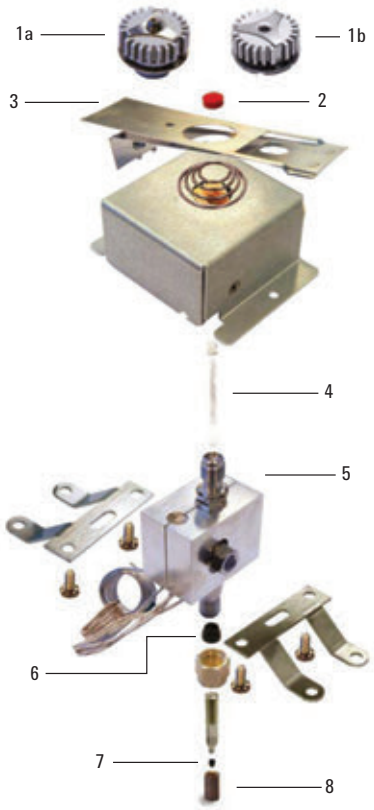
1093 Cool On-Column (COC) Injector

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/polyimide ferrule	8004-0217
	Graphite ferrule	8010-0305
8	Bottom nut	
	Brass	8004-0311
	Stainless steel	8004-0312

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



Agilent CrossLab Supplies for Bruker, Varian* GC Systems



1061 Packed/530 µm Capillary Column Injector

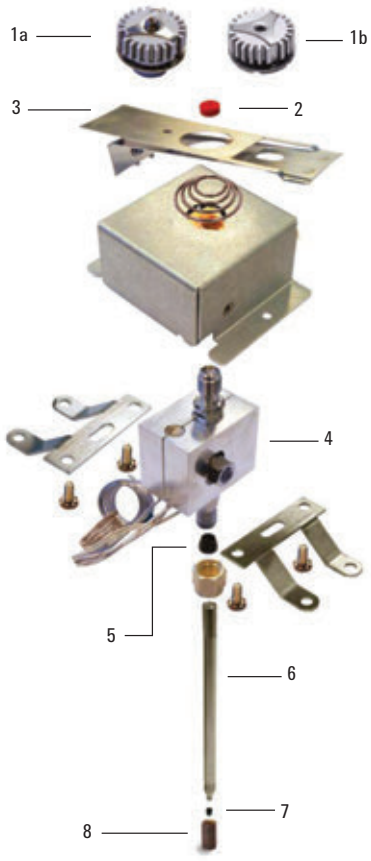
Item	Description	Agilent CrossLab and Agilent Part No.
1a	Injector nut	390812700
1b	Injector nut	392595501
	Injector nut wrench	390842300
2	Septum, 9.5 mm	
	BTO	8010-0219
	Advanced Green	8010-0203
	Septum pick	7200008400
3	Automatic start switch	390820601
4	Glass liner	8004-0168
5	Injector body, EFC23	392548301
6	Graphite/polyimide ferrule	8004-0217
	Graphite ferrule	8010-0305
7	For replacement ferrules, see complete CrossLab column ferrules ordering information, **see page 209**.	
8	Bottom nut	8004-0311

***Formerly Varian 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/polyimide 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 209**.	
8	Bottom nut	8004-0311



***Formerly Varian 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 makeup gas	392585291
Adapter TCD/DEFC reference gas kit	392585292
Adapter TCD capillary makeup gas, 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 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 systems, now Bruker products**

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 systems, now Bruker products**

Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Liners for AutoSystem, AutoSystem XL, Clarus Systems

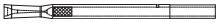
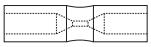
	Description	ID (mm)	OD (mm)	Length (mm)	Volume (µL)	Unit	Similar to OEM Part No.	Agilent Ultra Inert Deactivation	Similar to OEM Part No.	Agilent Original Deactivation
Split/Splitless Liners										
	PSS straight	2.0	4.0	86.2		5/pk	N6502002	8003-0153		8003-0103
	PSS straight with bottom restriction	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
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 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. 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

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

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% Polyimide/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
Polyimide 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

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

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% Polyimide/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
Polyimide 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

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Parts and Supplies for PerkinElmer GC Systems

Autosampler Syringes for PerkinElmer GC Systems

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		

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

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

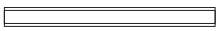
General Purpose Septa

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

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

Agilent CrossLab Supplies for Shimadzu GC Systems

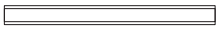
Liners for 2014 Systems

	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 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. 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	8001-0154		8001-0104
Splitless Liners										
	Single taper, wool	3.5	5.0	95		5/pk	221-48335-01 221-48876-02	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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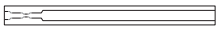
Agilent CrossLab Supplies for Shimadzu GC Systems

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	221-48335-01 221-48876-02	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 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. 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 liner O-rings, 8001-0202

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% Polyimide/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% Polyimide/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	1	10/pk	221-46403-92	8001-0214

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

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

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

General Purpose Septa

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

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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 id	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% Polyimide/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

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

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

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	25/50/cone tip	36500525	8002-0003		
TriPlus, AS2000	10	Fixed needle	23/80/cone tip	36520061	8002-0002		
TriPlus, AS2000	10	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	100	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

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. All Agilent CrossLab supplies are backed by Agilent's 90-day money-back warranty.

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

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Agilent CrossLab Supplies for CTC GC Autosamplers

Agilent PAL Sampler

Autosampler Syringes for CTC CombiPAL and GC PAL

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	
10	Fixed needle	23/50/cone tip	8010-0351	
	Fixed needle, gas tight	23/50/cone tip	8010-0371	8010-0359**
	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	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

The Right GC Connections Make All the Difference

Agilent Self Tightening column nut

Want to make column connection hassles a thing of the past?

Column connections can loosen after multiple heating cycles, which contributes to high-frequency baseline noise, questionable results, and wasted time spent retightening fittings.

Eliminate retightening once and for all with the *newly redesigned* Agilent Self Tightening column nut

This unique, stainless steel GC column nut delivers a tight connection without expensive upgrades or adaptors. It gives you the advantages of:

- *Reliable performance.* An innovative spring-driven piston continuously presses against the short graphite/polyimide ferrule. So you can maintain a leak-free seal even after hundreds of injections.
- *Better stability.* New locking collar holds your column in place for accurate column depth and ferrule positioning.
- *Less wasted time.* There's no need to retighten after repeated thermal cycles.
- *Ease of use.* Finger-tight design lets anyone in your lab make consistent connections without tools.
- *Faster maintenance.* The low-torque seal prevents ferrules from sticking or crumbling.
- *Lower column bleed.* This maximizes column life.

New easy-lock collar

Quickly lock the column in place and ensure a consistent column length. Measuring and locking the column depth before installation also eliminates the need to open the MS detector port. This reduces the risk of vacuum leaks.

Agilent

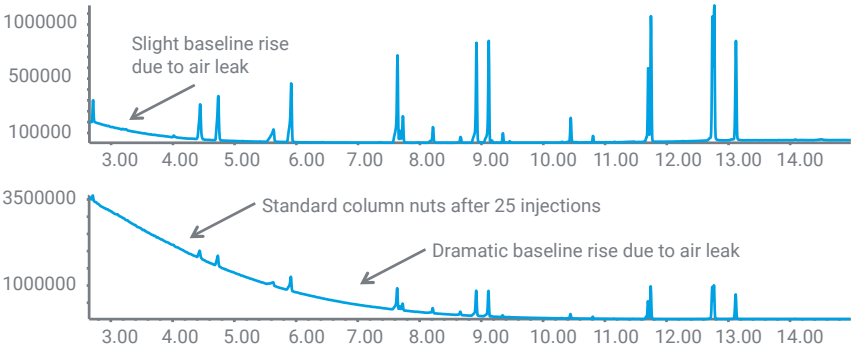
Trusted Answers

Make sure your column connections withstand the test of time

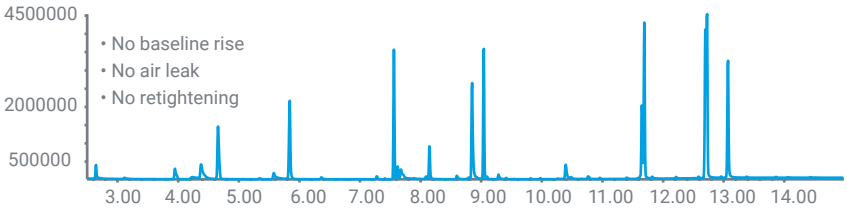
Comparison of standard fittings with Self Tightening column nuts

Even after retightening, air leaks still occurred with the standard fittings. With Agilent Self Tightening column nuts, leaks were not a problem—even after 400 injections.

Standard column nuts after a new fitting

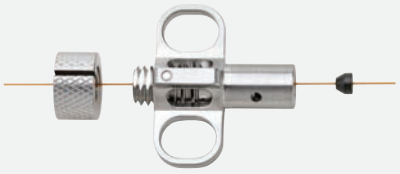


Agilent Self Tightening column nuts after 400 injections



Two configurations available—both use the same short ferrule

Agilent Self Tightening column nut for inlet and detector p/n G3440-81011



Agilent Self Tightening column nut for MS transfer line p/n G3440-81013

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1. Spend more time on what matters. New GC intelligence found in the Agilent Intuvo, 8890, and 8860 GC systems enables self-aware features and remote connectivity.
2. Eliminate laboratory variability—and ensure consistent flow, cleanliness, and recovery—with Agilent sample preparation products.
3. Choose Agilent J&W GC columns for the sharpest peaks, the best inertness, and the tightest column-to-column reproducibility.

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Trusted Answers

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